DISIBEINT ELECTRONIC SL

User's manual

Digital control relay **SVO/SVP**

DISIBEINT ELECTRONIC S.L, has been present in the field of the manufacture of components for the industrial automation for more than 35 years, and maintains in constant evolution their wide range of products structured in five families:

· Sensors, magnetic switches and transducers
· Level relays for liquids and solids
·Timers
· Control, surveillance and logic relays
· Digital control relay

Our permanent preoccupation is to give a suitable answer to the problems that appear in the automation of the different industrial processes, providing the most suitable material for each application.

GUARANTEE

The products provided by DISIBEINT has a guarantee period of two years, against all defect due to the materials or to the manufacture of the equipment. It does not cover the defects caused during the transport or by a bad application, neither the elements subject to wearing down, nor the direct or indirect consequences caused in the installation by the inadequate use of the equipment.

Rev.07/00· 13/02/2024

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MENUS AND SCREENS

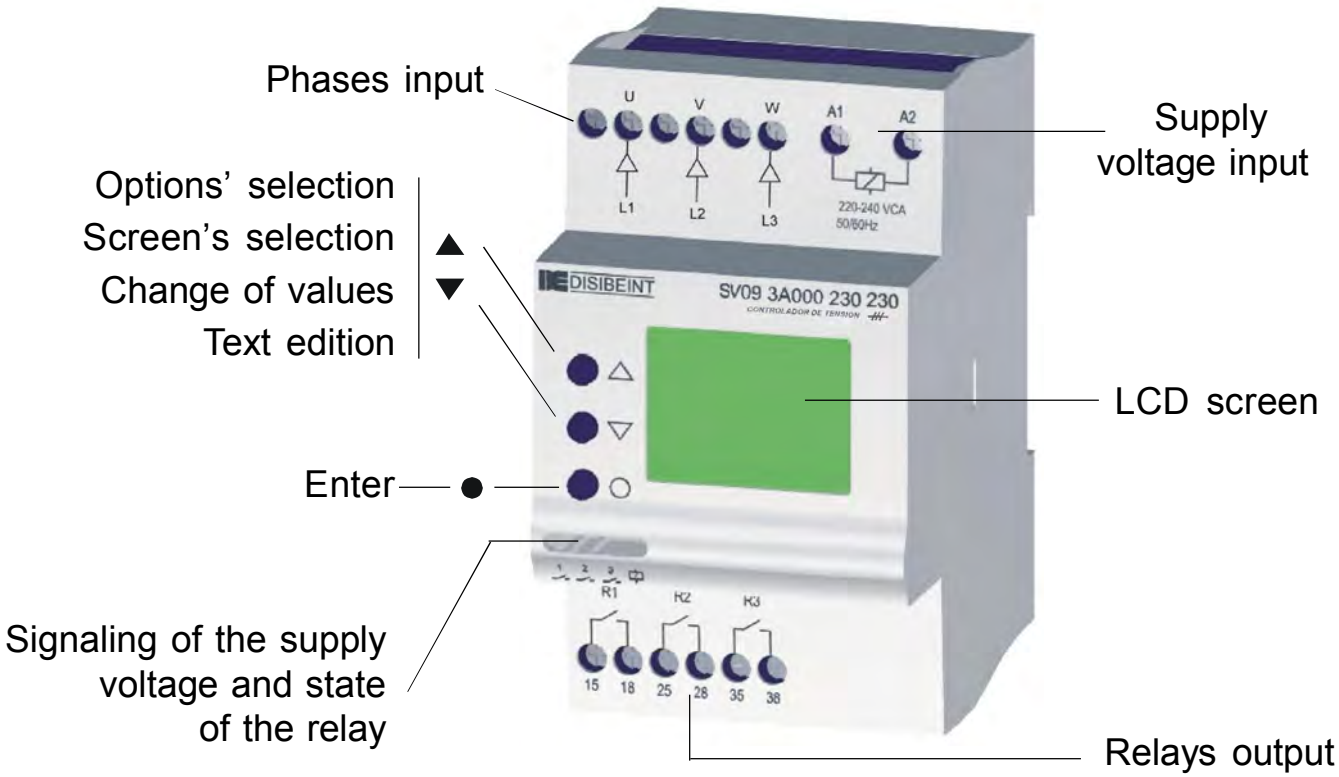
DESCRIPTION OF THE EQUIPMENT

The models SVO and SVP are voltage, phase and frequency monitors for three-phase lines without and with neutral, respectively.

They can control the following parameters:
- Maximum and/or minimum voltage between phases. RMS value.
- Maximum and/or minimum voltage between phase and neutral. RMS value (SVP)
- Phases unbalance.
- Phase-neutral unbalance (SVP).
- Maximum and/or minimum frequency.
- Phases sequence.

The actions derived of the control of the different parameters can be associated to three relays, to 4-20mA loop or to a serial communication RS232 or RS485. One or more parameters can be associated to each one of the available relays.

PARTS OF THE EQUIPMENT

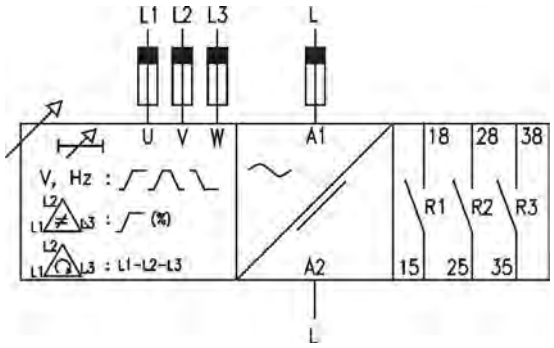
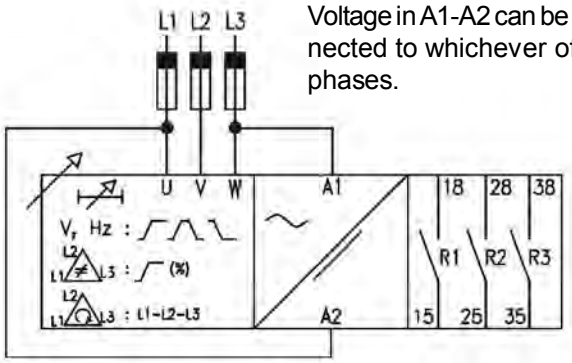


TECHNICAL DATA (1/3)

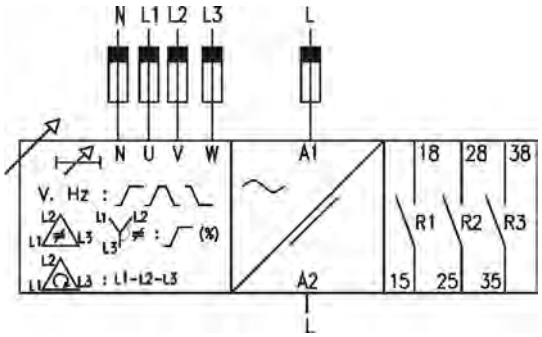
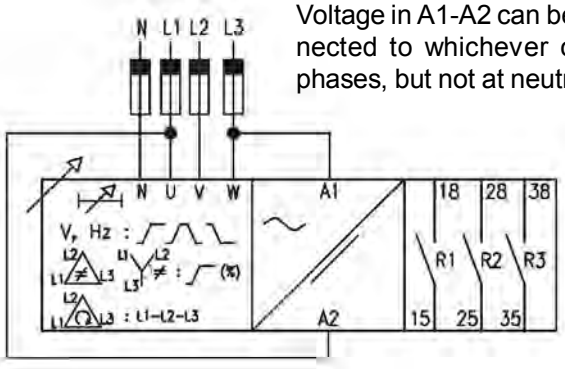
Function	Voltage relay for three-phase lines without (SVO) or with (SVP) neutral. Control of an auxiliary voltage or the own supply voltage.
Working mode	Through user's set up. To each one of the available relays can be assigned the operation by one or more magnitudes, doing it by the first that occurs.
Display of the reading values	By means of the followint status screens: VOLTAGE L1-L3: Voltage between L1 and L3. VOLTAGE L2-L3: Voltage between L2 and L3. VOLTAGE L1-L2: Voltage between L1 and L2. VOLTAGE L1-N: Voltage between L1 and N. (Only SVP) VOLTAGE L2-N: Voltage between L2 and N. (Only SVP) VOLTAGE L3-N: Voltage between L3 and N. (Only SVP) FREQUENCY: Network frequency. ≠ |Li-Lj|: Unbalance between phases. ≠ |Li-LN|: Unbalance between phase and neutral. (Only SVP) PHASES CYCLE: Phases secuence.
Output	- From 1 to 3 independent relays - Analogical 4-20 mA - Communication RS232 - RS485
Detection / Release	In all the magnitudes, the detection and/or release value can be settled, except in phase sequence.
Timer	Associated to a magnitude or a relay. Adjustment to detection and /or release. Several functions.
Repetibility	± 30 ppm
Time ranges	0,01..99,99 s 0,01..99,99 m 0,1..999,9 h
Reading precision	Taken on the measured value.
VAC L1-L3 y L2-L3	A 50Hz: 0,8% · A 60Hz: 1,0% (SVO) A 50Hz: 0,7% · A 60Hz: 0,8% (SVP)
VAC L1-L2	A 50Hz: 0,9% · A 60Hz: 1,1% (SVO) A 50Hz: 0,8% · A 60Hz: 0,9% (SVP)
VAC L3-N	A 50Hz: 0,7% · A 60Hz: 0,6% (SVP)
VAC L1-N and L2-N	A 50Hz: 1,3% · A 60Hz: 1,1% (SVP)
Frequency	0,3 %
4-20mA precision	1% additional to the measured value.
⚠ Caution	Disconnect the three-phase line before or simultaneously than the supply voltage, but never after.

TECHNICAL DATA (2/3)

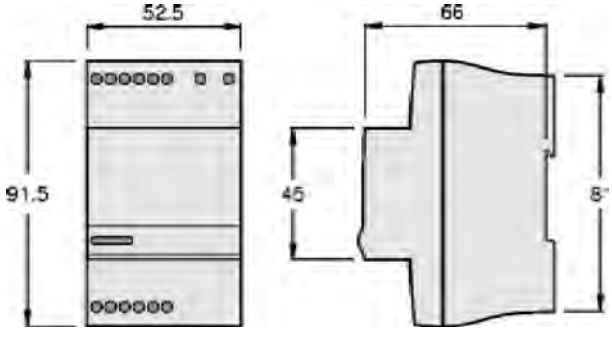
Connection SVO

With auxiliary supply voltage	With own supply voltage
	 Voltage in A1-A2 can be connected to whichever of the phases.

Connection SVP

With auxiliary supply voltage	With own supply voltage
	 Voltage in A1-A2 can be connected to whichever of the phases, but not at neutral.

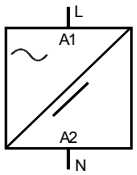
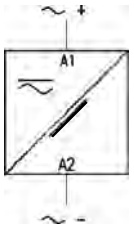
Dimensions



DISIBEINT

TECHNICAL DATA (3/3)

Supply voltage

	AC		AC / DC	
				
Supply voltage code	[024] .. [440]		[903]	[904]
Galvanic isolation	4000 V		2500 V	
Frequency	50Hz	60Hz	-	
Operating margins	±18%		15..70 V	60..240 V
Consumption	2,5 VA		3,5 W	3,1 W
Start-up time	120 ms	110 ms	< 600 ms *	< 200 ms *
Detection time (SVO)	45 ms	40 ms	135 ms	130 ms
Detection time (SVP)	70 ms	60 ms	160 ms	150 ms
Reset	1 net cycle and/or -30% of the nominal voltage		>70 ms* and/or -30% of the nominal voltage	
Indication	Green led			

* In the worth of the cases

Constructive and enviromental data

Voltage phase-neutral	300 V
Overvoltage category	III
Rated impulse voltage	4 kV
Pollution degree	2 (EN61010)
Protection	IP 20
Approximate weight	280 g
Storage temperature	-30..+80ºC
Operating temperature	-20..+50ºC
Humidity	< 95% HR
Housing	Cycoloy - Light grey
Socket	Lexan - Transparent
Leds cover	Technyl - Dark blue
Button, term. block, clip	Brass
Pins of terminal block	0,8 Nm

Dessigned and manufactured under EEC normative.

Directives referred:

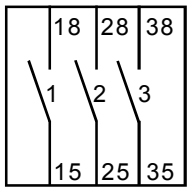
Electromagnetic compatibility: EMC 2004/108/EEC.

Low voltage: LVD 2006/95/EEC.

Hazardous substances: 2011/65/EEC.

Plastics: UL 91 V0.

Output relays



Resistive load	AC	6 A / 240 V
	DC	6 A / 24 V
Inductive load	AC	3 A / 240 V
	DC	3 A / 24 V
Mechanical life		> 10^6 oper.
Mech. switching rate		18.000 oper. / hour
Elect. life at full load		360 oper. / hour
Contact material		AgSnO Alloy
Operating voltage		240 VAC (85 ºC)
Volt. between contacts		1000 VAC
Volt. coil/contact		4000 VAC
Isolation resistance		> 100 MΩ (500 VDC)
Indication		1 red led per relay

CE

CE CONFORMITY DECLARATION
QUALITY CERTIFICATE

The company

DISIBEINT ELECTRONIC S.L.
Segle XX 91
E08032 Barcelona - Spain
CIF. B - 60893849

Declares under its sole responsability that the following products:

- Float Switches with generic references INCR, INMR, INME, INMF
- Level sensors and your accessories, with generic references NS, NR, NCP, NCV, NP, SC, CNM, CNP, CNPR, CNV, SVR, IBT, BPCB, BPCBA, CBBP
- Level Magnetic Switches with generic reference IMN
- Level Magnetic Transducers with generic references TMN, TMR
- Electronic relays embraced under the generic denomination of the series P*nnn*, D*nnn*, S*nnn*, *being 'nnn'* any combination of letters and/or numbers that make up a specific reference

identified with the brand DISIBEINT, have been manufactured according to the instructions of our procedure manual and are in conformity with:

Directive of Electromagnetic Compatibility
EMC 2014/30/UE from 26/02/2014
- Emission (UNE-EN 61000 6-4/2007/A1:2011)
- Immunity (UNE-EN 61000 6-2/2006)

Low Voltage Directive
LVD 2014/35/UE from 26/02/2014
- Machinery (UNE-EN 60204 -1/2007/A1:2009)
- Measuring Electronic Devices (UNE-EN 61010-1/2011)

Directive about certain hazardous sustances
2011/65/UE from 08/06/2011
- Pb, Hg, Cd, Cr +6, PBB, PBDE

Barcelona, June 2018

EMILIO JOLIS OLIVA

CONVENTIONS USED IN THIS MANUAL

References

This manual is usable for the models SVO and SVP. Since certain informations are not valid for both models, in the top row of each page are stated the references of the models explained in that page.

Symbols

	It refers to the information own of the theme that is treated.
	Indicate important warnings to take into account.
	It refers to how the keys must be pressed to perform the actions indicated in the examples.
	General information about the controller or about this manual, too.

Screens

In the pages where is explained how to access to the different screens and menus (page 9), it is shown the way to come to the resolution of every option. This way is highlighted by a dark background of the of the screens related in that option.

The union of several screens by means of a dashed line, means that the option is valid for all of them.

GENERAL CONCEPTS

Loop 4-20 mA (optional): The value sent by the 4-20mA loop can be whichever of the following ones:
- Phase-phase voltage
- Phase-neutral voltage (SVP)
- Phase-phase unbalance
- Phase-neutral unbalance (SVP)
- Frequency

See the page 39 to associate a value to the current loop.

Communication with PC (optional): It is possible to communicate to the controllers SVO and SVP with a computer via the serial port RS232 for its remote programming or to process the data that it generates.For a multiple communication (up to 31 equipments) an RS232-RS485 conversor must be used, reference SBAZ.

Display's illumination: The display remains illuminated while its is accessed to the different screens. If a key is not pressed for longer than 30 seconds, the light turns off. In order to turn the light on, it is enough to press any key once only.

Working mode: After setting up the controller's parameters, it can be back to the normal working mode by executing the option RETURN from the set up menu. The status screens can be also visualized if any key is not pressed for longer than 3 minutes.

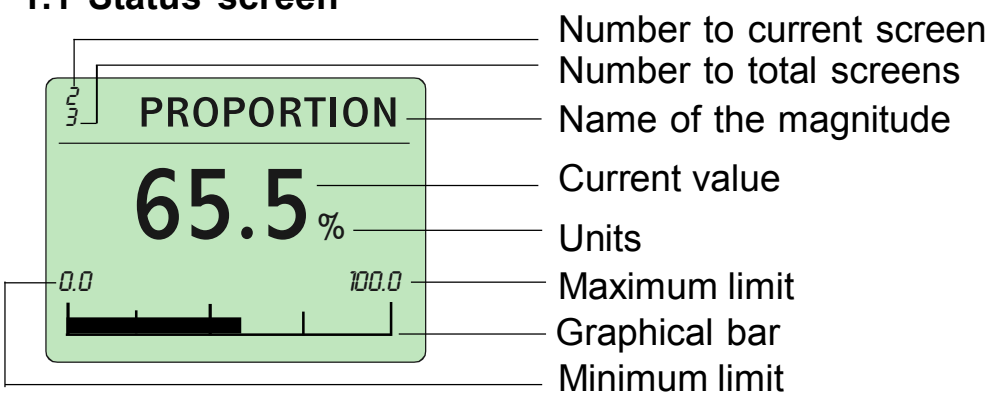
Interactive menus: Only those options that can be configured are accessible in menus, being the rest of the they no visible. This characteristic is interactive, this is, that it's produced automatically in function of the active options at each moment.

Change of values: The screens used to change a numerical value contain the margins between that value can be adjusted. These margins can depend on another options, so that they can visualize different values in function of another previous relations.

Assignation of magnitudes: Each relay can be activated by the control of one or various magnitudes. For exemple, it can be assigned to RELAY 1 the action by maximum voltage and minimum frequency, althongh when the relay is activated, it's not possible to know which magnitude has provoked it.

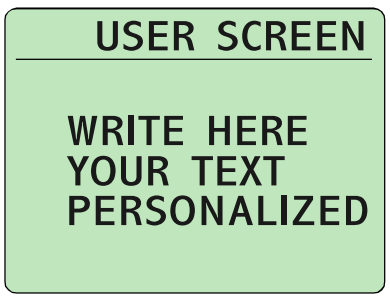
TYPES OF SCREENS (1/5)

1.1 Status screen



The status screens show the actual values of the magnitudes that the equipment controls . In the normal working mode, the equipment shows the status screen that the user has chosen like preferring magnitude of visualization.
In order to move around among the different status screens of status, press ▲▼. By pressing ● from anyone, it is entered to the set up menu.
The default status screen is the one shown when the equipment is powered or when any key is pressed for longer than 3 minutes. To select it, execute the option SEE SCREEN (see page 46).

1.2 User screen



The text edited in the user screen is the one that will be shown next to the status screens when the equipment is i the normal working mode. The characters that can be used are the following:

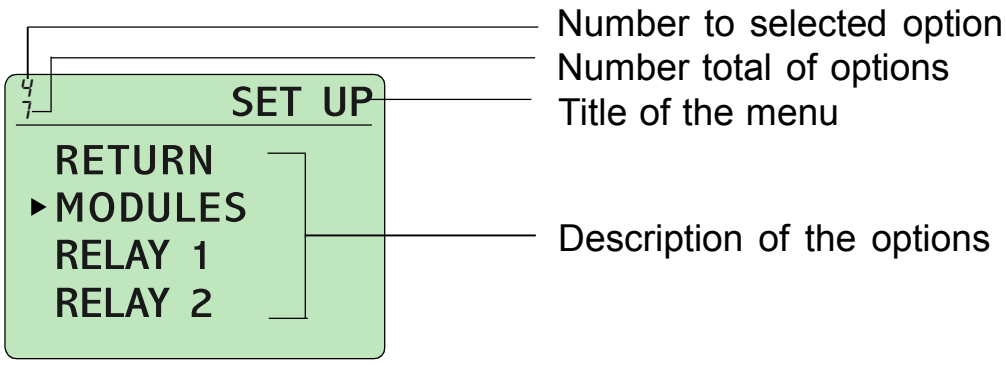
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Å Æ ß Ç Ñ Ø - / # % < = > 0 1 2 3 4 5 6 7 8 9

Pressing ▼ and ▲ the desired character is selected and becomes validated by pressing ●, moving up to the following position of the right hand or to the line below. The repeated pulsation ● of this key provokes the advance of the cursor.

A validated character can not get modified, that means that is not possible to move back. In order to modify a text, is necessary to enter again into the edition screen.
In order to abandon this screen is essential to advance until the last position of the last row.

TYPES OF SCREENS (2/5)

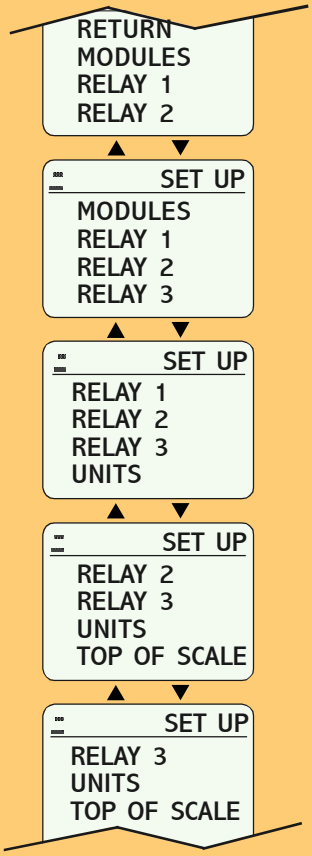
2.1 Screen of options menu



2.2 Selection of options menu

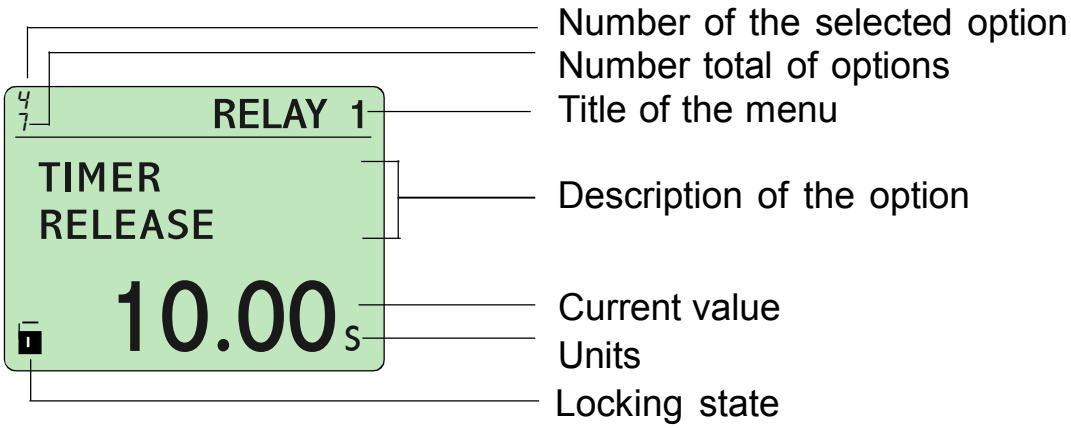
Are those in which a series of options is visualized, line by line. The selection of one option carries to a new menu. The digits placed at the top of the screen indicate, from top to down, the number of the selected option and the total number of options. The options are disposed in an endless loop, in such a way than after the last option it comes to the first one of the series. In the same way, moving back from the first option it comes to the last one of the series.

Press the keys ▲▼ until the cursor indicate the desired value and● to validate it and jump to a new menu. In order to abandon a menu of options and to return the preceding screen, the option RETURN must selected.

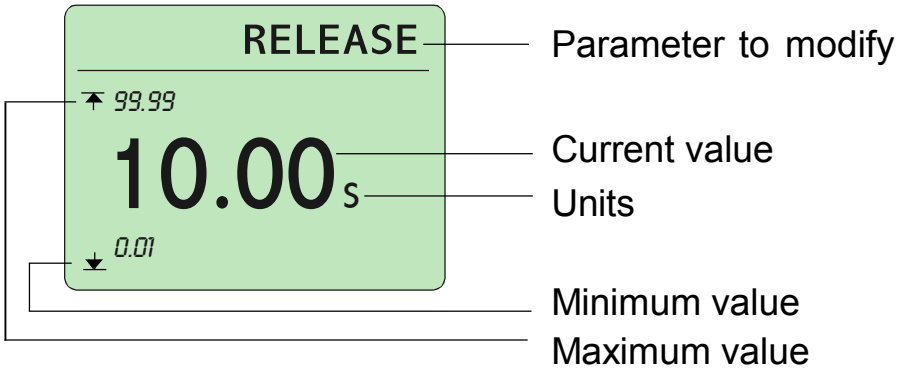


TYPES OF SCREENS (3/5)

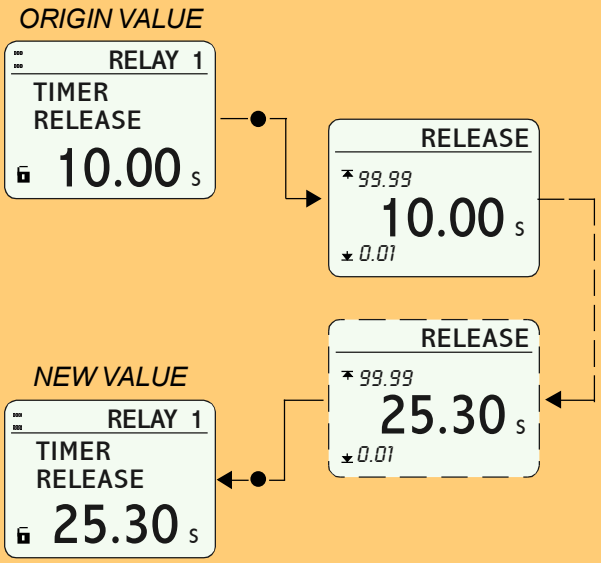
3.1 Informative screen of numerical value



3.2 Screen for changing a numerical value

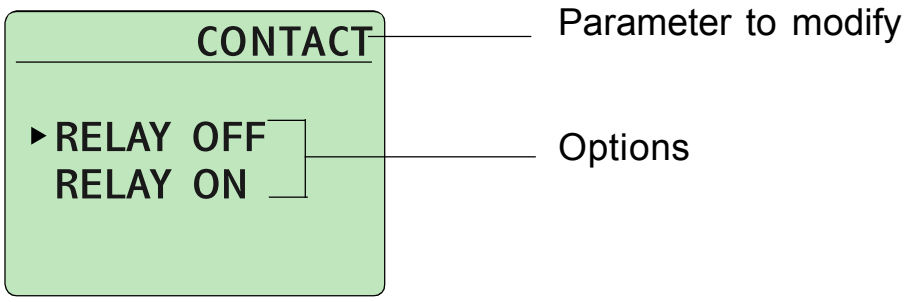


Once placed on the screen that shows the parameter we want to modify its value, press ● in order to access to the screen for changing the value. Since the modification is done digit by digit and not like a complete value, the first digit at left remains blinking. Press ▲ ▼ to modify the value and ● to validate it and to advance to the following digit. When the last digit becomes validated the preceding screen is visualizated again.

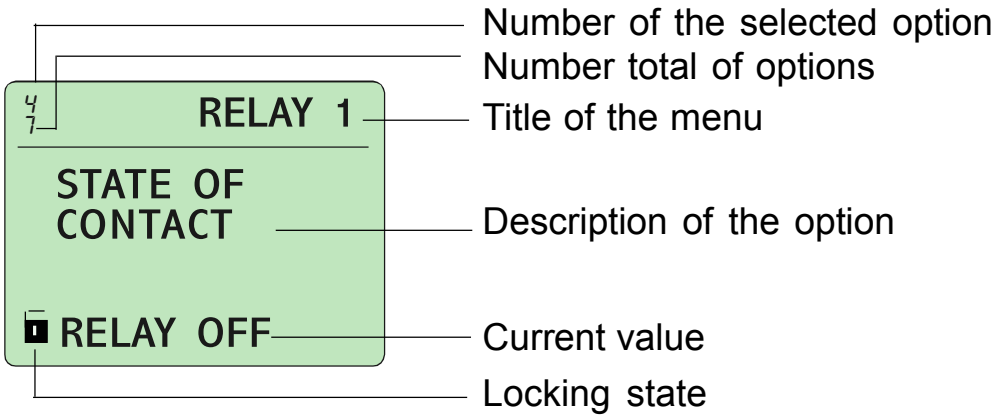


TYPES OF SCREENS (4/5)

4.1 Informative screen of alphanumeric value

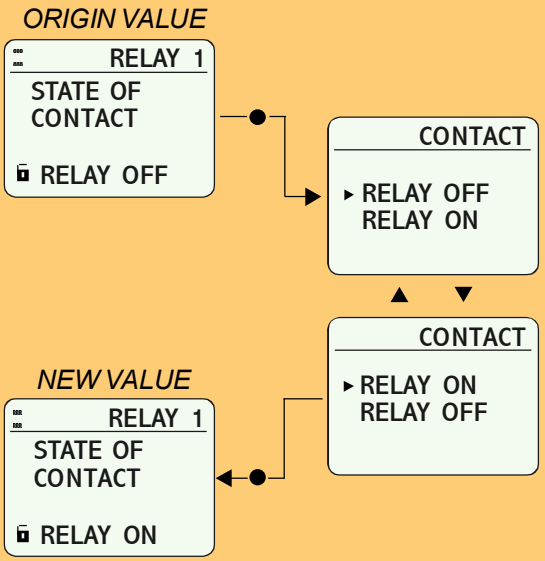


4.2 Screen for changing an alphanumerical value



Once placed on the screen that shows the parameter we want to modify its value, press ● in order to access to the screen for changing the value.

Press ▲ ▼ until the cursor indicates the desuired value and ● to validate it and return to the preceding screen.

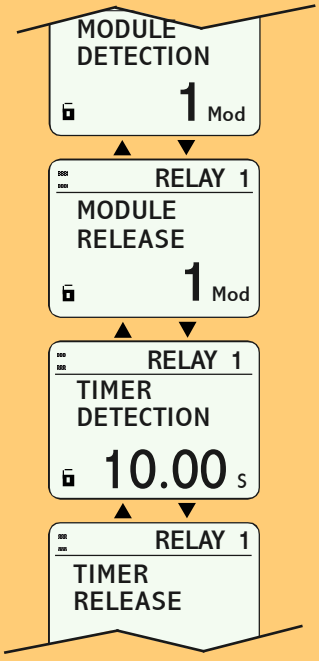


TYPES OF SCREENS (5/5)

5.1 Screens menus

Are those in which is visualized a series of screens, all them related under the same concept. The digits placed at the top of the screen indicate, from top to down, the number of the selected screen and the total number of screens. The screens are disposed in an endless loop, in such a way than after the last screen it comes to the first one of the series. In the same way, moving back from the first screen it comes to the last one of the series.

Each one of the screens usually displays the definition of a parameter and its actual value. Press the keys ▲▼ to move to a new screen and ● to modify the value visualized in it. If no-one value is visualized on the screen, pressing ● it is accessed to a new menu. In order to abandon a screens menu and return to the preceding one, the RETURN screen must be selected.



QUICK START

1 - Keep without voltage the input signal (three-phase line) and the output relay disconnected.

2 - Apply supply voltage to the terminals A1 and A2. Be sure that it be coincident with the value marked in the housing. The green led must be turned on. Now there is not important whether the red leds related with the relays are turned on or off. Because there is not input signal, the status screens display nonreal values, fluctuating constantly.

3 - Set up the parameters that your application needs. Now you can choose two solutions: configure each parameter individually (see Advanced Programming, page 17) or use the «user programs» than, as an example, contains several parameters already configured for some «typical» applications. You will only need to modify those parameters belonging to your particular application. Read carefully the description of these programs and see if they becomes adapted to your needs. (see pages 15..19).
Don't mind if the relays switch on/off while your are setting up the controller: remember that the input signal is not applied.

4 - Switch off the supply voltage.

5 - Apply simultaneously the supply voltage and the three-phase line to be controlled. In the case that both lines can not be connected simultaneously, connect always the supply voltage first than the three-phase line to be controlled. The order of the phases can be checked reading the status screen PHASE CYCLE: the order is correct if the displayed value is "123". On the contrary, change the phases until is displayed such value. Confirm that the state of the relay is the required one by checking the red leds in the front of the housing. You can disconnect one phase or interchange them to check whether the relay detects these situations (in the case that they are associated to any relay).

6 - If everything is right, turn the supply voltage off and connect the output relays according to the conditions of your installation. When the supply voltage is applied again, the controller is ready for normal operation.

USER PROGRAMS (1/5)

User programs are permanent in the controllers SVO and SVP.

In order to modify them, load the program you desire (for example, number 1) into memory by means of the sequence SET UP-OPTIONS-PROGRAM 1. Modify the parameters, values, timers, etc. and do the opportune checkings until everything work correctly.

Bear in mind that the disconnection of the supply voltage does not provoke the loss of data. For your safety, save your changes by means of the sequence SET UP-OPTIONS-SAVE PROG. (see page 43).

Remember than every time that Program 1 is loaded into memory, the default factory parameters will be restored. If the User Program is loaded (SET UP-OPTIONS-PROG USER), you will obtain the parameters that you modified (see page 44).

It is not required to load any user program when the equipment turns on: it is kept the same configuration that was operative the last time that the equipment was turned off.

USER PROGRAMS (2/5)

PROGRAM 1: Control for overvoltage, undervoltage, phases unbalance and phases cycle. It is suposed a three-phase voltage of 230V.

RELAY 1: Control phases cycle.

DEFINITION MODE WORKING	=
STATE OF CONTACT	= ON

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= NON OPERTIVE
V |Li-Lj| MINIMUM	= NON OPERTIVE
≠ MAX |Li-Lj| MAXIMUM	= NON OPERTIVE
FREQUENCY MAXIMUM	= NON OPERTIVE
FREQUENCY MINIMUM	= NON OPERTIVE
PHASES CYCLE	= ACTIVE
DETECTION MODE	= CANCELLED
RELEASE MODE	= CANCELLED

RELAY 2: Control of voltage threshold (overvoltage and undervoltage).

DEFINITION WORKING MODE	=
V |Li-Lj| DETEC / MAX	*= 253 Vac*
V |Li-Lj| RELEASE / MAX	*= 248 Vac*
V |Li-Lj| DETEC / MIN	*= 207 Vac*
V |Li-Lj| RELEASE / MIN	*= 211 Vac*
STATE OF CONTACT	= ON
DETECTION TIMER	*= 0.50 s*
RELEASE TIMER	*= 0.50 s*

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= OPERATIVE
V |Li-Lj| MINIMUM	= OPERATIVE
≠ MAX |Li-Lj| MAXIMUM	= NON OPERATIVE
FREQUENCY MAXIMUM	= NON OPERATIVE
FREQUENCY MINIMUM	= NON OPERATIVE
PHASES CYCLE	= NON OPERATIVE
DETECTION MODE	= DELAYED
TIME RANGE DETECTION	= SECONDS
RELEASE MODE	= DELAYED
TIME RANGE RELEASE	= SECONDS

RELAY 3: Control of phase unbalance.

DEFINITION WORKING MODE	=
≠ |Li-Lj| DETEC / MAX	*= 10.0 %*
≠ |Li-Lj| RELEASE / MAX	*= 5.0 %*
STATE OF CONTACT	= ON
TIMER DETECTION	*= 0.50 s*
TIMER RELEASE	*= 0.50 s*

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= NON OPERATIVE
V |Li-Lj| MINIMUM	= NON OPERATIVE
≠ |Li-Lj| MAXIMUM	= OPERATIVE
FREQUENCY MAXIMUM	= NON OPERATIVE
FREQUENCY MINIMUM	= NON OPERATIVE
PHASES CYCLE	= NON OPERATIVE
DETECTION MODE	= DELAYED
TIME RANGE DETECTION	= SECONDS
RELEASE MODE	= DELAYED
TIME RANGE RELEASE	= SECONDS

NOTE: Options in italics are only available according to the ones selected in DEFINITION WORKING MODE.

USER PROGRAMS (3/5)

PROGRAM 2: Control for overvoltage, undervoltage, phases unbalance, phases cycle and frequency. It is suposed a three-phase voltage of 230V.

RELAY 1: Control of phases cycle.

DEFINITION WORKING MODE	=
STATE OF CONTACT	= ON

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= NON OPERATIVE
V |Li-Lj| MINIMUM	= NON OPERATIVE
≠ |Li-Lj| MAXIMUM	= NON OPERATIVE
FREQUENCY MAXIMUM	= NON OPERATIVE
FREQUENCY MINIMUM	= NON OPERATIVE
CYCLE PHASES	= OPERATIVE
DETECTION MODE	= CANCELLED
RELEASE MODE	= CANCELLED

RELAY 2: Control of voltage threshold (overvoltage, undervoltage and unbalance).

DEFINITION WORKING MODE	=
V |Li-Lj| DETEC / MAX	*= 253 Vac*
V |Li-Lj| RELEASE / MAX	*= 248 Vac*
V |Li-Lj| DETEC / MIN	*= 207 Vac*
V |Li-Lj| RELEASE / MIN	*= 211 Vac*
≠ |Li-Lj| DETEC / MAX	*= 10.0 %*
≠ |Li-Lj| RELEASE / MAX	*= 5.0 %*
STATE OF CONTACT	= ON
TIMER DETECTION	*= 0.50 s*
TIMER RELEASE	*= 0.50 s*

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= OPERATIVE
V |Li-Lj| MINIMUM	= OPERATIVE
≠ MAX |Li-Lj| MAXIMUM	= OPERATIVE
FRECUENCY MAXIMUM	= NON OPERATIVE
FRECUENCY MINIMUM	= NON OPERATIVE
CYCLE PHASES	= NON OPERATIVE
MODE DETECTION	= DELAYED
TIME RANGE DETECTION	= SECONDS
RELEASE MODE	= DELAYED
TIME RANGE RELEASE	= SECONDS

RELAY 3: Control of the frequency

DEFINITION WORKING MODE	=
FREQUENCY DETEC / MAX	*= 52.0 Hz*
FREQUENCY RELEASE / MAX	*= 51.0 Hz*
FREQUENCY DETEC / MIN	*= 48.0 Hz*
FREQUENCY RELEASE / MIN	*= 49.0 Hz*
STATE OF CONTACT	= ON
TIMER DETECTION	*= 0.50 s*
TIMER RELEASE	*= 0.50 s*

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= NON OPERATIVE
V |Li-Lj| MINIMUM	= NON OPERATIVE
≠ |Li-Lj| MAXIMUM	= NON OPERATIVE
FREQUENCY MAXIMUM	= OPERATIVE
FREQUENCY MINIMUM	= OPERATIVE
PHASES CYCLE	= NON OPERATIVE
MODE DETECTION	= DELAYED
TIME RANGE DETECTION	= SECONDS
RELEASE MODE	= DELAYED
TIME RANGE RELEASE	= SECONDS

NOTE: Options in italics are only available according to the ones selected in DEFINITION WORKING MODE.

USER PROGRAMS (4/5)

PROGRAM 1: Control for overvoltage, undervoltage, phases unbalance and phases cycle. It is suposed a three-phase voltage of 400V.

RELAY 1: Detection of the phase sequence.

DEFINITION WORKING MODE	=
STATE OF CONTACT	= ON

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= NON OPERATIVE
V |Li-Lj| MINIMUM	= NON OPERATIVE
V |Li-LN| MAXIMUM	= NON OPERATIVE
V |Li-LN| MINIMUM	= NON OPERATIVE
≠ MAX |Li-Lj| MAXIMUM	= NON OPERATIVE
≠ MAX |Li-LN| MAXIMUM	= NON OPERATIVE
FRECUENCIA MAXIMUM	= NON OPERATIVE
FRECUENCIA MINIMUM	= NON OPERATIVE
PHASE CYCLE	= OPERATIVE
DETECTION MODE	= INSTANTANEOUS
RELEASE MODE	= INSTANTANEOUS

RELAY 2: Detection of the voltage

DEFINITION WORKING MODE	=
V |Li-Lj| DETEC / MAX	= 460 Vac
V |Li-Lj| RELEASE / MAX	= 440 Vac
V |Li-Lj| DETEC / MIN	= 340 Vac
V |Li-Lj| RELEASE / MIN	= 360 Vac
V |Li-LN| DETEC / MAX	= 264 Vac
V |Li-LN| RELEASE / MAX	= 253 Vac
V |Li-LN| DETEC / MIN	= 195 Vac
V |Li-LN| RELEASE / MIN	= 207 Vac
STATE OF CONTACT	= ON
DETECTION TIMER	= 0.5 s
TIMER RELEASE	= 0.5 s

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= OPERATIVE
V |Li-Lj| MINIMUM	= OPERATIVE
V |Li-LN| MAXIMUM	= OPERATIVE
V |Li-LN| MINIMUM	= OPERATIVE
≠ MAX |Li-Lj| MAXIMUM	= NON OPERATIVE
≠ MAX |Li-LN| MAXIMUM	= NON OPERATIVE
MAXIMUM FREQUENCY	= NON OPERATIVE
MINIMUM FREQUENCY	= NON OPERATIVE
PHASES CYCLE	= NON OPERATIVE
DETECTION MODE	= DELAYED
TIME RANGE DETECTION	= SECONDS
RELEASE MODE	= DELAYED
TIME RANGE RELEASE	= SECONDS

RELAY 3: Detection of the unbalance

DEFINITION WORKING MODE	=
≠ |Li-Lj| MAX DETEC / MAX	= 10.0 %
≠ |Li-Lj| MAX RELEASE / MAX	= 5.0 %
STATE OF CONTACT	= ON
≠ |Li-N| MAX DETEC / MAX	= 10.0 %
≠ |Li-N| MAX RELEASE / MAX	= 5.0 %
DETECTION TIMER	= 0.5 s
TIMER RELEASE	= 0.5 s

NOTE: Options in italics are only available according to the ones selected in DEFINITION WORKING MODE.

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= NON OPERATIVE
V |Li-Lj| MINIMUM	= NON OPERATIVE
V |Li-LN| MAXIMUM	= NON OPERATIVE
V |Li-LN| MINIMUM	= NON OPERATIVE
≠ |Li-Lj| MAXIMUM	= OPERATIVE
≠ |Li-LN| MAXIMUM	= OPERATIVE
FRECUENCIA MAXIMUM	= NON OPERATIVE
FRECUENCIA MINIMUM	= NON OPERATIVE
PHASE CYCLE	= NON OPERATIVE
DETECTION MODE	= DELAYED
TIME RANGE DETECTION	= SECONDS
RELEASE MODE	= DELAYED
TIME RANGE RELEASE	= SECONDS

USER PROGRAMS (5/5)

PROGRAM 2: Control for overvoltage, undervoltage, phases unbalance, phases cycle and frequency. It is suposed a three-phase voltage of 400V.

RELAY 1: Detection of the phase sequence.

DEFINITION MODE WORKING	=
STATE OF CONTACT	= ON

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= NON OPERATIVE
V |Li-Lj| MINIMUM	= NON OPERATIVE
V |Li-LN| MAXIMUM	= NON OPERATIVE
V |Li-LN| MINIMUM	= NON OPERATIVE
≠ MAX |Li-Lj| MAXIMUM	= NON OPERATIVE
≠ MAX |Li-LN| MAXIMUM	= NON OPERATIVE
FREQUENCY MAXIMUM	= NON OPERATIVE
FREQUENCY MINIMUM	= NON OPERATIVE
PHASES CYCLE	= OPERATIVE
DETECTION MODE	= INSTANTANEOUS
RELEASE MODE	= INSTANTANEOUS

RELAY 2: Detection of the voltage and the unbalance.

DEFINITION WORKING MODE	=
V |Li-Lj| DETEC / MAX	*= 460 Vac*
V |Li-Lj| RELEASE / MAX	*= 440 Vac*
V |Li-Lj| DETEC / MIN	*= 340 Vac*
V |Li-Lj| RELEASE / MIN	*= 360 Vca*
V |Li-LN| DETEC / MAX	*= 264 Vac*
V |Li-LN| RELEASE / MAX	*= 253 Vac*
V |Li-LN| DETEC / MIN	*= 195 Vac*
V |Li-LN| RELEASE / MIN	*= 207Vac*
≠ |Li-Lj| MAX DETEC / MAX	*= 10.0 %*
≠ |Li-Lj| MAX RELEASE / MAX	*= 5.0 %*
STATE OF CONTACT	*= 10.0 %*
≠ |Li-N| MAX DETEC / MAX	*= 5.0 %*
≠ |Li-N| MAX RELEASE / MAX	= ON
TIMER DETECTION	*= 0.50 s*
TIMER RELEASE	*= 0.50 s*

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= OPERATIVE
V |Li-Lj| MINIMUM	= OPERATIVE
V |Li-LN| MAXIMUM	= OPERATIVE
V |Li-LN| MINIMUM	= OPERATIVE
≠ MAX |Li-Lj| MAXIMUM	= NON OPERATIVE
≠ MAX |Li-LN| MAXIMUM	= NON OPERATIVE
FREQUENCY MAXIMUM	= NON OPERATIVE
FREQUENCY MINIMUM	= NON OPERATIVE
PHASES CYCLE	= NON OPERATIVE
DETECTION MODE	= DELAYED
TIME RANGE DETECTION	= SECONDS
RELEASE MODE	= DELAYED
TIME RANGE RELEASE	= SECONDS

RELAY 3: Detection of the frequency.

DEFINITION WORKING MODE	=
FREQUENCY DETEC / MAX	*= 52.0 Hz*
FREQUENCY RELEASE / MAX	*= 51.0 Hz*
FREQUENCY DETEC / MIN	*= 48.0 Hz*
FREQUENCY RELEASE / MIN	*= 49.0 Hz*
STATE OF CONTACT	= ON
TIMER DETECTION	= 0.50 s
TIMER RELEASE	= 0.50 s

ALARM STATE	= OFF
V |Li-Lj| MAXIMUM	= NON OPERATIVE
V |Li-Lj| MINIMUM	= NON OPERATIVE
V |Li-LN| MAXIMUM	= NON OPERATIVE
V |Li-LN| MINIMUM	= NON OPERATIVE
≠ |Li-Lj| MAXIMUM	= NON OPERATIVE
≠ |Li-LN| MAXIMUM	= NON OPERATIVE
FRECUENCIA MAXIMUM	= OPERATIVE
FRECUENCIA MINIMUM	= OPERATIVE
PHASES CYCLE	= NON OPERATIVE
DETECTION MODE	= DELAYED
TIME RANGE DETECTION	= SECONDS
RELEASE MODE	= DELAYED
TIME RANGE RELEASE	= SECONDS

NOTE: Options in italics are only available according to the ones selected in DEFINITION WORKING MODE.

ADVANCED PROGRAMMING

If you want to program by your own the controllers SVO or SVP, it is not necessary to load any program. Set the parameters showed in the screens that appear when putting the equipment on for the first time. Follow the steps below before beginning to program:

1 - Determine what action will make each relay (Ex.: relay 1 to control the overvoltage, relay 2 to control the phases cycle, …). Bear in mind the following characteristics:

    1.1 - Different relays can control relés the same magnitude (Ex.: To set up two set points for a minimum voltage, active the detection by minimum voltage for the relays 1 and 2, and set a different value to each one of them).

    1.2 - Diferent magnitudes can be associated to the same relay.

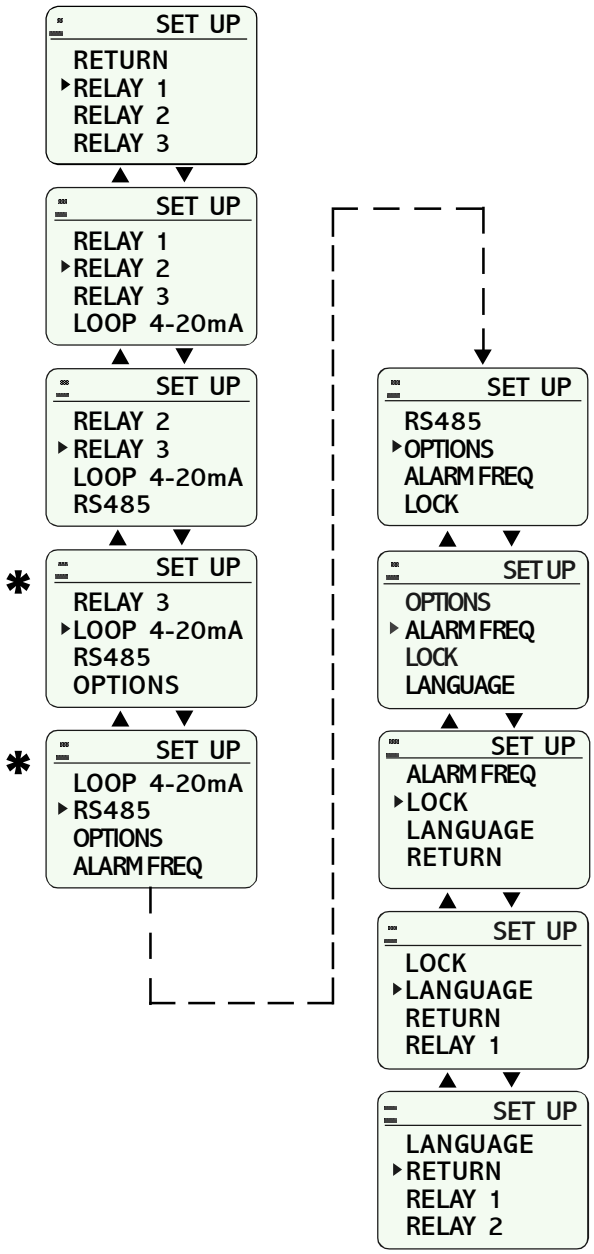
2 - Determine what actions will have timing (Ex.: 3 seconds when detecting overvoltage, 5 seconds if the phases are unbalanced, …).

3 - Begin to program. Remember that certain options will be available according to which are settled in other previous options. Enter to the menu SET UP and select RELAY 1. Look for the screen DEFINITION WORKING MODE and select it. Active and deactive the options of the screens of this menu according to your previous planning. If you want to add timing to the detection or to the release, set the screens MODE DETECTION or MODE RELEASE like DELAYED, respectively. In the following screen you will be able to set the time units. Select the screen RETURN to return to the previous menu and program the rest of the options that you have actived for RELAY 1.

4 - Proceed in the same way for the rest of relays, in case that you are going to use them.

5 - Consult the following pages to know the rest of programming possibilities offered by the controllers SVO and SVP.

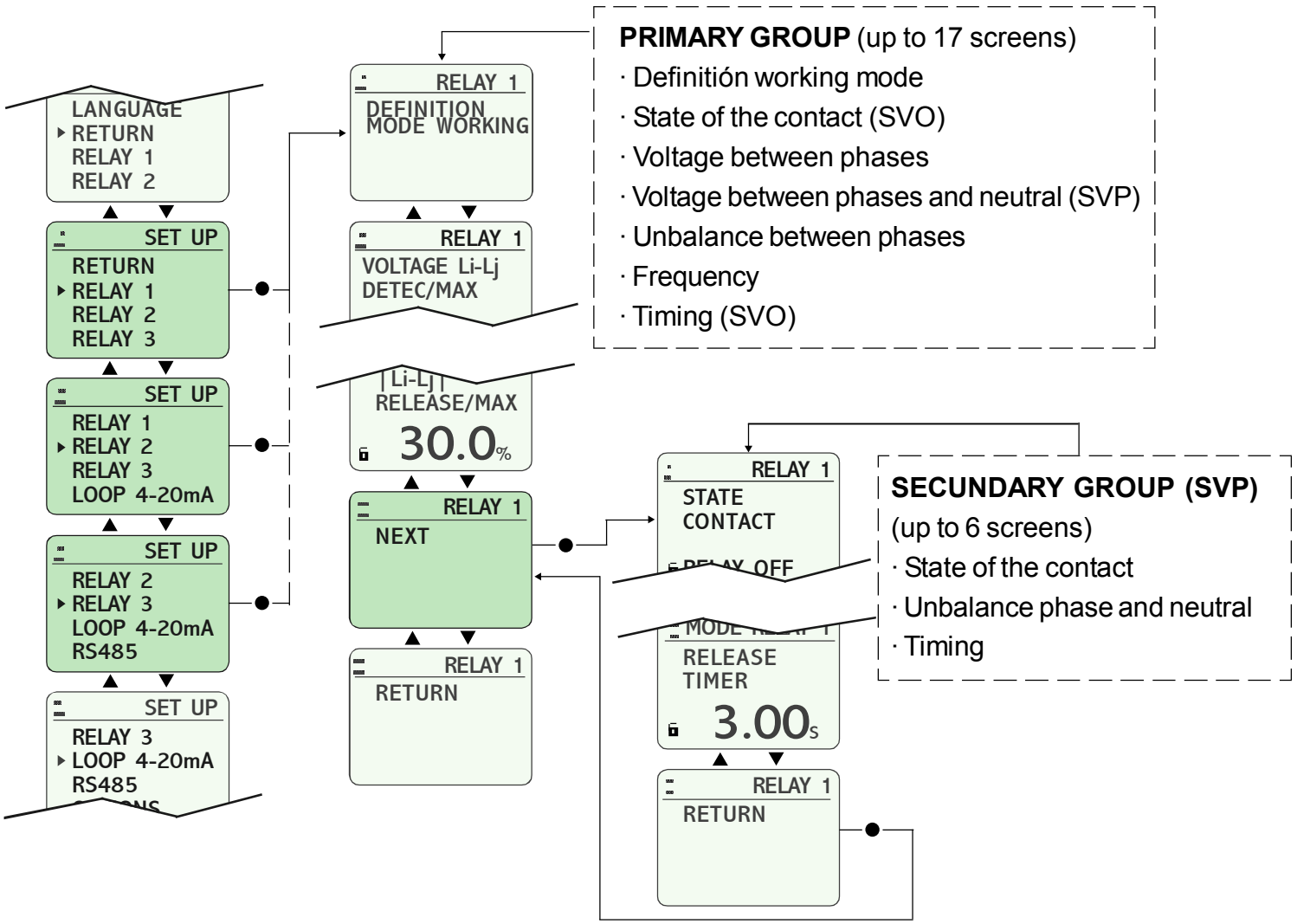
SET UP MENU



Is the main menu from which is possible to set up all the parameters involved in the equipment. It is accessed from the status screens when pressing the button ●. It is also possible to arrive here by chosing the succesives options RETURN included in whichever of the rest of menus or screens.

* These options depend on the selected equipment, it means that they cannot be available in the one you have.

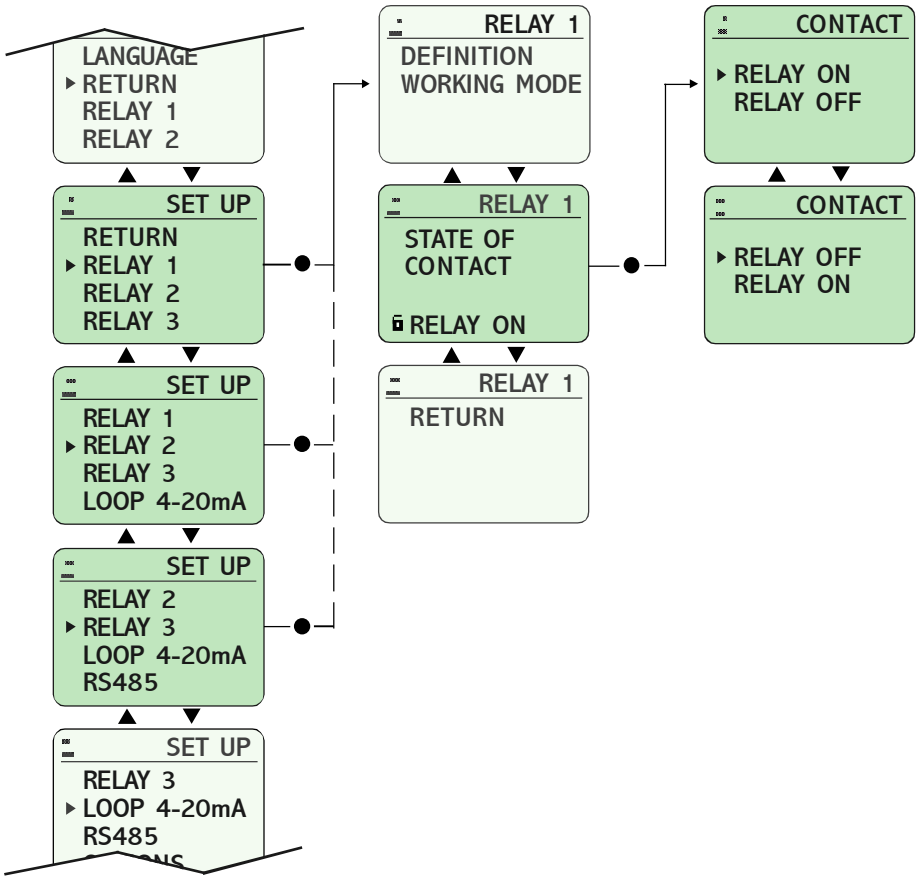
RELAY MENU



The informations existing in this page and in the following ones are refered to the set up of RELAY 1 and are also extensive to RELAY 2 and RELAY 3, being necessary to set up the parameters of each relay independently.

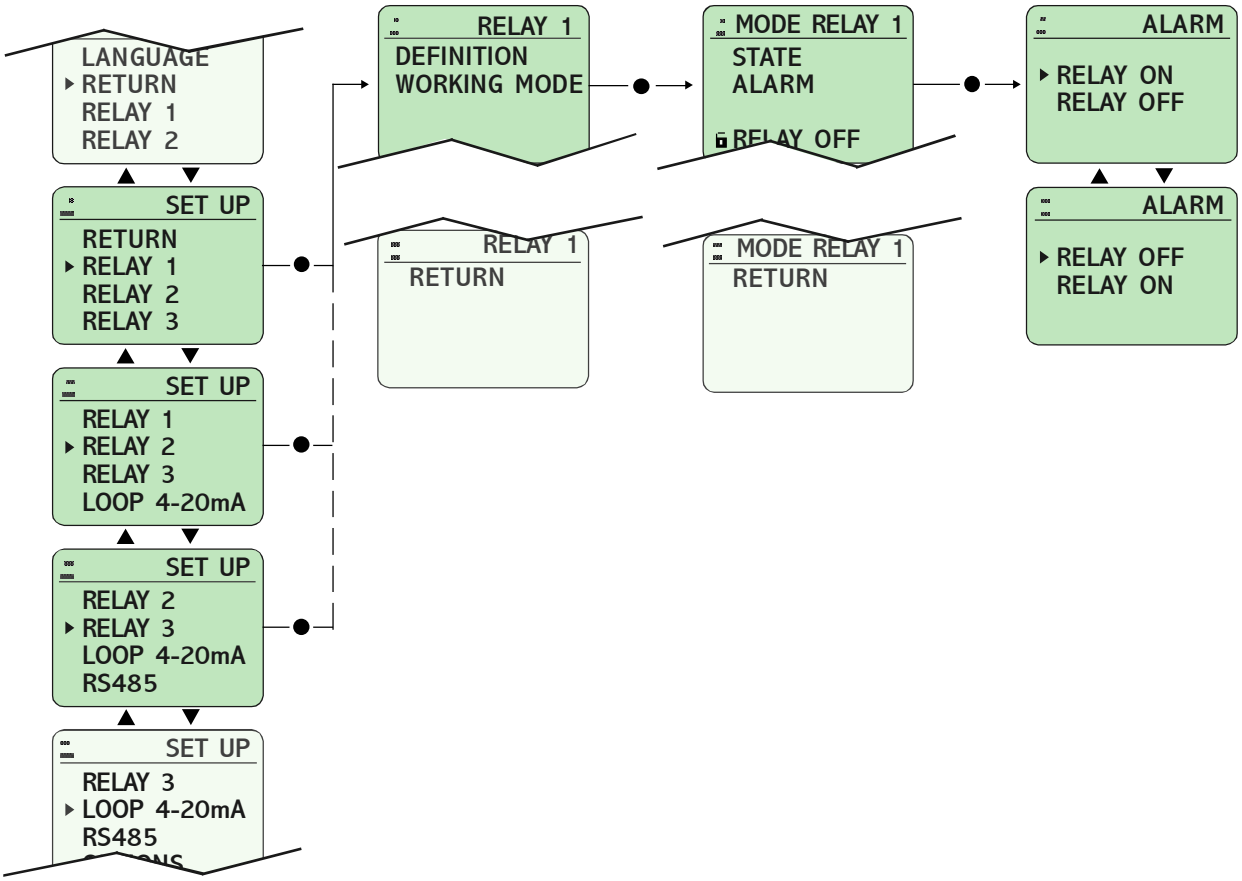
Due to the large number of screens that can appear in the menus for RELAY 1, RELAY 2 and RELAY 3, and also y due to a certain technical limitations these menus are separeted into two groups of screens.
The link is done by means of the screen NEXT, placed at the end of the primary group and you can came back to this level by means of the screen RETURN in the secondary group.
In order to facilitate the comprehension in the pages where those relays menus are explained, this characteristic has been removed and the screens appear in a correlative way.

STATE OF THE RELAY CONTACTS



The state of the relay (OFF/ON) indicates the position of the contacts of the relay when the controller is turned on. The state of the contact of the relay must be set up according to the required operation you need to perform.

STATE OF THE RELAY IN ALARM MODE



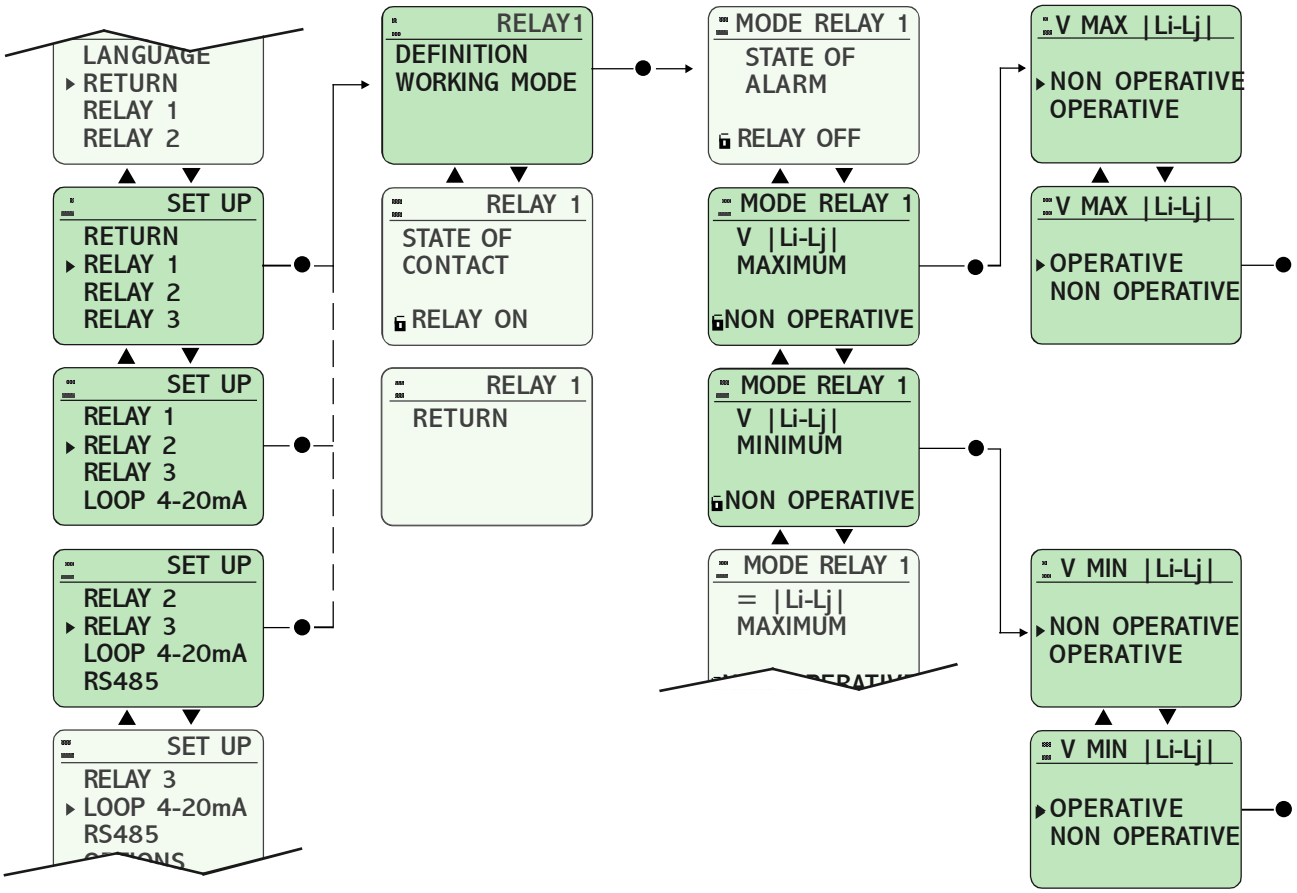
The “alarm mode” is that which is produced in some of the following circunstances:

- An error in the internal memory or in some other component has occurred, affecting to the normal operation of the controller.

- The frequency varies in such a magnitude that the controller loose the precision for the normal operation (see Technical Data at page 3). This situation will only set the relay in the alarm state when it has any volatge parameter activated and the option ‘Frequency deviation alarm’ be activated (see page 51).

Because the controller would remain with a wrong information, by means of this option can be set up the state of the contacts of the relay when this situation is produced.

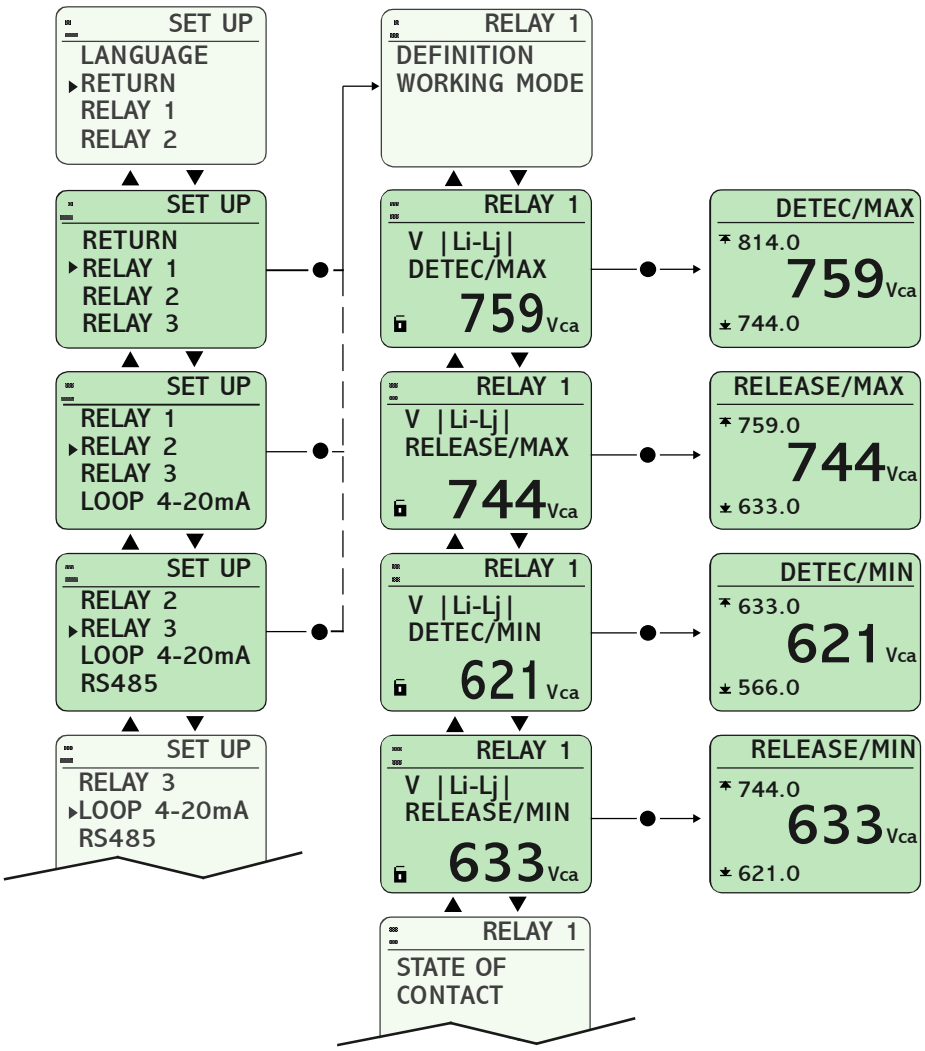
MAX. AND/OR MIN. VOLTAGE BETWEEN PHASES (1/2)

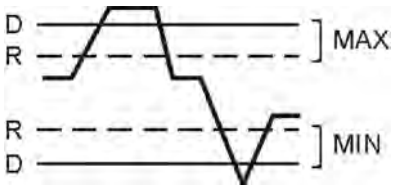


Activation

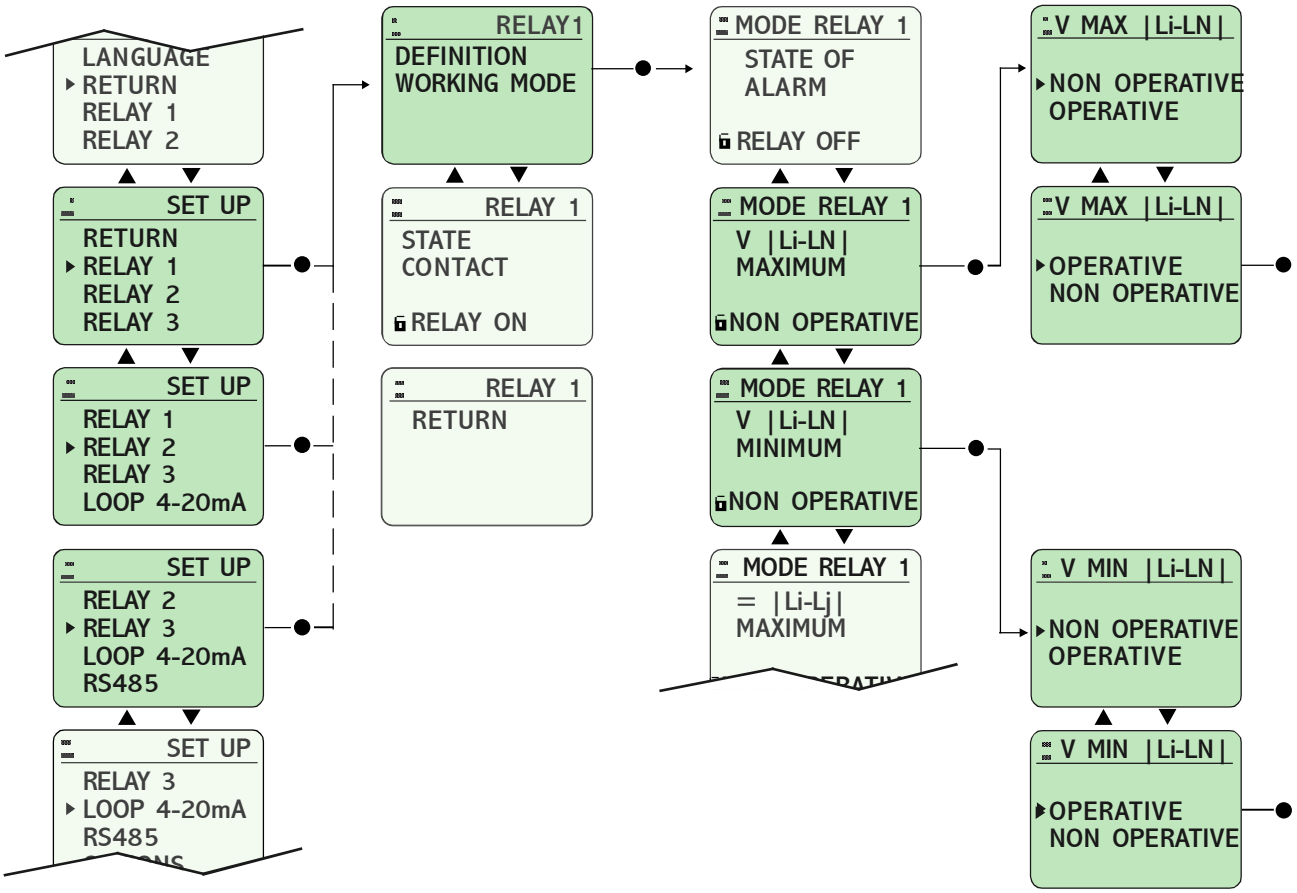
To make the relay operates when the controller detects a determinate maximum and/or minimum voltage between phases, set this option as OPERATIVE.

MAXIMUM AND/OR MINIMUM VOLTAGE BETWEEN PHASES (2/2)



Previous conditions	V |Li-N| MAXIMUM = **[** OPERATIVE **]** V |Li-N| MINIMUM = **[** OPERATIVE **]**
Adjustment	It allows to set the value (VAC) for the detection and/or the release of the maximum and/or minimum voltage between each ones of the phases. When setting the working values for Maximum, the release value must be lower than the detection value. When setting the working values for Minimum, the release value must be higher than the detection value. 

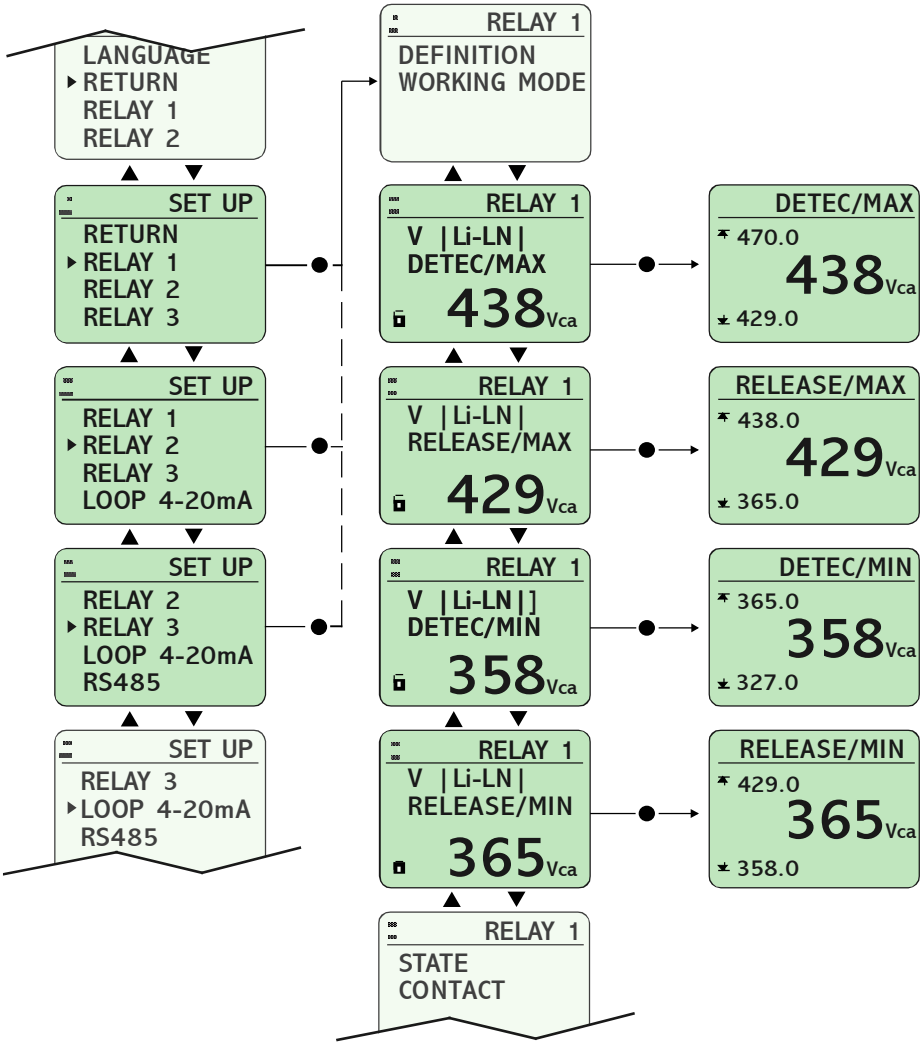
MAX. AND/OR MIN. VOLTAGE BETWEEN PHASE AND NEUTRAL (1/2)



Activation

To make the relay operates when the controller detects a determinate maximum and/or minimum voltage between phase and neutral, set this option as OPERATIVE.

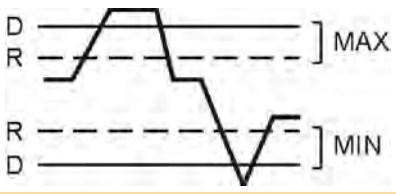
MAX. AND/OR MIN. VOLTAGE BETWEEN PHASE AND NEUTRAL (2/2)



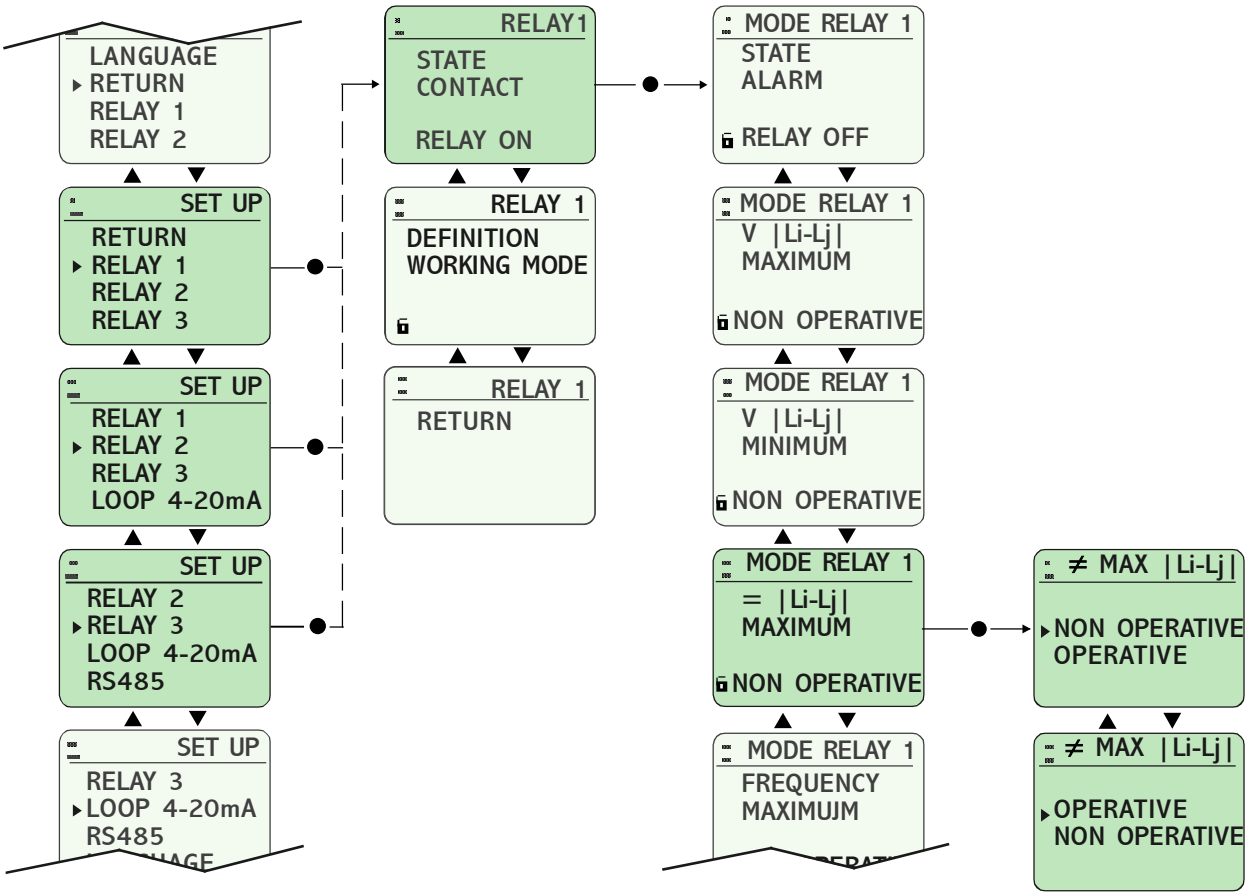
Previous conditions	V |Li-N| MAXIMUM = **[** OPERATIVE **]** V |Li-N| MINIMUM = **[** OPERATIVE **]**

Adjustement

It allows to set the value (VAC) for the detection and/or the release of the maximum and/or minimum voltage between each one of the phases and the neutral.
When setting the working values for Maximum, the release value must be lower than the detection value.
When setting the working values for Minimum, the release value must be higher than the detection value.



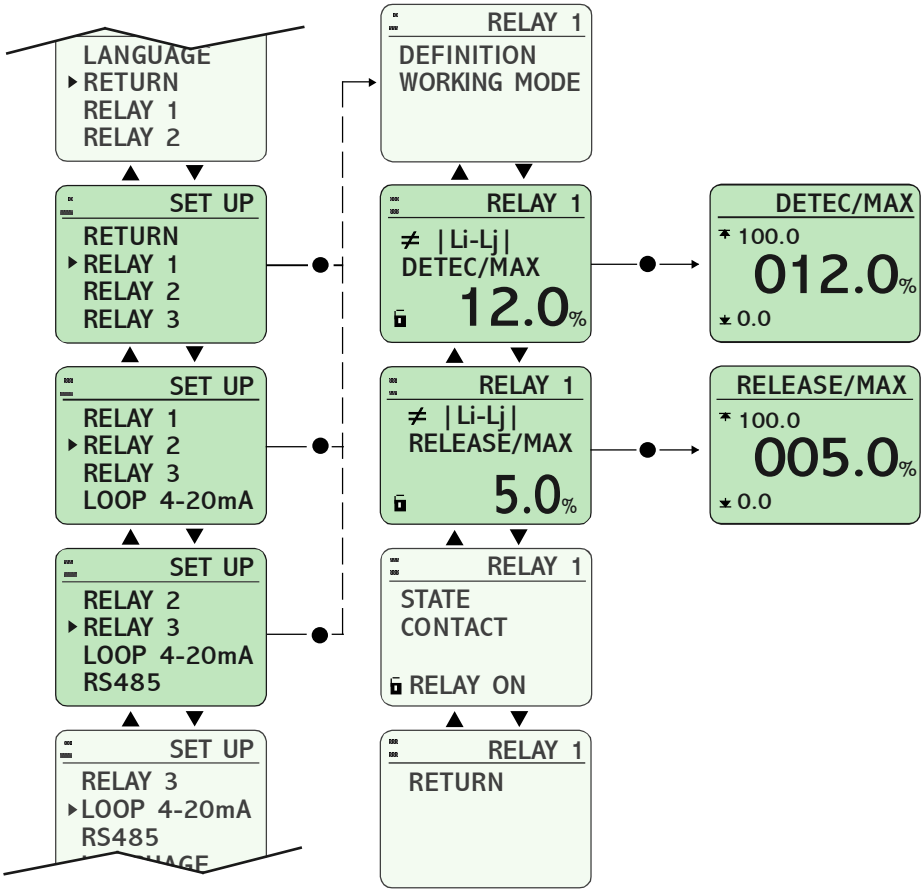
MAXIMUM UNBALANCE BETWEEN PHASES (1/2)



Activation

To make the relay operates when the maximum voltage between phases be unbalanced in a determinate percentage, set this option as OPERATIVE.

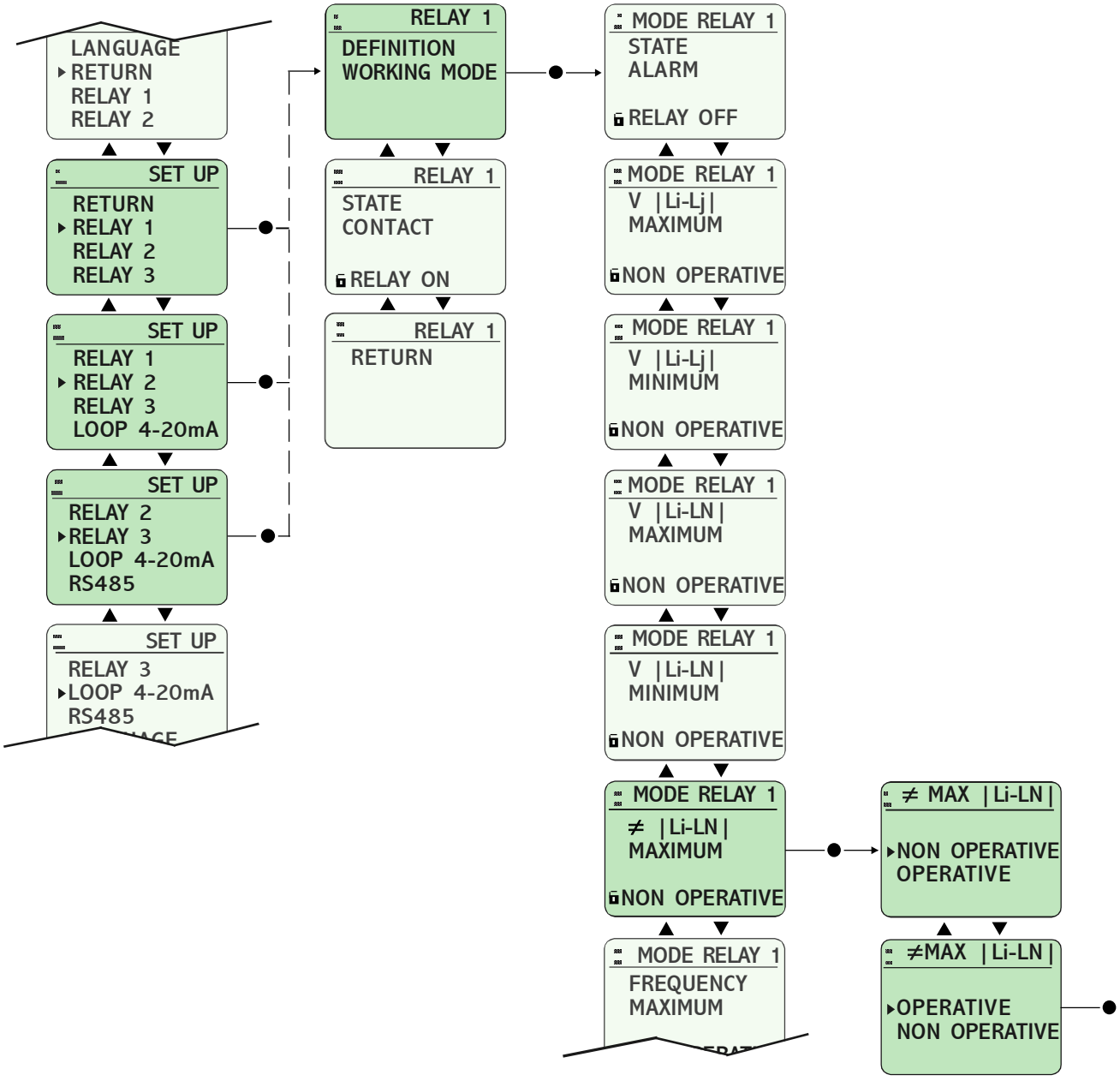
MAXIMUM UNBALANCE BETWEEN PHASES (2/2)



Previous conditions	≠ |Li - Lj| MAXIMUM = **[** OPERATIVE **]**

Adjustment	It allows to set the percentage value for the detection and/ or the release of the max. unbalance between phases. The release value must be always lower than the detection value.

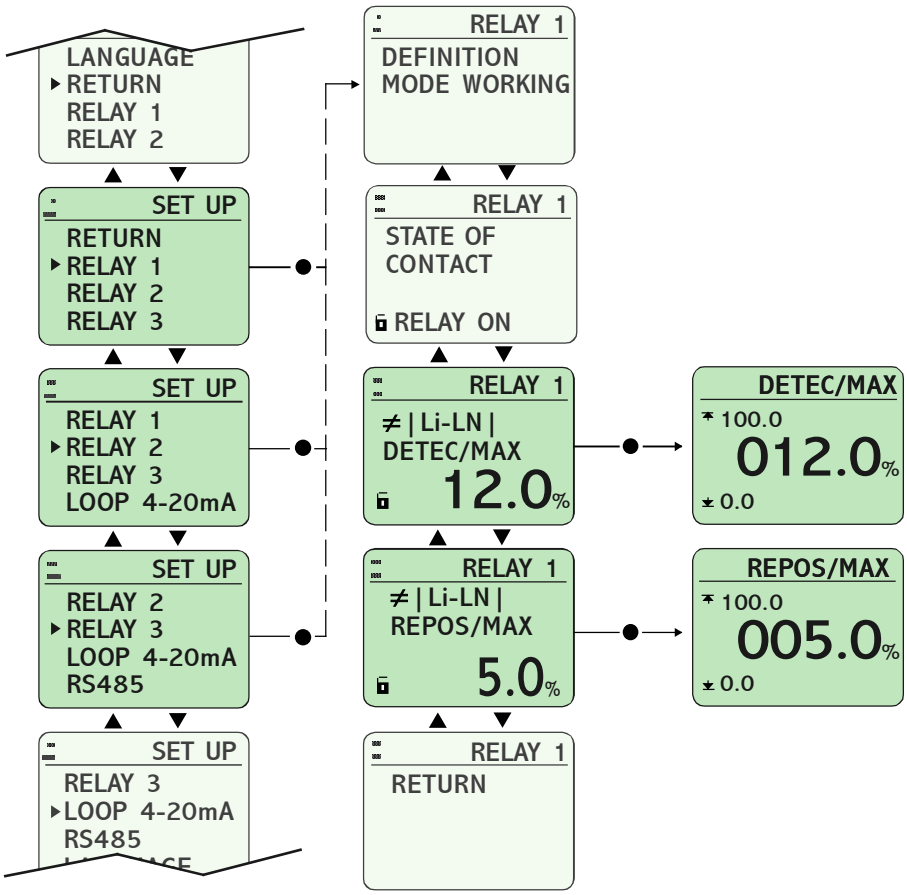
MAXIMUM UNBALANCE BETWEEN PHASE AND NEUTRAL (1/2)



Activation

To make the relay operates when the maximum voltage between one phase and the neutral be unbalanced in a determinate percentage, set this option as OPERATIVE.

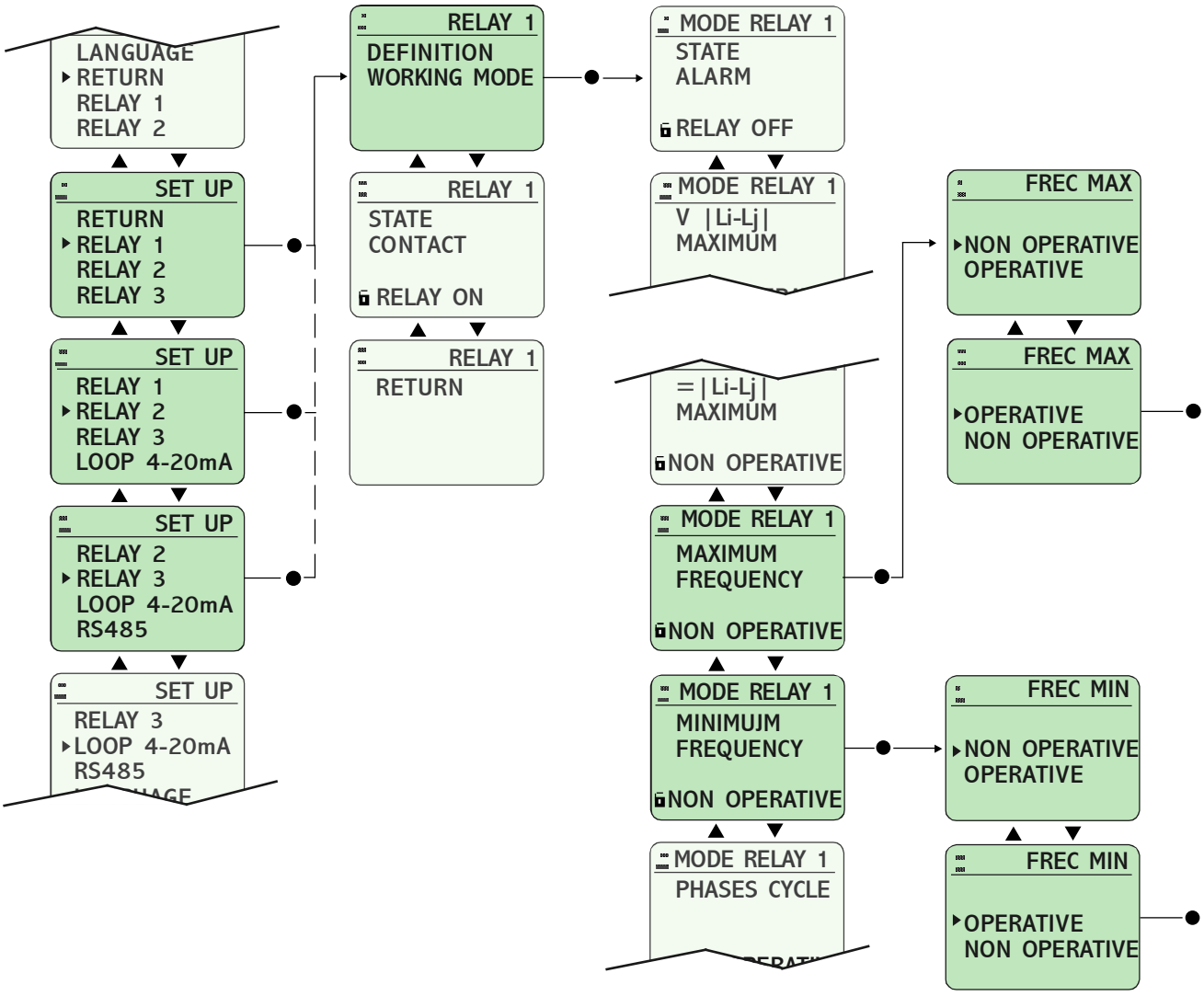
MAXIMUM UNBALANCE BETWEEN PHASE AND NEUTRAL (2/2)



Previous conditions	≠|Li-LN| MAXIMUM = **[** OPERATIVE **]**

Adjustment	It allows to set the percentage value for the detection and/ or the release of the maximum unbalance between one phase and the neutral. The release value must be always lower than the detection value.

MAXIMUM AND/OR MINIMUM FREQUENCY (1/2)



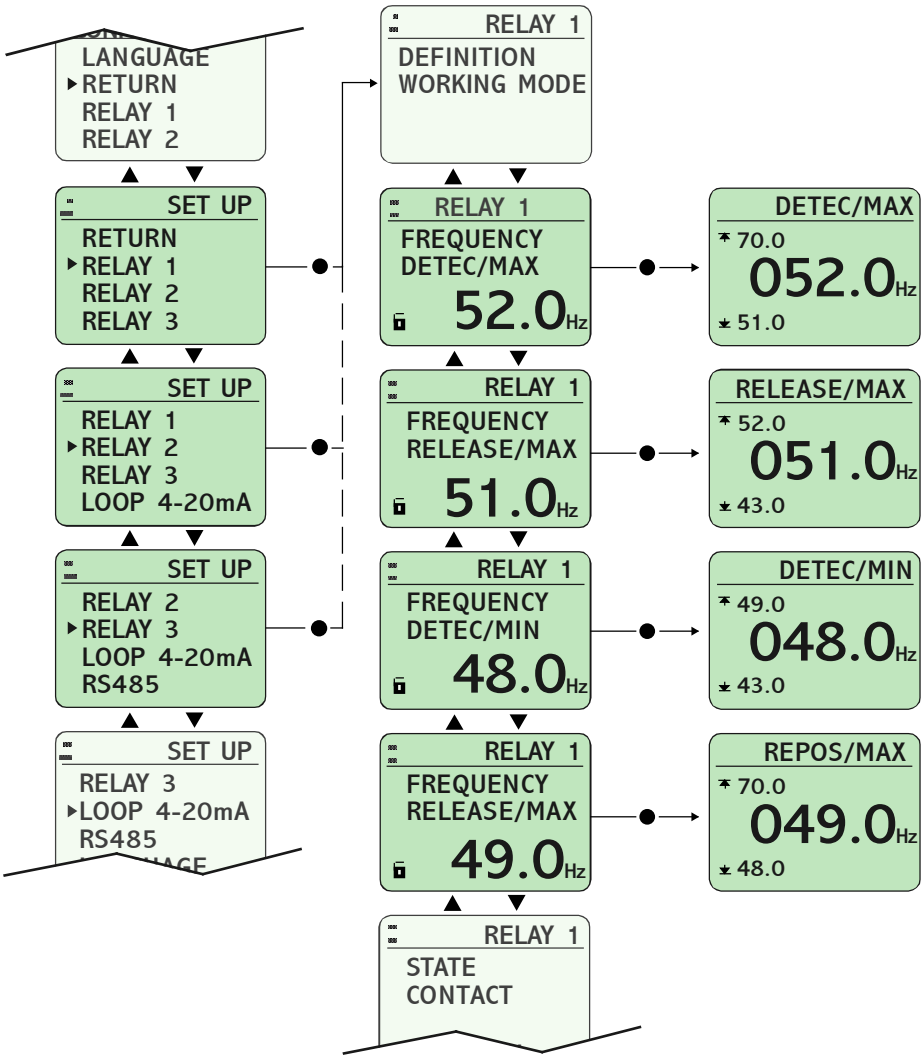
Activation

To make the relay operates when the controller detects a determinate maximum and/or minimum frequency, set this option as OPERATIVE.

With independence of the state of this option,
- if the frequency varies in such a magnitude than the controller looses the indicated precision (see 'Technical Data' at page 3)
- the relay keeps activated any voltage parameter and
- the option 'Alarm for frequency deviation' is activated,

the controller will switch to the alarm state. See page 51 for further details.

MAXIMUM AND/OR MINIMUM FREQUENCY (2/2)



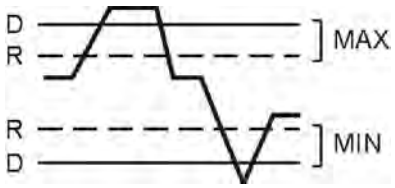
Previous conditions	MAXIMUM FREQUENCY = **[** OPERATIVE **]** MINIMUM FREQUENCY = **[** OPERATIVE**]**

Adjustment

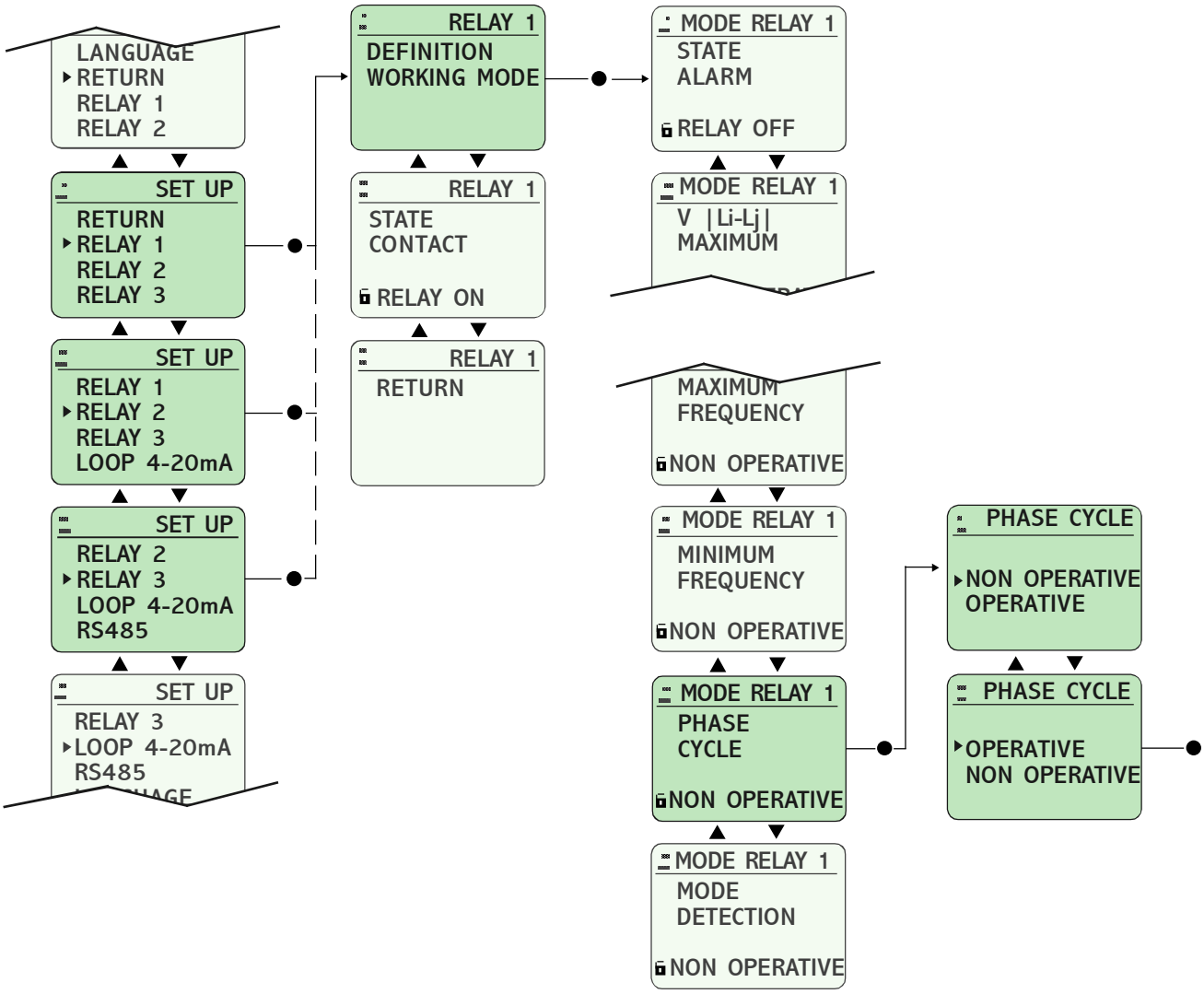
It allows to set the value (Hz) for the detection and/or the release of the maximum and/or minimum frequency.

When setting the working values for Maximum, the release value must be lower than the detection value.

When setting the working values for Minimum, the release value must be higher than the detection value.



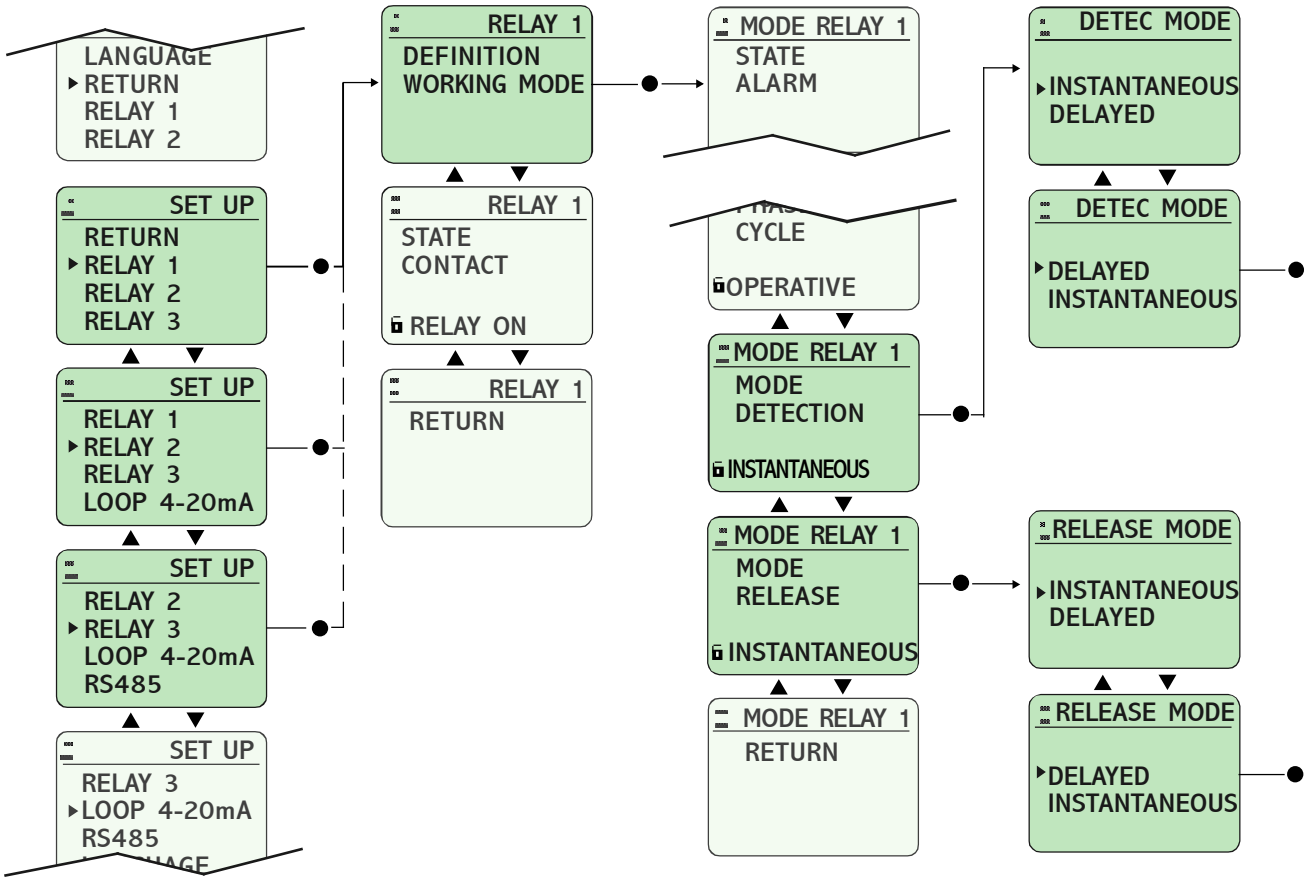
PHASES CYCLE



To make the relay operate when the controller detects a wrong phases cylce (different than L1-L2-L3), set this option as OPERATIVE.

[SVP]: The cycle phases is only detected when the supply voltage is connected or when the three-phase control voltage is applied.

DELAY ON DETECTION AND/OR ON RELEASE (1/3)

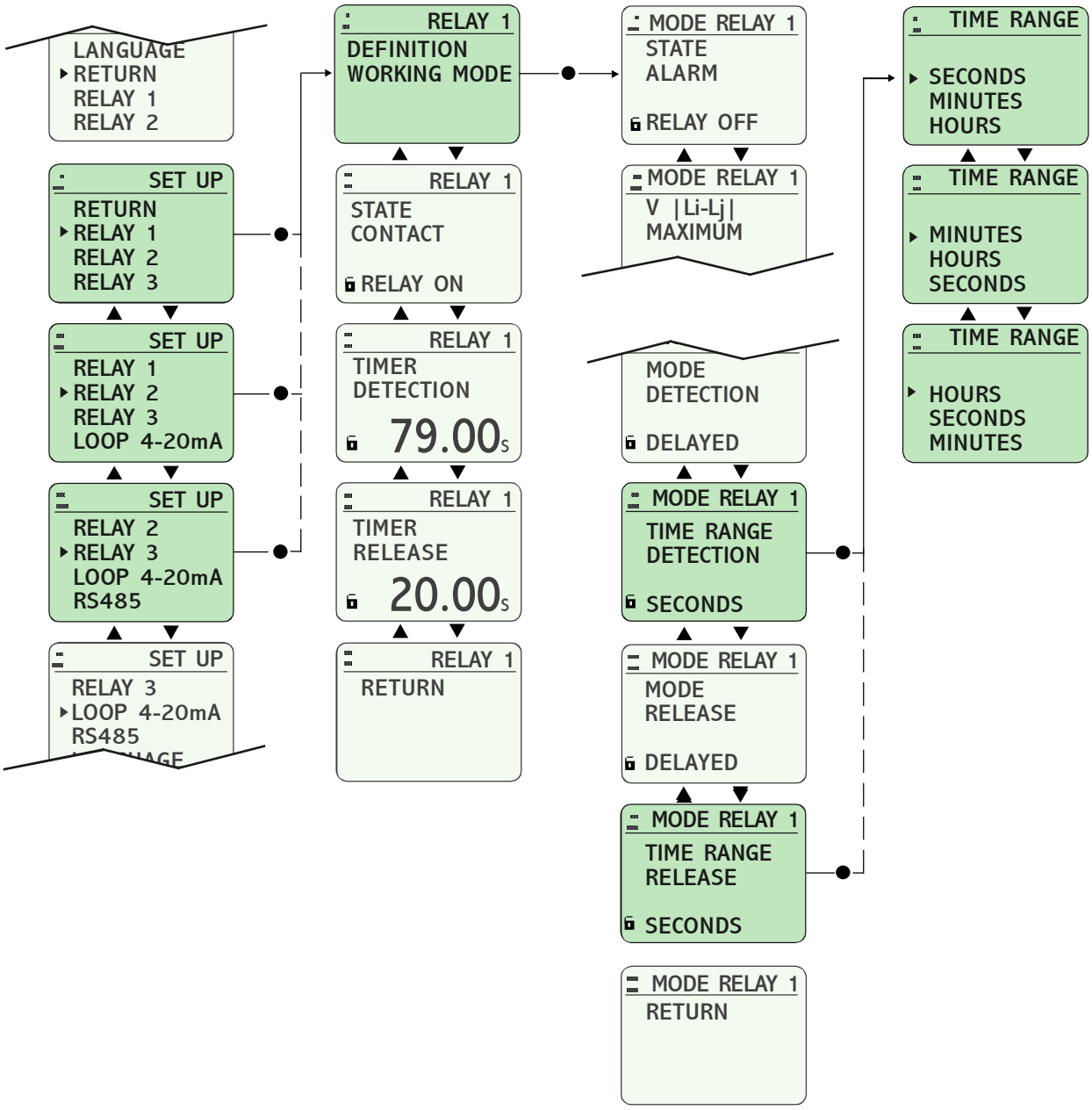


Activation

To incorporate a time delay to the detection and/or to the release the options MODE DETEC and/or MODE RELEASE must be set as DELAYED. The relay will not operate until the signal will be kept (at the detection) and/or lost (at the release) for a time longer than the adjusted one.

The time delay is related to the relay and not to the magnitude associated to the relay. It means that a timed relay with two magnitudes associated (for example, overvoltage and frequency) will start the timer for whichever of them, the first who occurs. It means, too, that in the case that both magnitudes occurs at the same time, the delay will be unique.

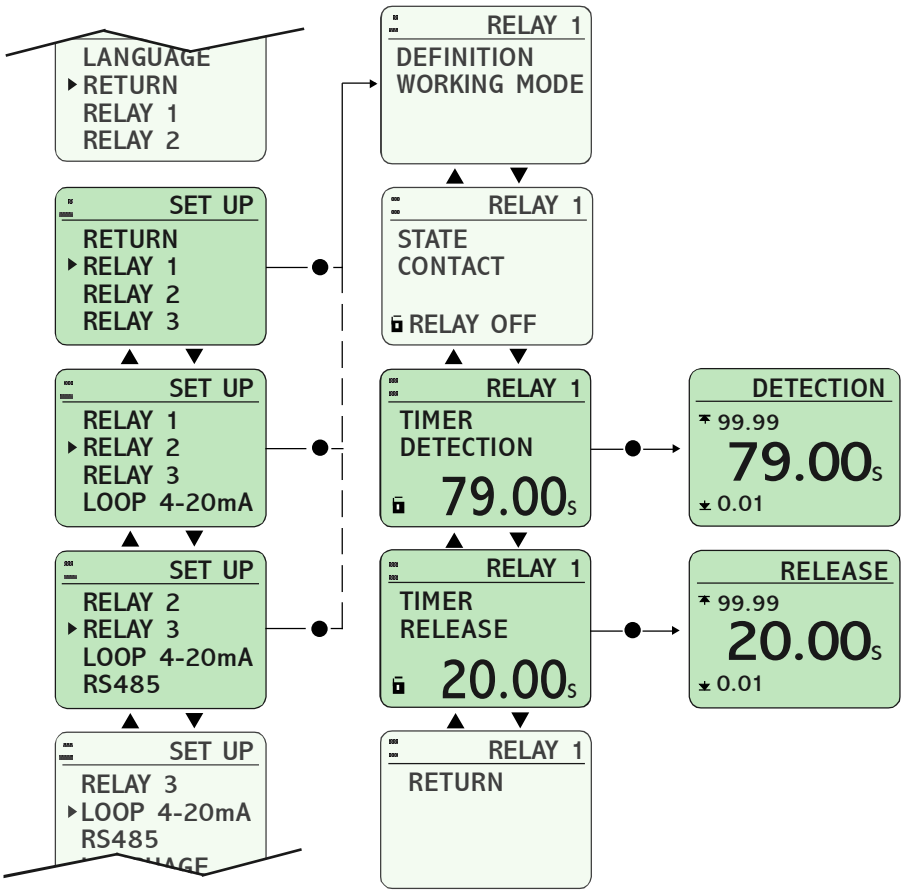
DELAY ON DETECTION AND/OR ON RELEASE (2/3)



Ranges

The time ranges for the detection and/or for the release can be set as SECONDS, MINUTES or HOURS.

DELAY ON DETECTION AND/OR ON RELEASE (3/3)

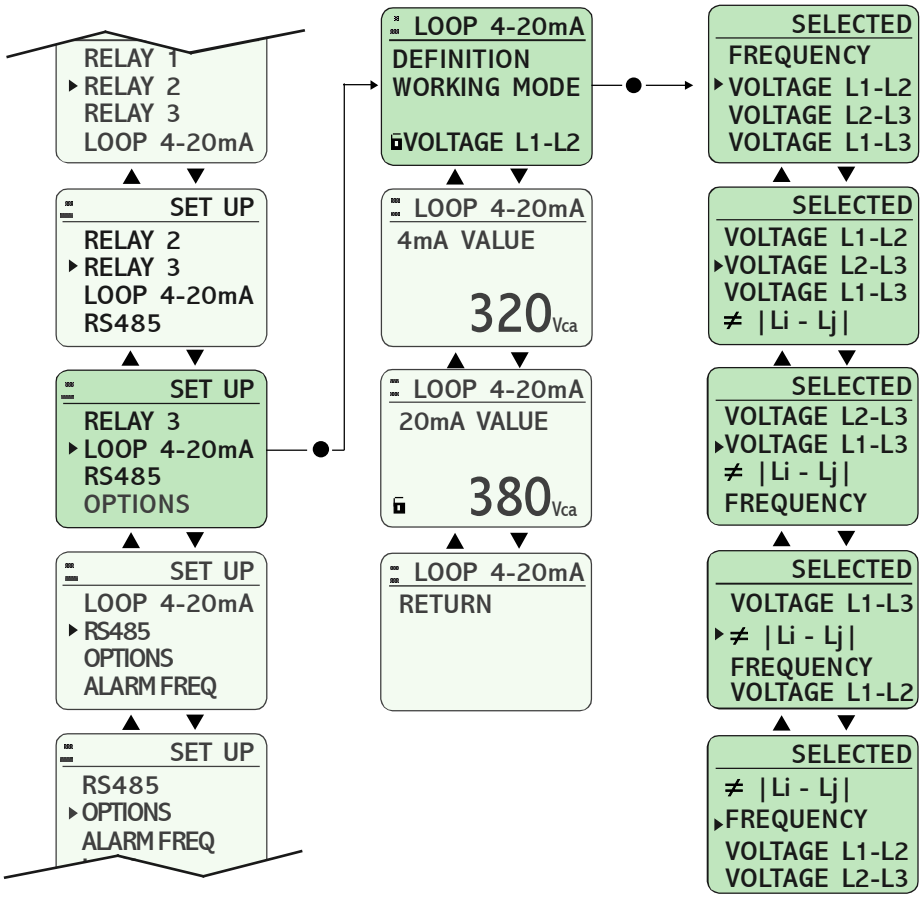


Time

It allows to set the exact time for the detection and/or the release.

The time margins depend on the previously selected range, and can be adjusted between the following values:
· 0,01..99.99 SECONDS
· 0,01..99.99 MINUTES
· 0,1..999.9 HOURS

LOOP 4-20 mA (1/2)



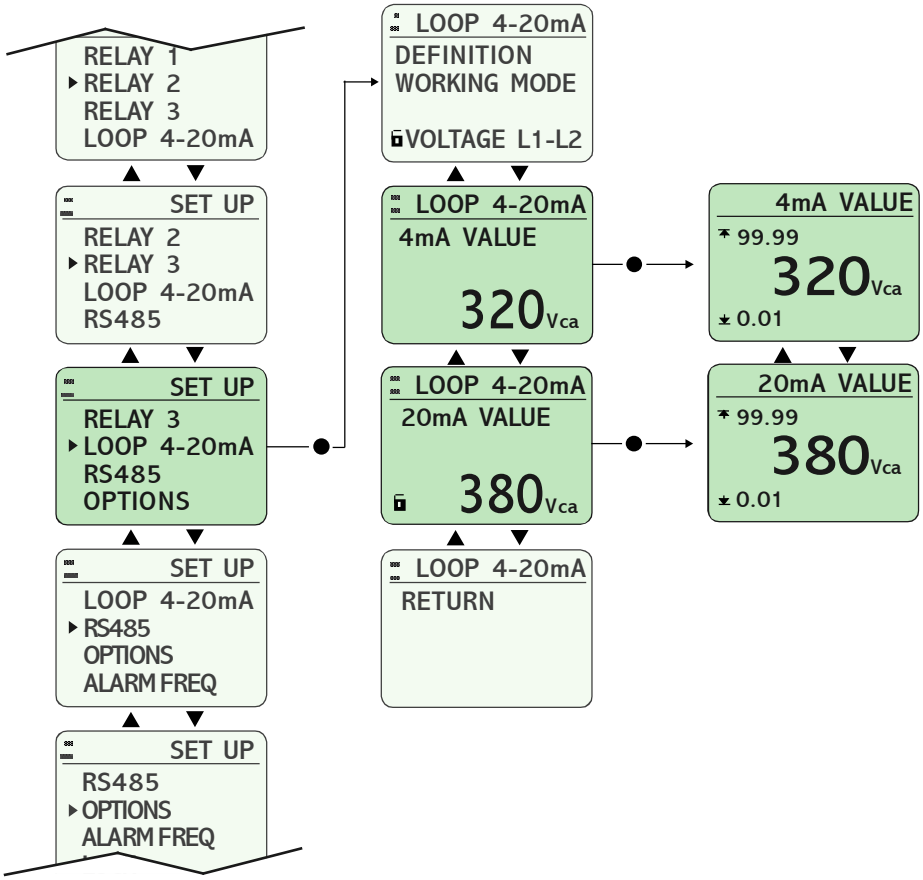
Assignation

Throught this option is set the magnitude related with the 4-20 mA current loop, and it can be whichever of the following ones:

- Voltage L1-L2
- Voltage L2-L3
- Voltage L1-L3
- Voltage L1-N **(SVP)**
- Voltage L2-N **(SVP)**
- Voltage L3-N **(SVP)**
- Unbalance between phases
- Unbalance between phase and neutral **(SVP)**
- Frequency

This feature is optional.
Consult the communication options, and its connection at page 59.

LOOP 4-20 mA (2/2)

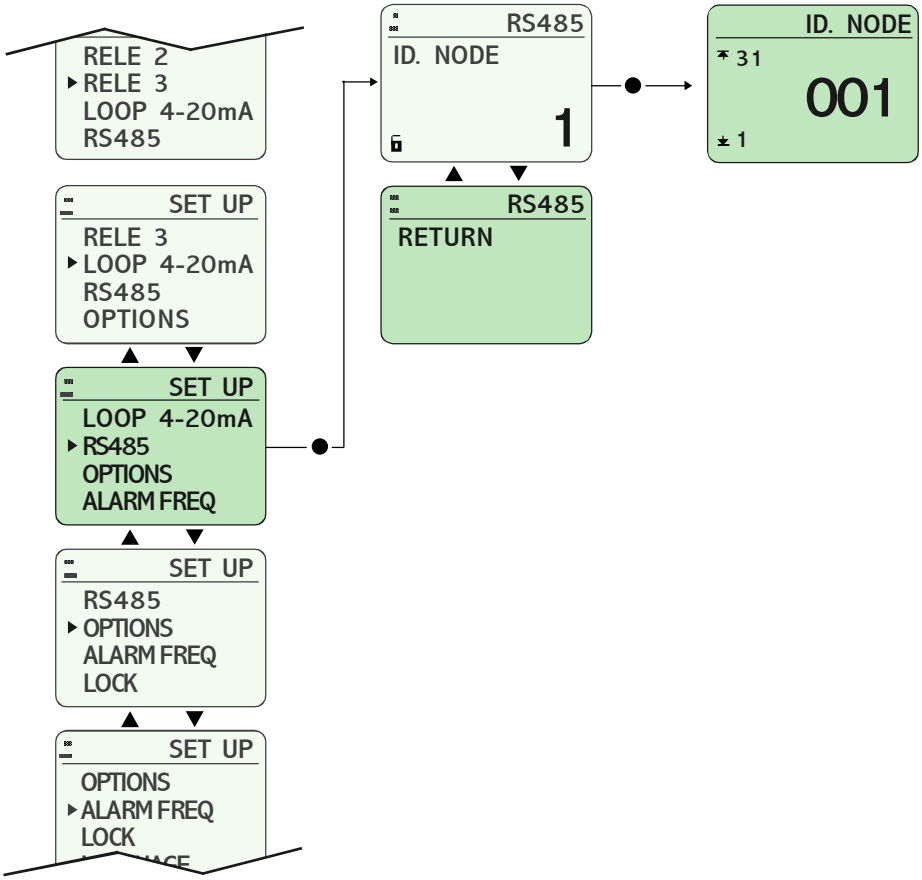


Adjustment

This option allows to define the operating margins for the 4-20 mA loop current. It is required to set by separate a countervalue for 4 mA and for 20 mA. It is possible to invert the loop sense by setting to 4 mA a countervalue higher than to 20 mA.

This feature is optional.
Consult the communication options at page 59.

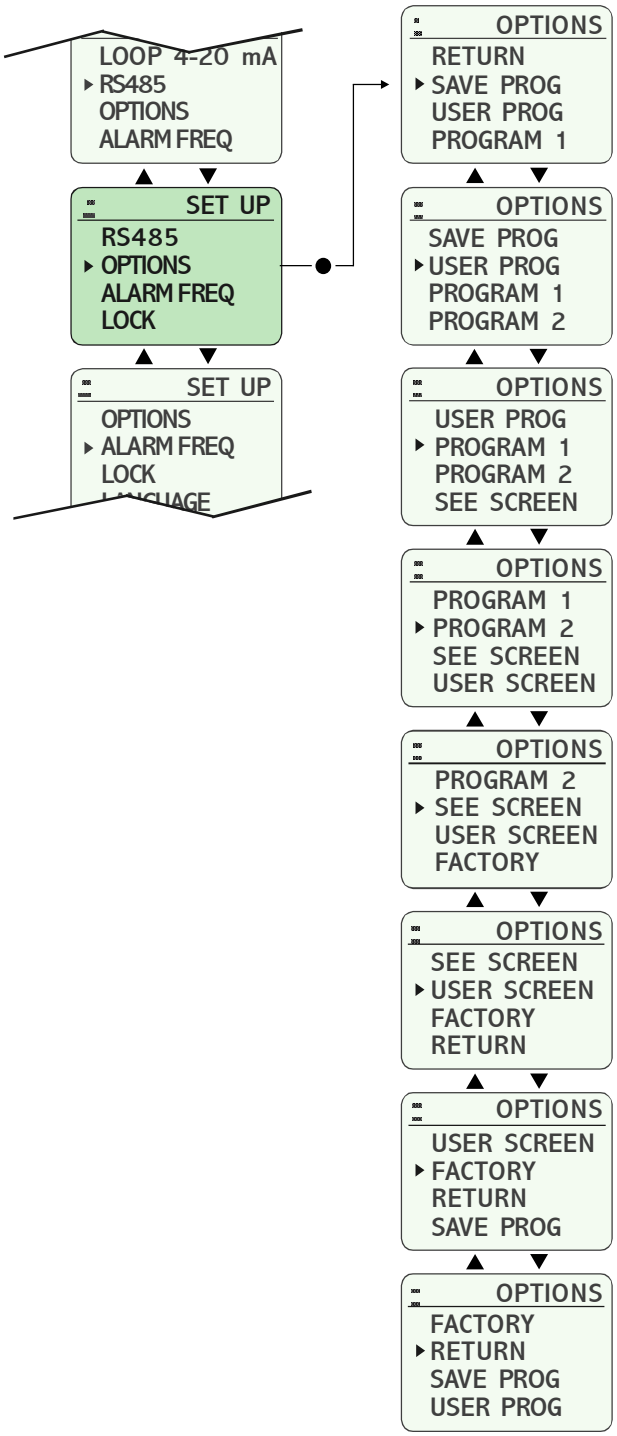
RS485



Is possible to communicate the controllers SVO and SVP with a computer via the serial port RS232 for the remote programming or to process the generated data.
With the option RS485 can be connected up to 31 equipments in the same net, being equal or different among them. A node number, exclusive identification number, must be assigned to each equipment.
Is essential to employ the converter RS232-RS485 (reference SBAZ).
For extended information relative to programming with a computer, consult the manual *deCom*.

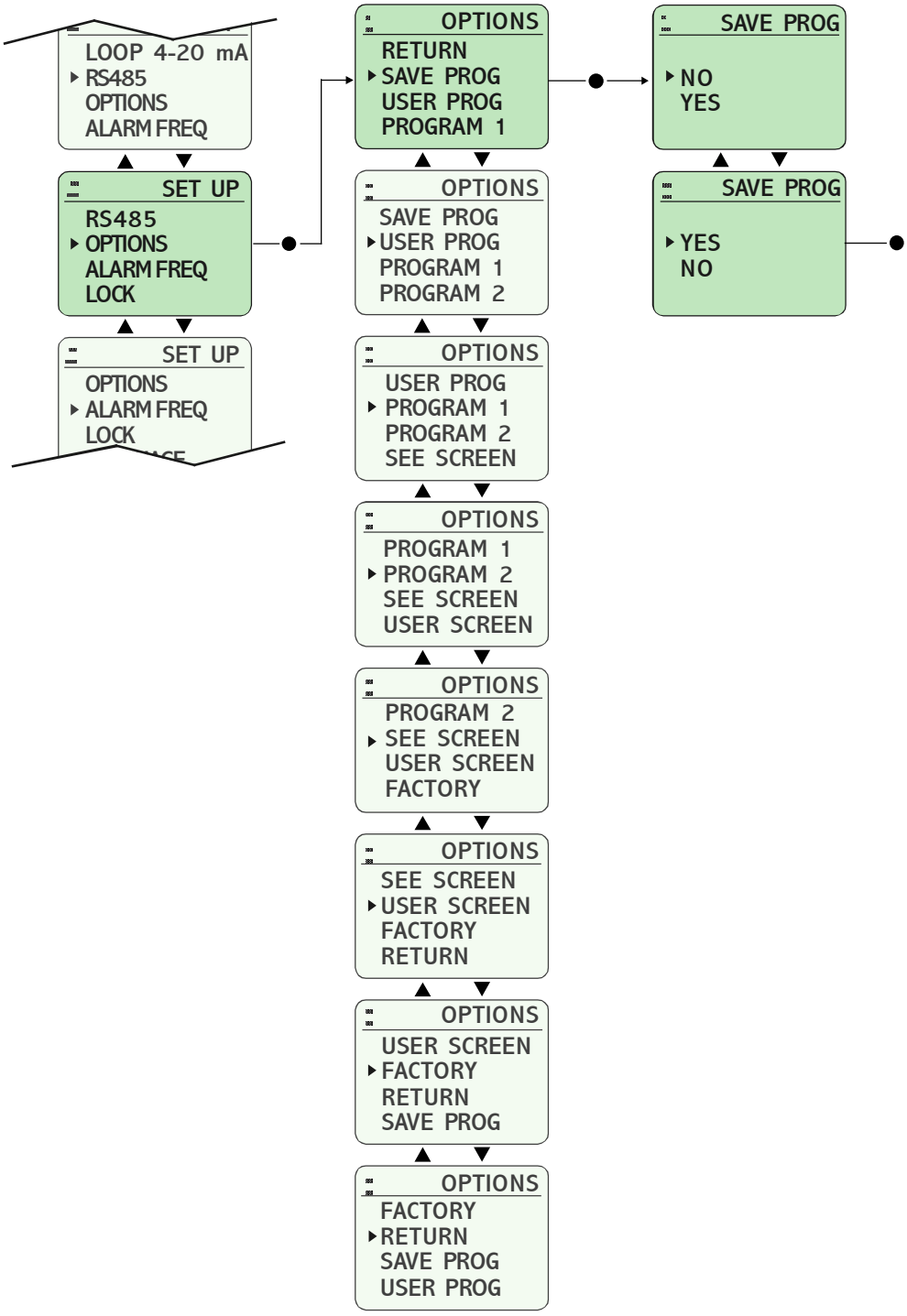
This feature is optional.
Consult the communication options at page 59.
Consult the connection at page 60.

OPTIONS MENU



With the options menu are set those parameters which are not basic for the operative of the equipment.

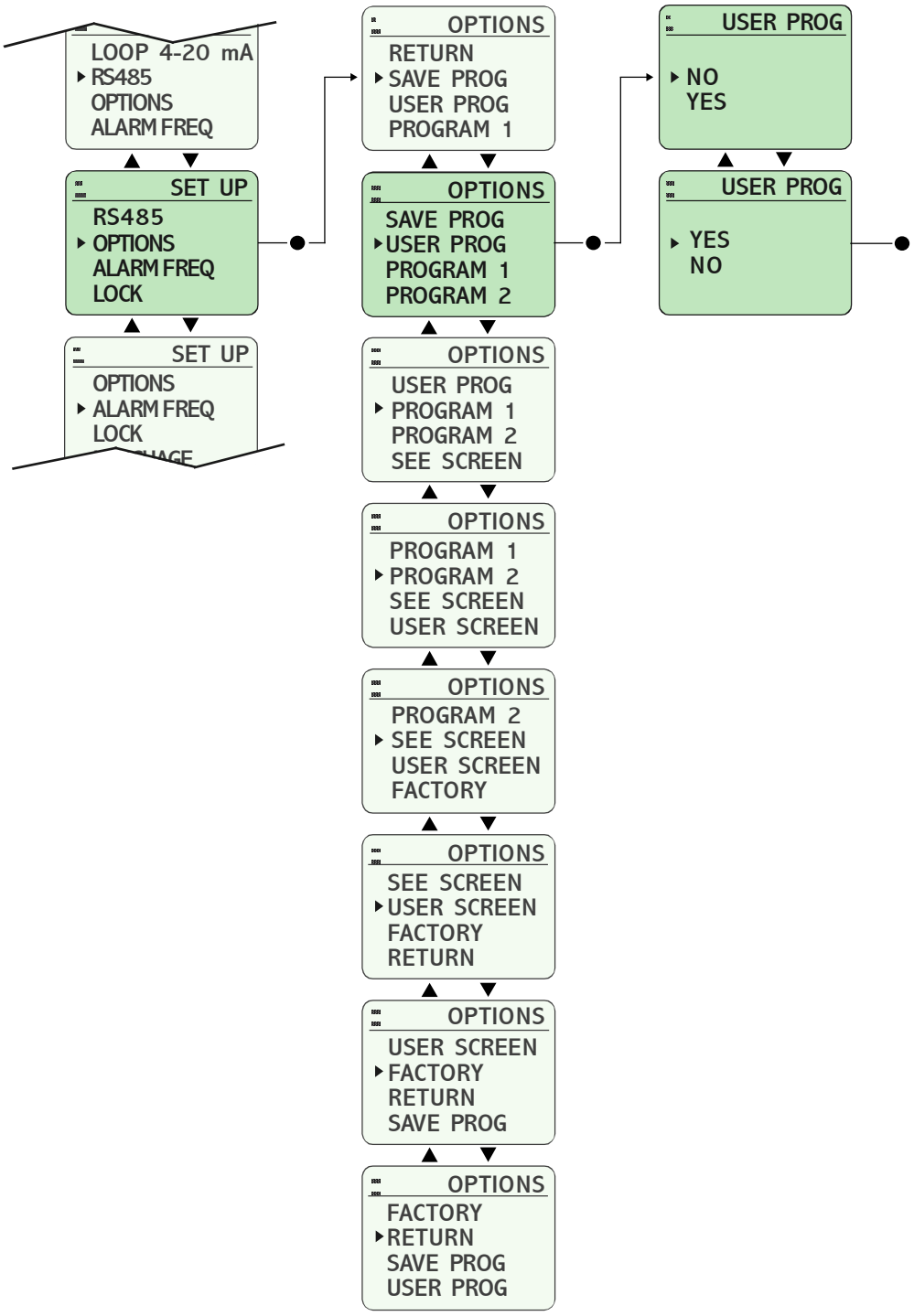
SAVE PROGRAM



It stores the changes done in the different parameters and options. Each time that SAVE PROGRAM is executed, the values stored in the user program are overwritten.

You will find more information related to the user program in the pages 15..19.

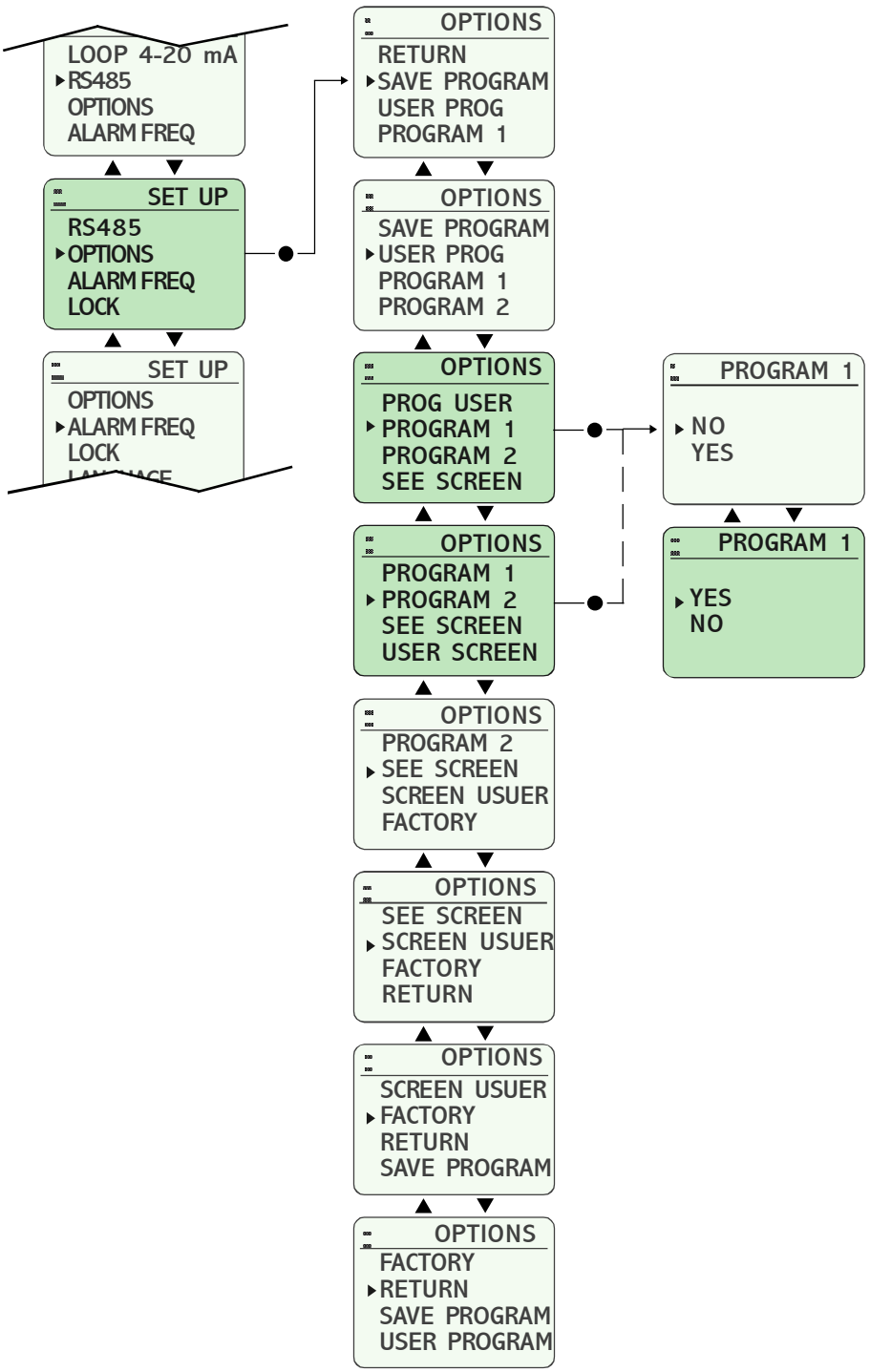
USER PROGRAMS



It loads into memory the program that was stored with the option SAVE PROGRAM, becoming the working program. Each time that this option is executed, the values stored in the memory are overwrtten.

You will find more information related to the user program in the pages 15..19.

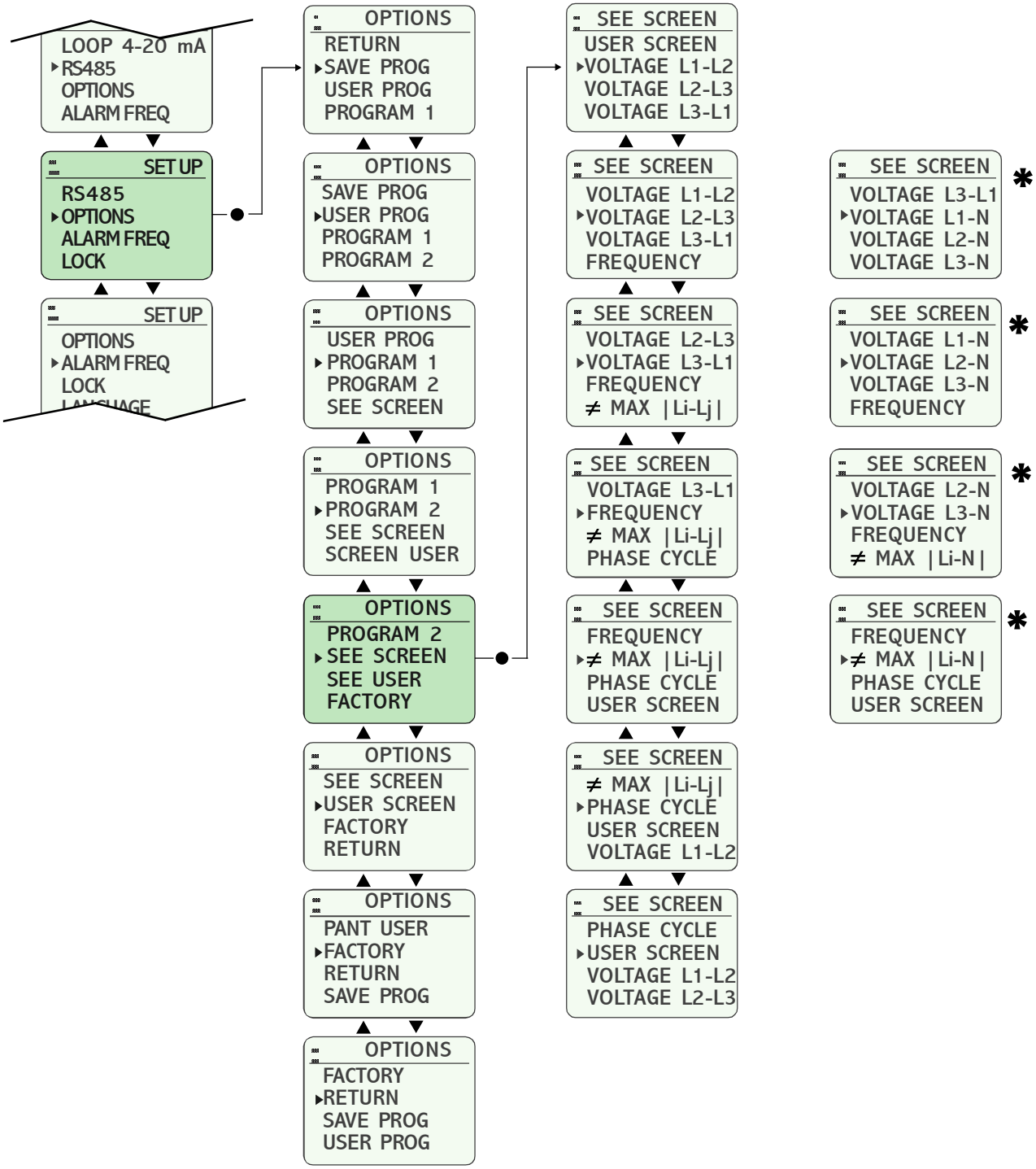
PROGRAM 1 AND 2



It loads into memory the selected program, becoming the working program. Each time that this option is executed, the values stored in the memory are overwritten.

You will find more information related to the user program in the pages 15..19.

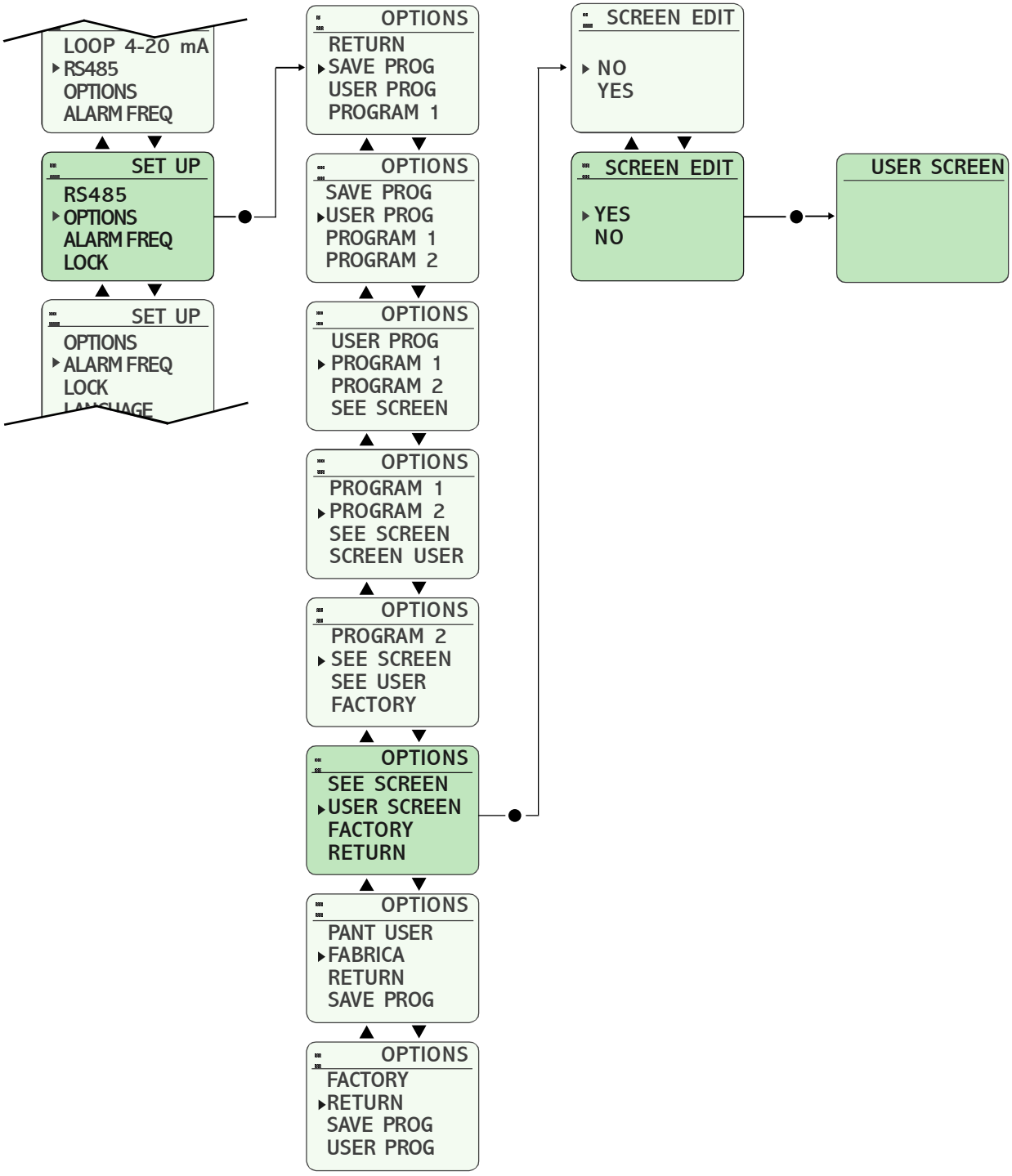
SEE SCREEN



This option allows to set which will be the default screen in the status screens menus (normal working mode).

* These screens will be found in the model SVP.

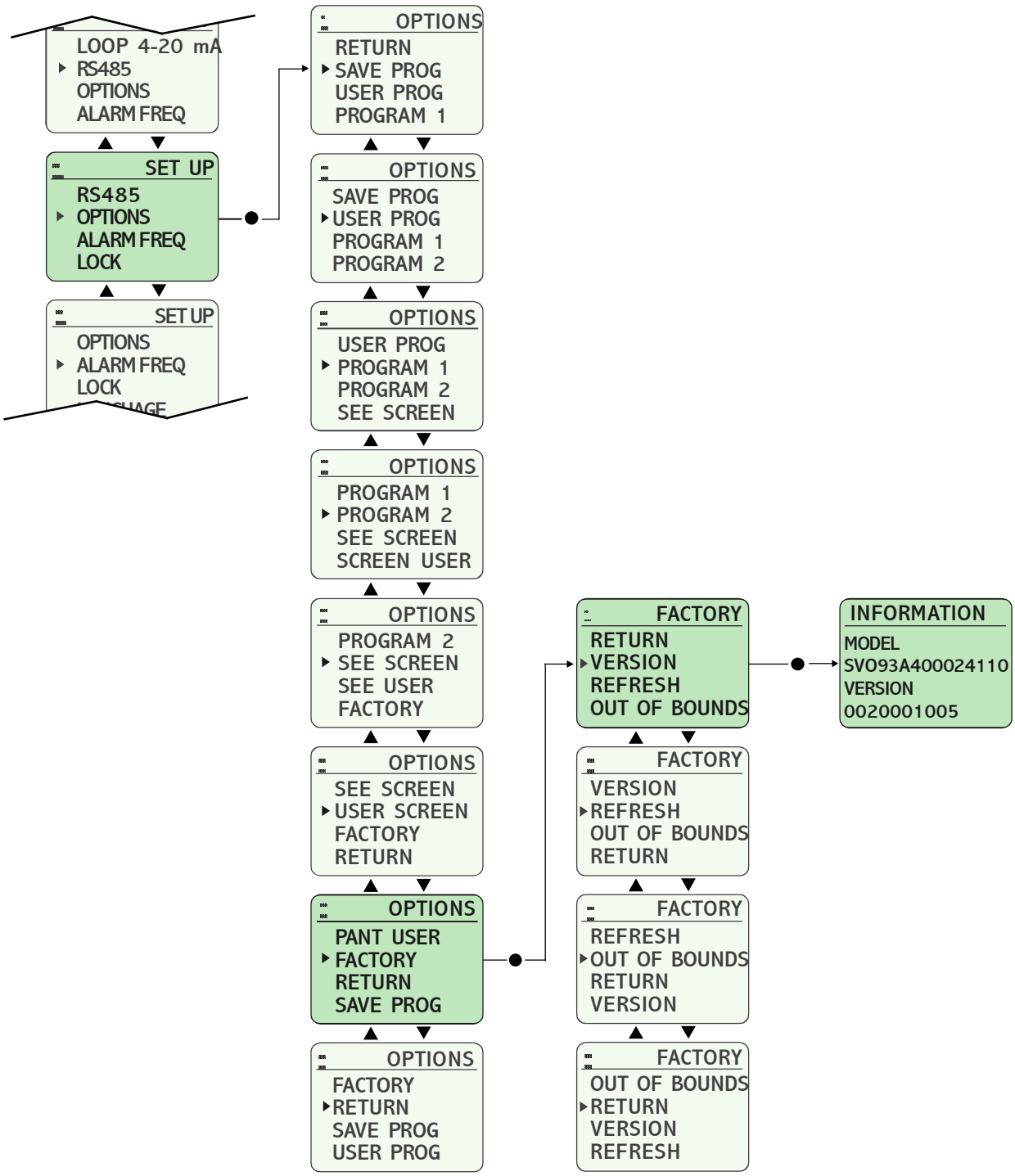
USER SCREEN EDIT



In this screen it can be edited any text to identificate the equipment. It can be used 4 lines and 13 characters each.

To learn which are the available characters and the way to edit them see “1.2 USER SCREEN” at page 9.

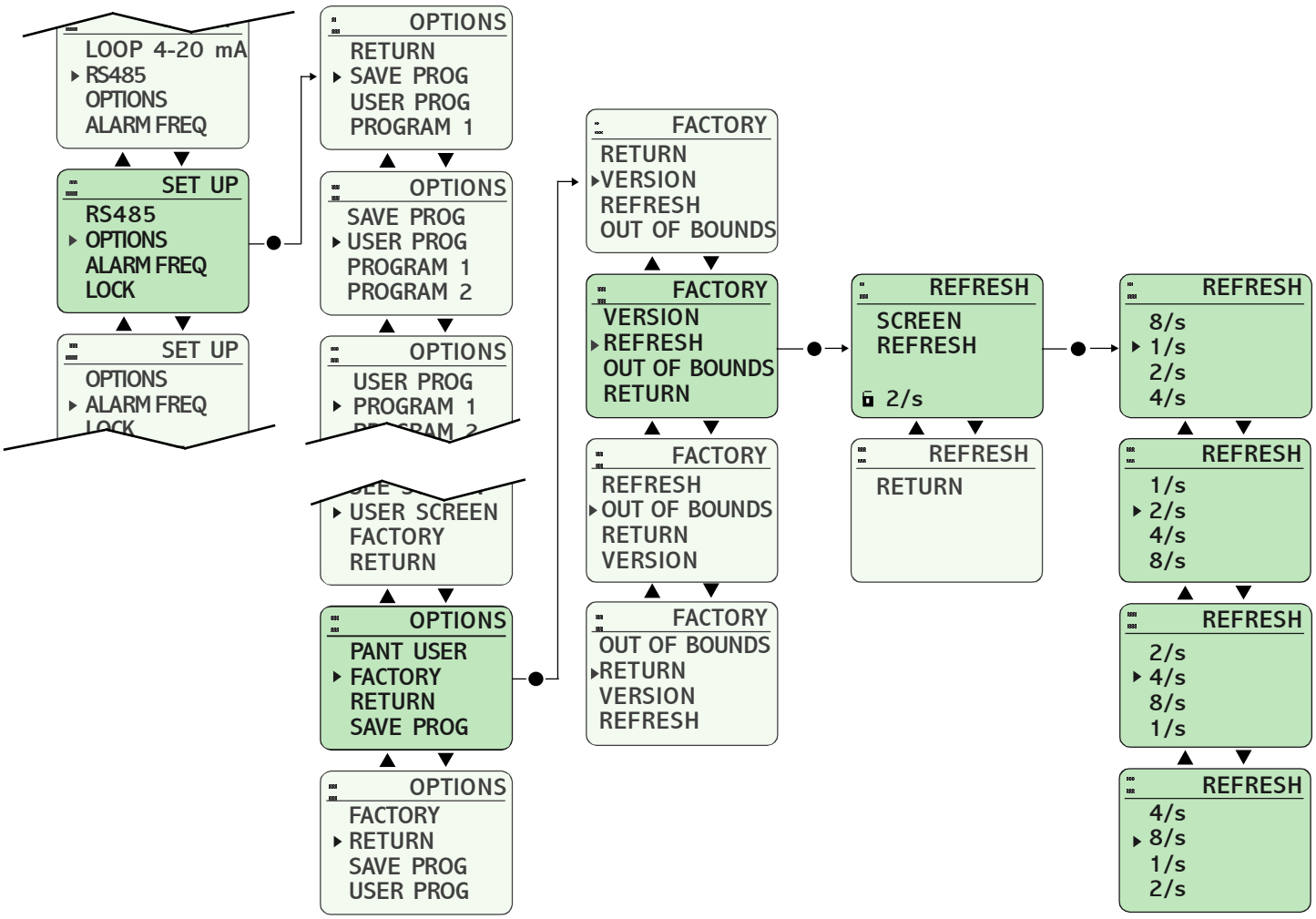
INFORMATION OF THE MODEL AND VERSION



Access to this option if you want to know the exact reference of the model and the version of the built-in software.

This is an informative screen. It is active for 3 seconds and returns automatically to the previous screen once the time has elapsed.

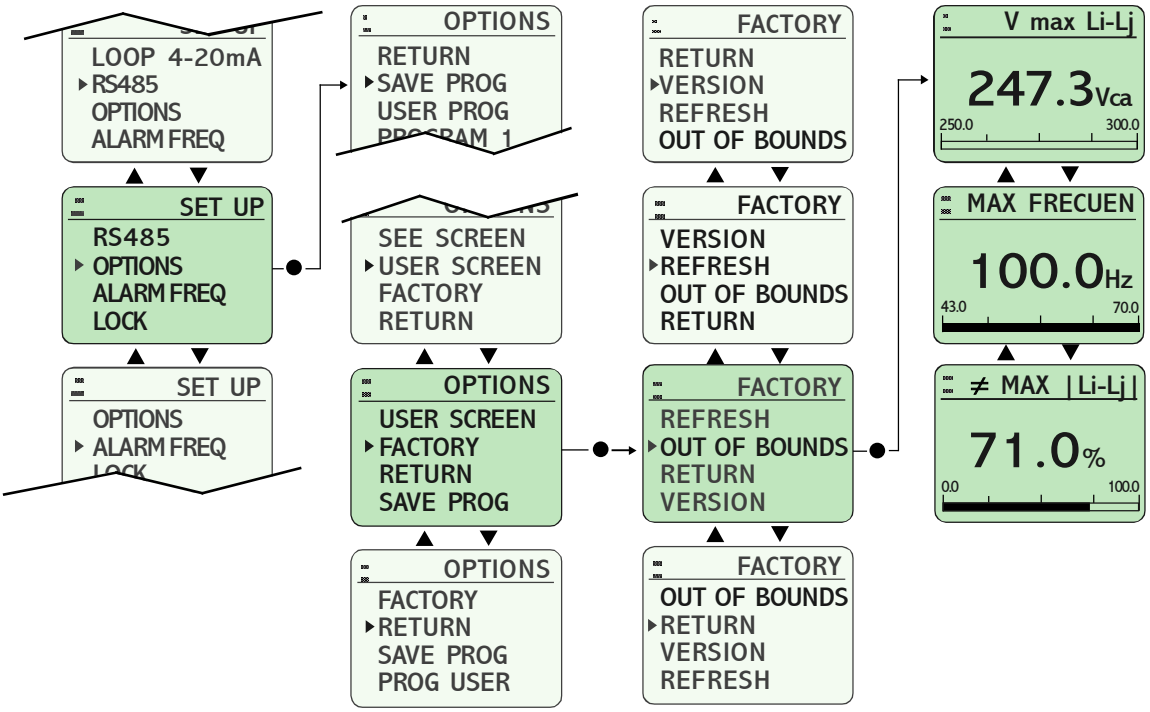
SCREEN REFRESH



It is defined as the time of regeneration of the information showed in the LCD. Only the status screens are affected for this option.

The value indicates the times that the screen is regenerated each second. So, with the value 1/s the screen is regenerated 1 time per second, and with the value 8/s it is done 8 times per second.

OUT OF BOUNDS VALUES



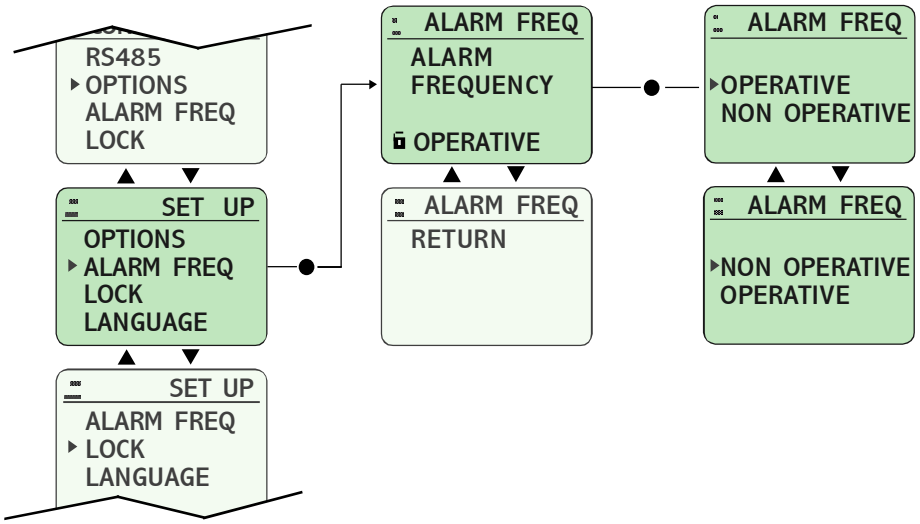
By means of this option is possible to read the highest values registered since the first time that the controller was turned on. A value higher than the stored one overwrites it. The magnitudes to be controlled are:

- Voltage Li-Lj
- Unbalance Li-Lj
- Frequency

The stored values do not depend of the controller's operation margins and they can be higher than them.

This screen is just informative and the values can't be modified using neither the buttons nor the programing software.
The "Out of bounds" values are available only for the model SVO.

FREQUENCY DEVIATION ALARM

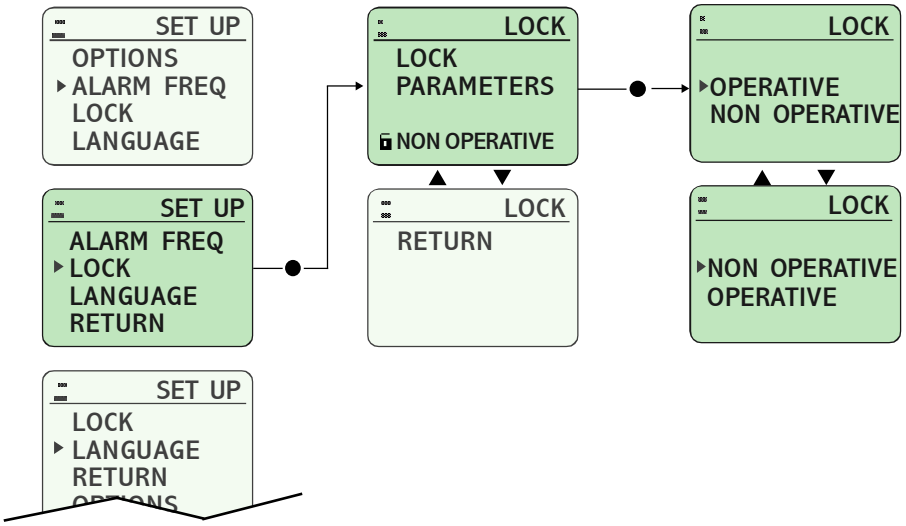


Previous condition	This option affects the relays that have enabled some voltage parameter. By default, this option is activated.

Set the relays in alarm state if the frequency deviates of ±0,4 Hz in the detection process, and ±0,3 Hz for the release. For these deviations in the frequency of the network the working accuracy is reduced. The greater deviation in the frequency of the network, worst accuracy in reading the voltage.

If this option is off, remember that reading precision of the voltage parameters decreases when the frequency varies from their nominal values (50 Hz / 60 Hz). You should consider this reduction in accuracy when setting the values of detection and/or release.

LOCKING PARAMETERS

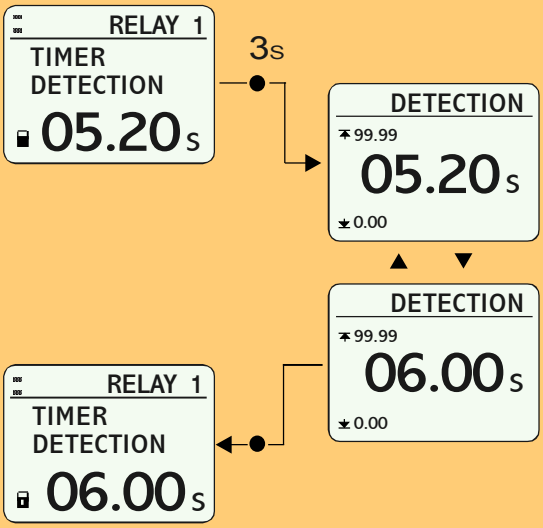


All the parameters of the equipment can be locked in order to avoid any undesired modification.

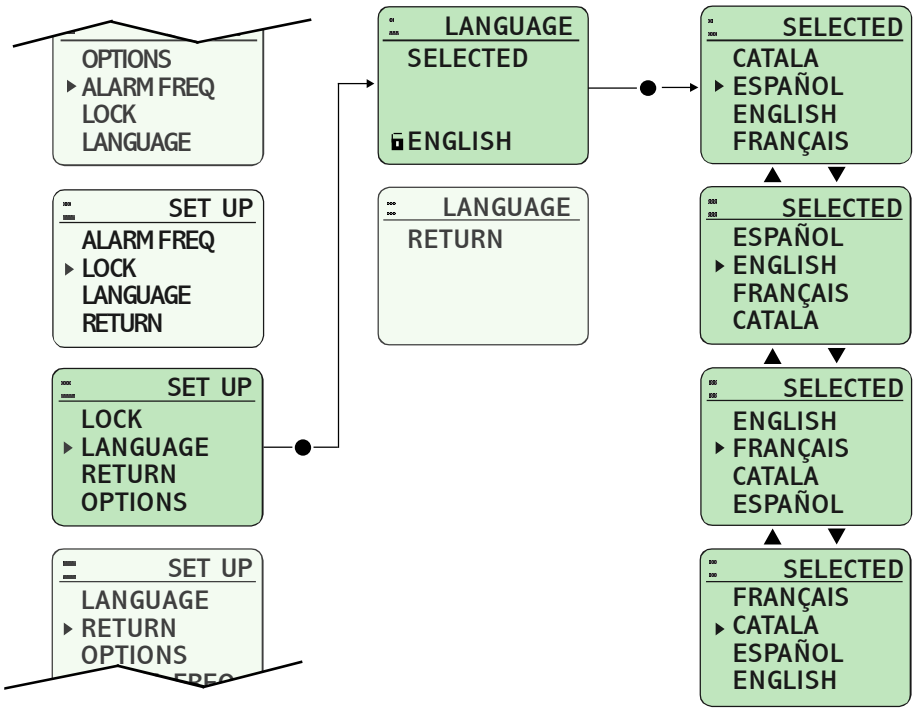
In the LCD the state of parameters is indicated as follows:

- Locked parameters:
- Unlocked parameters:

It is possible to modify the value of a locked parameter without access to the above mentioned options. To do that, once placed in the screen showing the parameter and the value to be modified, hold the button ● for 3 seconds and will reach to the screen of change of value.
Once the change has been validated, it returns to the previous screen and the parameter become locked again.



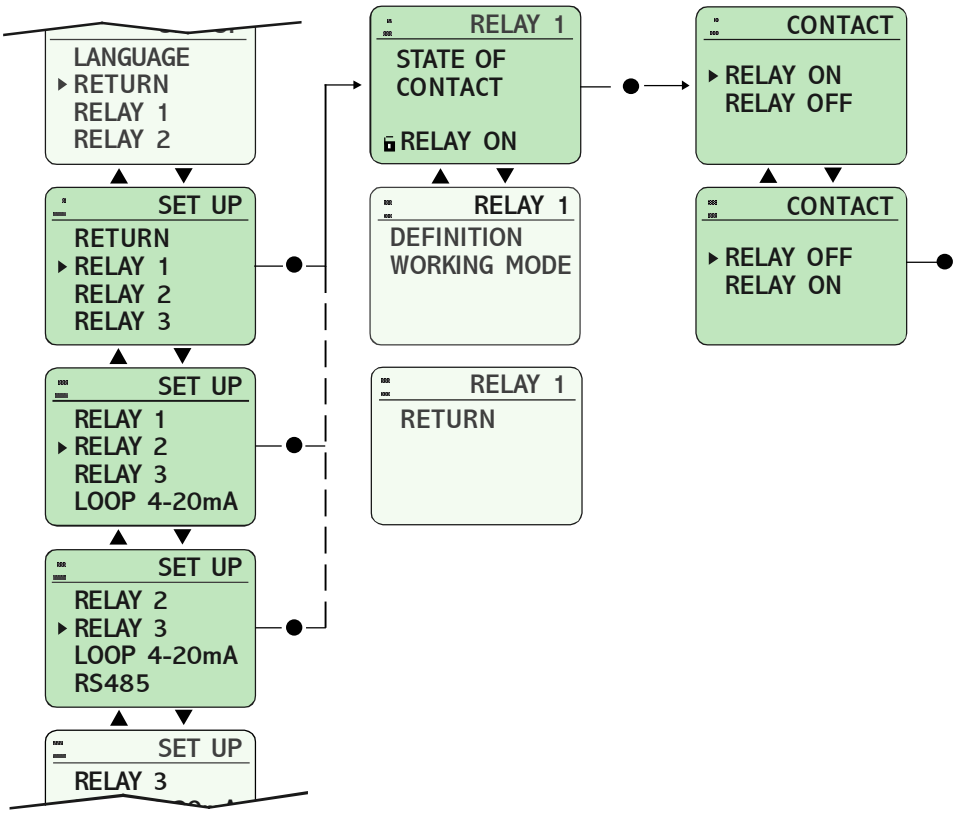
LANGUAGE



The controllers SVO and SVP incorporate four different languages for showing the texts in the screen. Three of them are the same in all the models: Spanish, English and French, being optional the fourth one.

Complementary Functions (1/4) AUXILIARY CONTACT

The relays that are not related with any magnitude can be used to perform complementary functions.



Common previous conditions

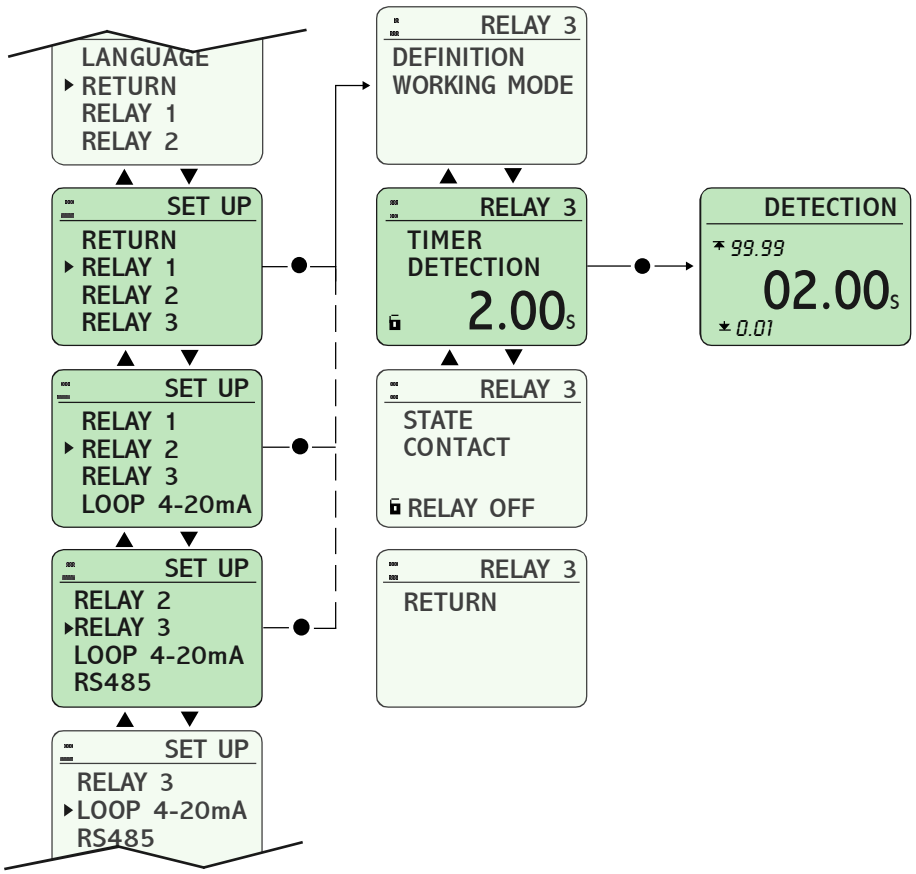
V |Li-Lj| MAXIMUM = **[** NON OPERATIVE **]**
V |Li-Lj| MINIMUM = **[** NON OPERATIVE **]**
V |Li-LN| MAXIMUM = **[** NON OPERATIVE **] (SVP)**
V |Li-LN| MINIMUM = **[** NON OPERATIVE **] (SVP)**
≠ |Li-Lj| = **[** NON OPERATIVE **]**
≠ |Li-LN| = **[** NON OPERATIVE **] (SVP)**
MAX. FREQUENCY = **[** NON OPERATIVE **]**
MIN. FREQUENCY = **[** NON OPERATIVE **]**
PHASES CYCLE = **[** NON OPERATIVE **]**

Specific previous conditions

STATE OF CONTACT = **[** RELAY ON **]**
MODE DETECTION = **[** CANCELLED **]**
MODE RELEASE = **[** CANCELLED **]**

When the supply voltage is connect the contact of the relay operates instantaneously and will remain in this state until the supply voltage disconnected.

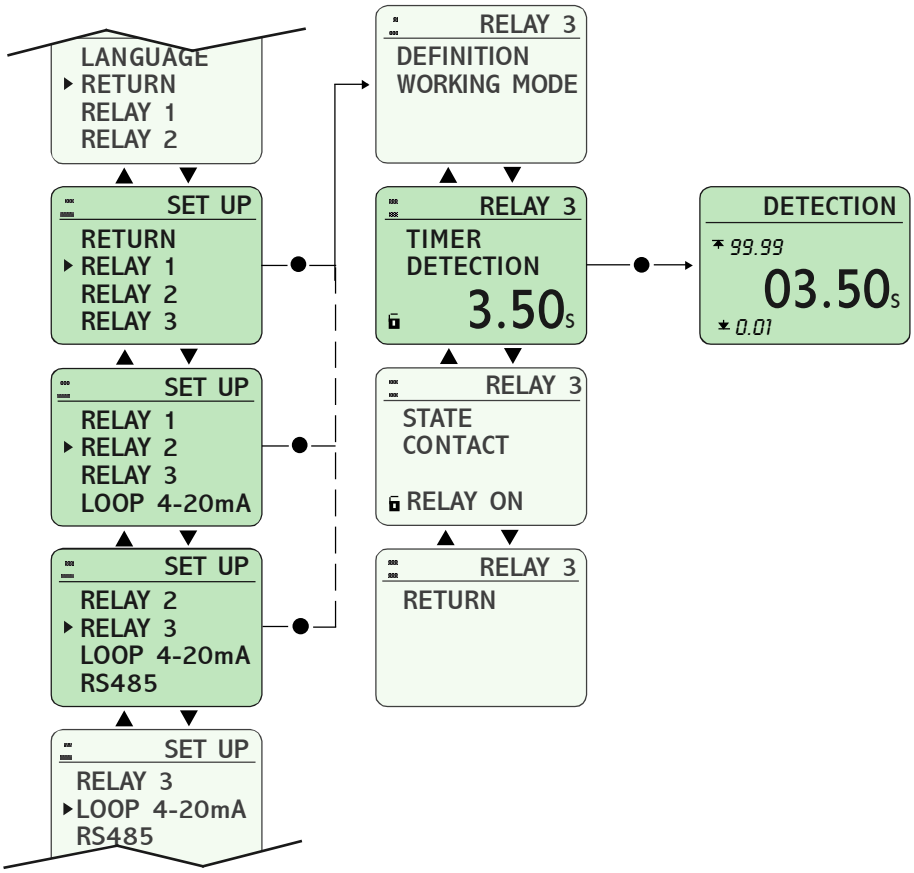
Complementary Functions (2/4) DELAY ON CONNECTION



Previous conditions	The common ones of page 54 and: STATE CONTACT = **[** OFF **]** MODE DETECTION = **[** DELAYED **]** MODE RELEASE = **[** CANCELLED **]**

When the supply voltage is connected the relay remains released and the time circuit starts up. Once the time has elapsed the relay operates. It can remain in this state for an undefined time.

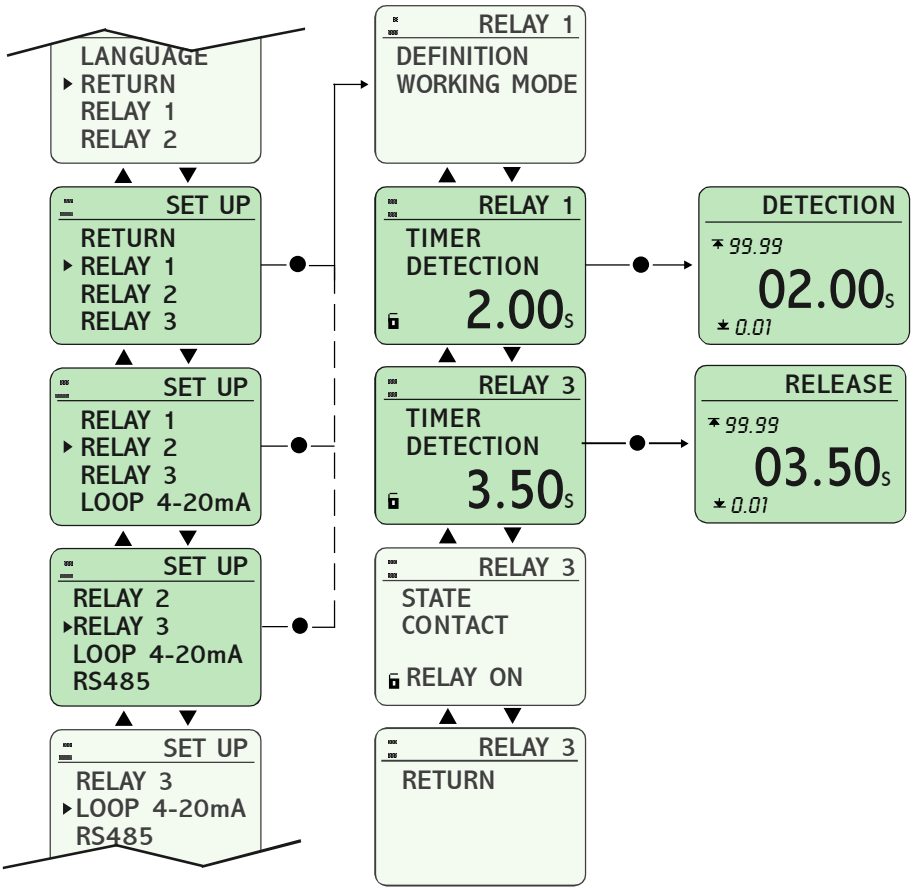
Complementary Functions (3/4) — DELAY ON INTERVAL



Previous conditions	The common ones of page 54 and: STATE CONTACT = **[** ON **]** MODE DETECTION = **[** DELAYED **]** MODE RELEASE = **[** CANCELLED **]**

When the supply voltage is connected the relay operates instantaneously and the time circuit starts up. Once the time has elapsed the relay releases. It can remain in this state for an undefined time.

Complementary Functions (4/4) — RECYCLER TIMER



Previous conditions	The common ones of page 54 and: MODE DETECTION = **[** DELAYED **]** MODE RELEASE = **[** DELAYED **]**
Cycle OFF-ON	STATE OF CONTACT = **[** RELAY OFF **]** When the supply voltage is connected the time adjusted in TIMER DETECTION starts up. Once the time has elapsed the relay operates until the time adjusted in TIME RELEASE elapses. The cycle repeates non-stop itself.
Cycle ON-OFF	STATE OF CONTACT = **[** RELAY ON **]** When the supply voltage is connected the relay operates instantaneously and the time circuit adjusted in TIMER DETECTION starts up. Once the time has elapsed the relay releases and remains in this state until the time adjusted in TIME RELEASE elapses. The cycle repeates non-stop itself.

ERROR SCREENS AND INFORMATION

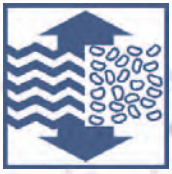
If front of certain situations the controllers SVO and SVP displays informative screens, usually related with errors or unapropiated actions.

	Cause	Solution
INFORMATION OUT OF RANGE VALUE	It has been introduced a value out of the allowed limits in the magnitude which is being adjusted.	Introduce whichever value between the allowed limits.
INFORMATION FOR LOADING USER PROGRAM IS REQUIRED SAVE PROGRAM	It was attempted to load into memory the user program, but this was not loaded previously.	Save an user program.
ERROR MEMORY FAIL	An error in the internal memory of the controller has been produced.	Contact with the manufacturer.

Manufacturing program

Sensors

A wide variety of types of sensors allows an easy way to find out the efficient solution for the control of the level in a large number of products.



Level relays

Its combination with the level sensors is the suitable complement for the control of the level in wells, tanks and reservoirs.

Timers

From the common functions of timing and passing through the multifunction models, it is arrived to elements with specific functions

Control relays

This wide family who contributes to confidence and yield in complex installations where the security is the essential element.

Digital control relays

This family of controllers combines the own characteristics of the classic relays and improve them by adding new benefits.

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