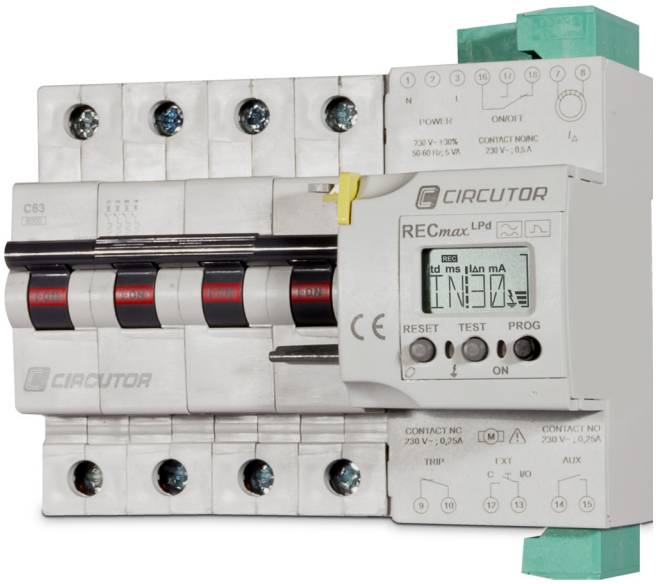
Earth leakage circuit breaker with automatic re-closing system

RECmax Lpd



INSTRUCTION MANUAL

(M98252901-03-18A)

CE

SAFETY PRECAUTIONS

Follow the warnings described in this manual with the symbols shown below.

	**DANGER** Warns of a risk, which could result in personal injury or material damage.

	**ATTENTION** Indicates that special attention should be paid to a specific point.

If you must handle the unit for its installation, start-up or maintenance, the following should be taken into consideration:

	Incorrect handling or installation of the unit may result in injury to personnel as well as damage to the unit. In particular, handling with voltages applied may result in electric shock, which may cause death or serious injury to personnel. Defective installation or maintenance may also lead to the risk of fire. Read the manual carefully prior to connecting the unit. Follow all installation and maintenance instructions throughout the unit's working life. Pay special attention to the installation standards of the National Electrical Code.
	**Refer to the instruction manual before using the unit** In this manual, if the instructions marked with this symbol are not respected or carried out correctly, it can result in injury or damage to the unit and /or installations.

CIRCUTOR, SA reserves the right to modify features or the product manual without prior notification.

DISCLAIMER

CIRCUTOR, SA reserves the right to make modifications to the device or the unit specifications set out in this instruction manual without prior notice.

CIRCUTOR, SA on its web site, supplies its customers with the latest versions of the device specifications and the most updated manuals.

www.circutor.com

	**CIRCUTOR,** recommends using the original cables and accessories that are supplied with the device.

CONTENTS

REVISION LOG

Table 1: Revision log.

Date	Revision	Description
10/13	M98252901-03-13A	Initial Version
11/13	M98252901-03-13B	Modifications in the characteristics of earth leakage transformer.
12/17	M98252901-03-17A	New manual design
05/18	M98252901-03-18A	Changes in the following sections: 3.3. - 3.4. - 4.7. - 4.9. - 4.10.

SYMBOLS

Table 2: Symbols.

Symbol	Description
CE	In compliance with the relevant European directive.
	The device complies with the 2012/19/EC European directive. Do not dispose of the device in a household waste container at the end of its useful life. Observe the local electronic device recycling regulations.
⎓	Direct current.
~	Alternating current.

Note: *The images of the devices are for illustrative purposes only and might differ from the original device.*

1.- VERIFICATIONS UPON RECEPTION

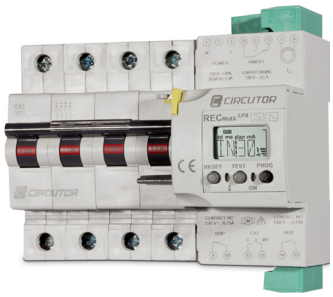
The following must be checked upon reception of the device:

a) The device has been supplied according to the specifications in your order.
b) The device has not been damaged during transport.
c) Perform an external visual inspection of the device before connecting it.
d) Check that it has been supplied with the following:
- An installation guide.
- 3 Plug-in terminals,
- 1 Adhesive label with a warning message.

	Immediately contact the carrier and/or **CIRCUTOR's** after-sales service if you detect any problem in the device upon reception.

2.- DESCRIPTION OF THE PRODUCT

The **RECmax Lpd** protects against over-currents and is based on an ultra-immunised circuit breaker and earth leakage protection system, with breaking capacity at full load and automatic re-closing control.
The device comprises a 2 or 4-pole circuit breaker, which is mechanically connected to a motor and a tripping device controlled by an earth leakage relay. It provides protection against leakage currents and has an automatic re-closing control. The **RECmax Lpd** requires an external earth leakage transformer (with suitable sensitivity), which is supplied separately.



There are 2 models available:

✓ **RECmax Lpd 2-pole**, for single-phase installations.
✓ **RECmax Lpd 4-pole**, for three-phase installations.

The device features:

- Inputs for the measurement of earth leakage current.
- 3 keys that can be used to browse the various screens and program the device.
- 2 Indicator LEDs.
- LCD Display, to view the parameters.
- 1 inputs for remote control.
- 2 alarm outputs.
- 1 output to indicate the status of the main switch.

3.- INSTALLING THE DEVICE

3.1.- PRELIMINARY RECOMMENDATIONS

	The operators using and handling the device must follow the safety measures established in the country where the device will be used to guarantee its safe operation, using personal protective equipment if needed.

The **RECmax Lpd** device must be installed by authorised and qualified staff.

Disconnect the device from the mains and disconnect the measuring devices before handling, changing the connections of or replacing the device. Handling the device while it is connected is hazardous to people nearby.

The cables must be in perfect working order to prevent accidents or injuries to people and/or damage to the facilities/installations.

Limit the operation of the device to measuring the specified current or voltage values.

The manufacturer of the device shall not be held responsible for any damage resulting from the user or installation company failing to observe the warnings and/or recommendations indicated in this manual nor for any damage resulting from the use of non-original products or accessories or those from other brands.

Inspect the device before using it. Make sure that there are no cracks and that the housing is intact.

Do not use the device to take measurements if you detect an anomaly or malfunction.

Check the environment in which the device is installed before taking a measurement. Do not use the device to take measurements in dangerous, explosive, wet or damp environments.

	Disconnect the device from the mains and from the power supply (both the device and its measuring system) before performing any maintenance work, repairs or handling any of the connections of the device. Contact the after-sales service if you detect that the device is not working properly.

3.2.- INSTALLATION

	While the device is connected, the terminals, opening the cover or removing elements can expose parts that are hazardous to the touch. The device must not be used until the installation process is complete.

The **RECmax Lpd** must be installed inside an electric panel or enclosure and mounted on a DIN rail 46277 (EN 50022).

The device has connection indicator LEDs, indicating the presence of voltage. Even if these LEDs are not on, the user must still verify that the device is disconnected from all power supplies.

The device's auxiliary supply must be protected with fuses or protection elements appropriate for the power supply range and consumption. Preferably the protection should consist of a small circuit breaker allowing the disconnection of the unit from the power supply in case of servicing.

3.2.1.- MEASUREMENT OF THE EARTH LEAKAGE CURRENT IΔ

The earth leakage current must be measured using the **WG/WGS/WGC** earth leakage transformers from **CIRCUTOR**.

The transformer terminals which should be connected to terminals 7-8 of the **RECmax Lpd (Table 4),** are :

Table 3: Earth leakage transformer terminals.

Earth leakage transformer to connect in the RECmax Lpd	
Model	**Terminals**
WGC	S1 - S2
WGS - WG	1S1 - 1S2

	The external earth leakage transformer is necessary for the device to operate correctly. Even if its installation only appears linked to the correct working of the earth leakage protection, failing to install it will affect other functions of the device, such as the reclosing and display of parameters on the **RECmax Lpd** display.

	An incorrect or faulty connection of the earth leakage transformer means loss of the earth leakage protection and possible risk of electric shock.

	When using the **WG/WGS** earth leakage transformers, the 2S1-2S2 terminals should not be connected to the **RECmax Lpd** nor should be short-circuited. They should be left at open circuit.

In case of a faulty connection of the earth leakage transformer or if this transformer is not compatible with the **RECmax Lpd,** the screen shown in **Figure 1** will appear.

Figure 1: Error in the connection of the earth leakage transformer.

3.3.- TERMINALS OF THE DEVICE

The **RECmax Lpd** terminals are distributed between the upper and lower face of the device.

Table 4:List of RECmax Lpd terminals.

Terminals of the RECmax Lpd device	
1, 3: Power supply	**13: EXT**, remote control input
7: Input S1 for measuring the earth leakage current IΔ	**14: AUX**, AUX output (Common)
8: Input S2 for measuring the earth leakage current IΔ	**15: AUX**, AUX output (NO)
9: TRIP, TRIP output (Common)	**16: ON/OFF**, ON/OFF output (Common)
10: TRIP, RIP output (NC)	**17: ON/OFF**, ON/OFF output (NC)
12: EXT, remote control input	**18: ON/OFF**, ON/OFF output (NO)

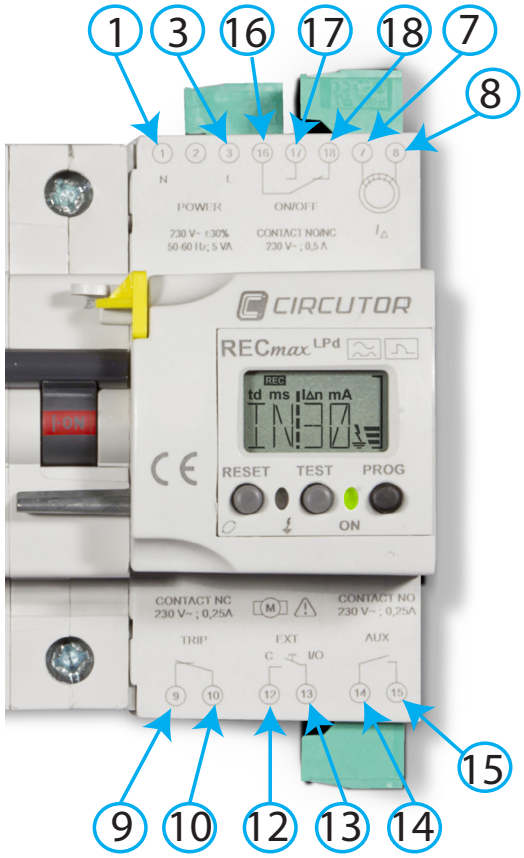


Figure 2:RECmax lpd terminals.

3.4.- CONNECTION DIAGRAMS

3.4.1.- MEASUREMENT OF SINGLE-PHASE NETWORK: RECmax Lpd 2-POLE

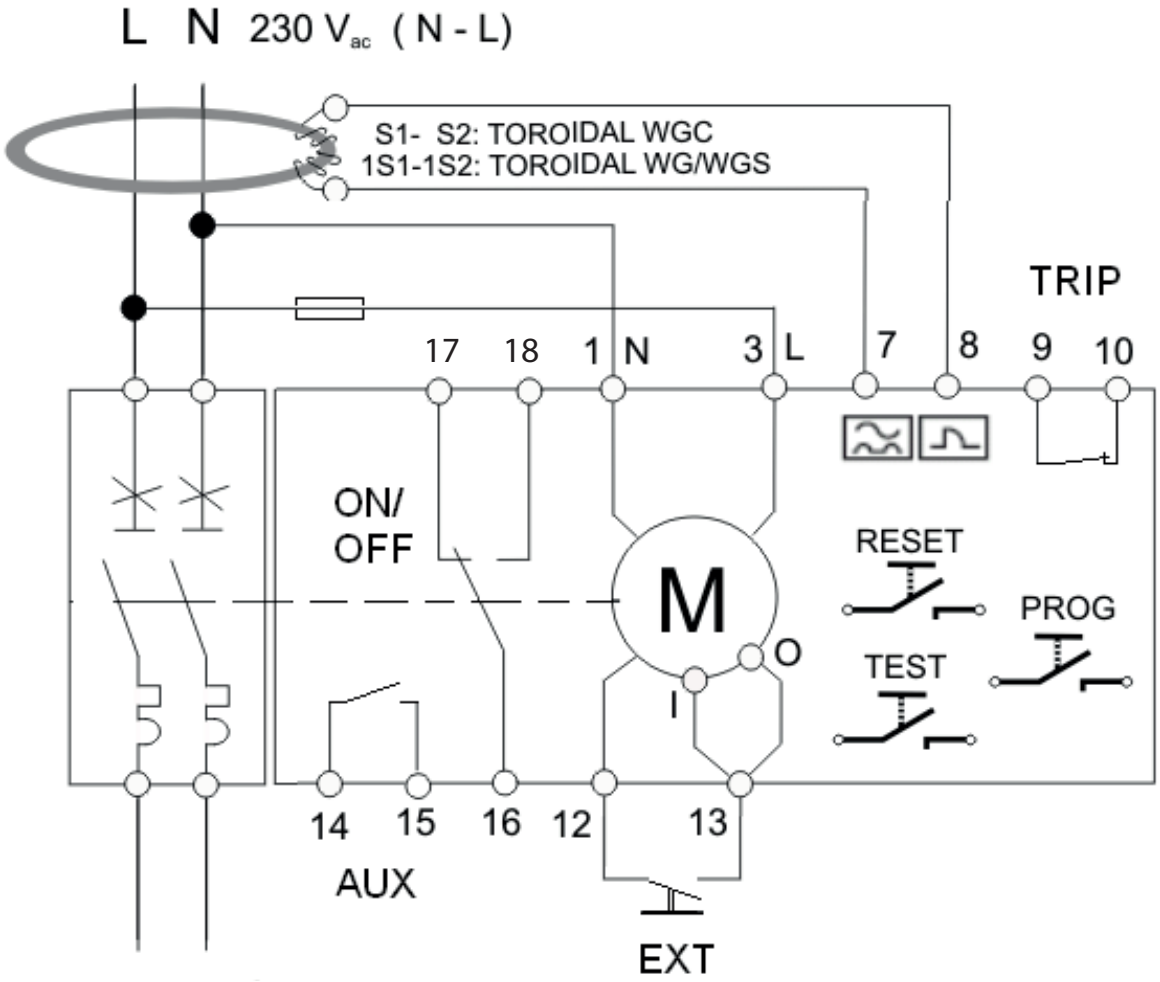


Figure 3: Measurement of single-phase network: RECmax Lpd 2-pole.

⚠	The **EXT** input enables the motorised switch to be controlled remotely (opening and closing). The input is activated when terminals 12-13 are short circuited with an external voltage-free contact, for example a button. Said input acts as an edge-triggered bistable T-type input, i.e., the status of the main switch changes on each pulse, if the switch is open it closes, if it is closed it opens.
⚠	The N-L auxiliary power supply (terminals **1-3**) may be external to the installation to be protected, but in no case it must be connected downstream from the main switch.

3.4.2.- MEASUREMENT OF THREE-PHASE NETWORK: RECmax Lpd 4-POLE

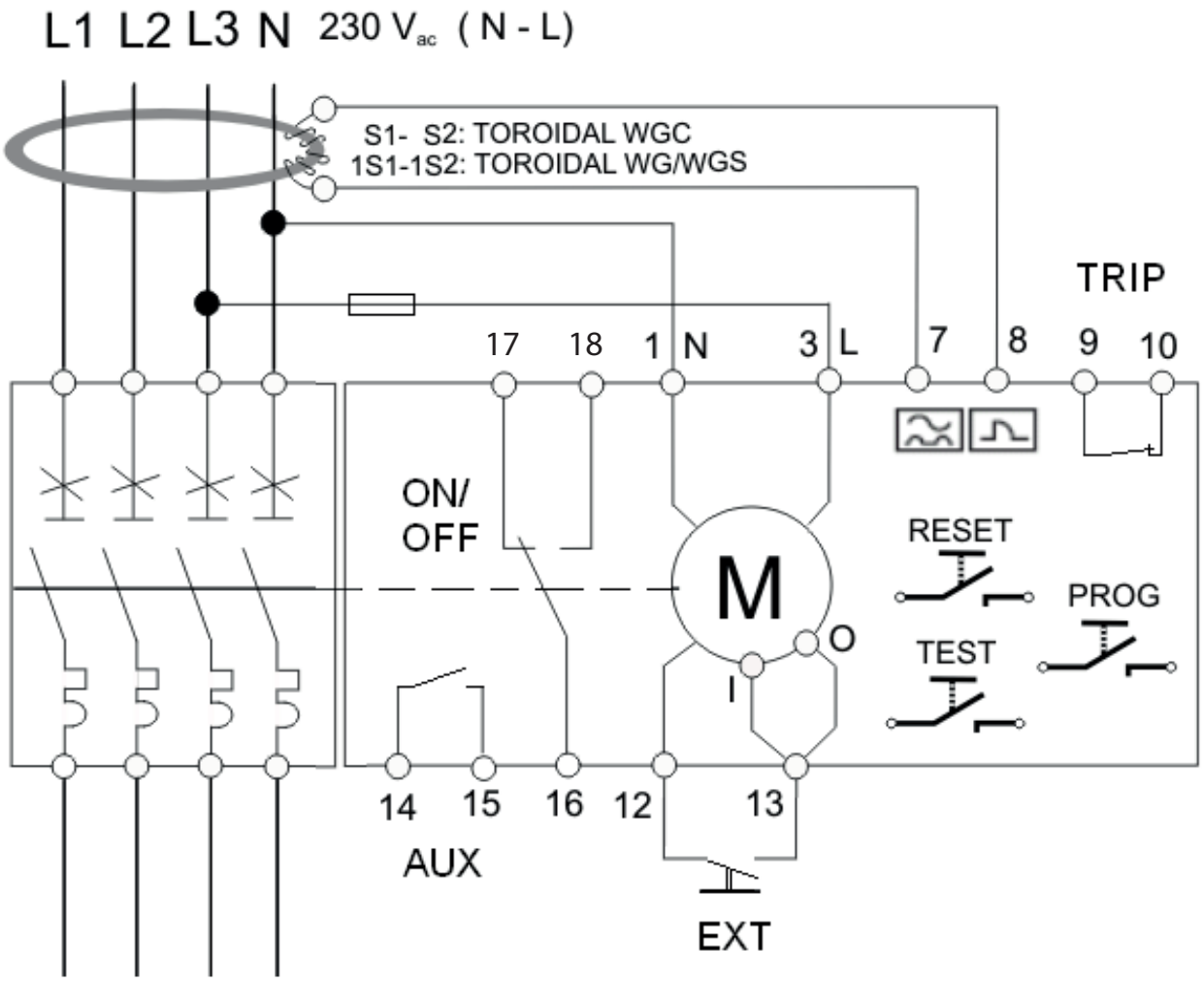


Figure 4: Measurement of three-phase network: RECmax Lpd 4-poles.

⚠	The **EXT** input enables the motorised switch to be controlled remotely (opening and closing). The input is activated when terminals 12-13 are short circuited with an external voltage-free contact, for example a button. Said input acts as an edge-triggered bistable T-type input, i.e., the status of the main switch changes on each pulse, if the switch is open it closes, if it is closed it opens.
⚠	The N-L auxiliary power supply (terminals **1-3**) may be external to the installation to be protected, but in no case it must be connected downstream from the main switch.

3.5.- DISCONNECTION OF THE DEVICE

If after wiring the **RECmax Lpd** you decide to have the protected line disconnected, you must disconnect the device manually by pushing the contact lever of the switch downwards and moving the mechanical lock (yellow sealable catch **Figure 5**) upwards. This eliminates any possibility of accidental reclosing

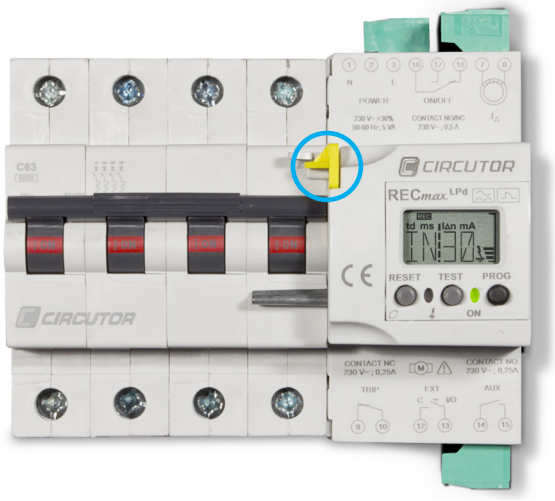


Figure 5: Mechanical lock.

	**Never** manually lower the circuit breaker without previously enabling the mechanical lock (moving the yellow sealable catch, **Figure 5,** upwards). This prevents accidental reclosing while handling the installation. On doing this, although the green LED is not on, the unit remains connected to the upstream auxiliary power supply and therefore precautions should be taken to avoid touching parts with voltage.

4.- OPERATION

4.1.- OPERATING PRINCIPLE

RECmax Lpd is a device for protecting single-phase or three-phase electrical installations of up to 63 A in which a high continuity of electrical service must be guaranteed.
The device has an automatic reset system after a trip, so it reconnects on its own after a period of time, with the installation recovering power without human operator intervention.

The basic functions of the **RECmax Lpd** are:

✓ Earth leakage protection (protecting people against electric shock and property against the risk of fire)

✓Protection against overloads and short-circuits with a circuit breaker.

4.2.- DESCRIPTION OF THE DEVICE

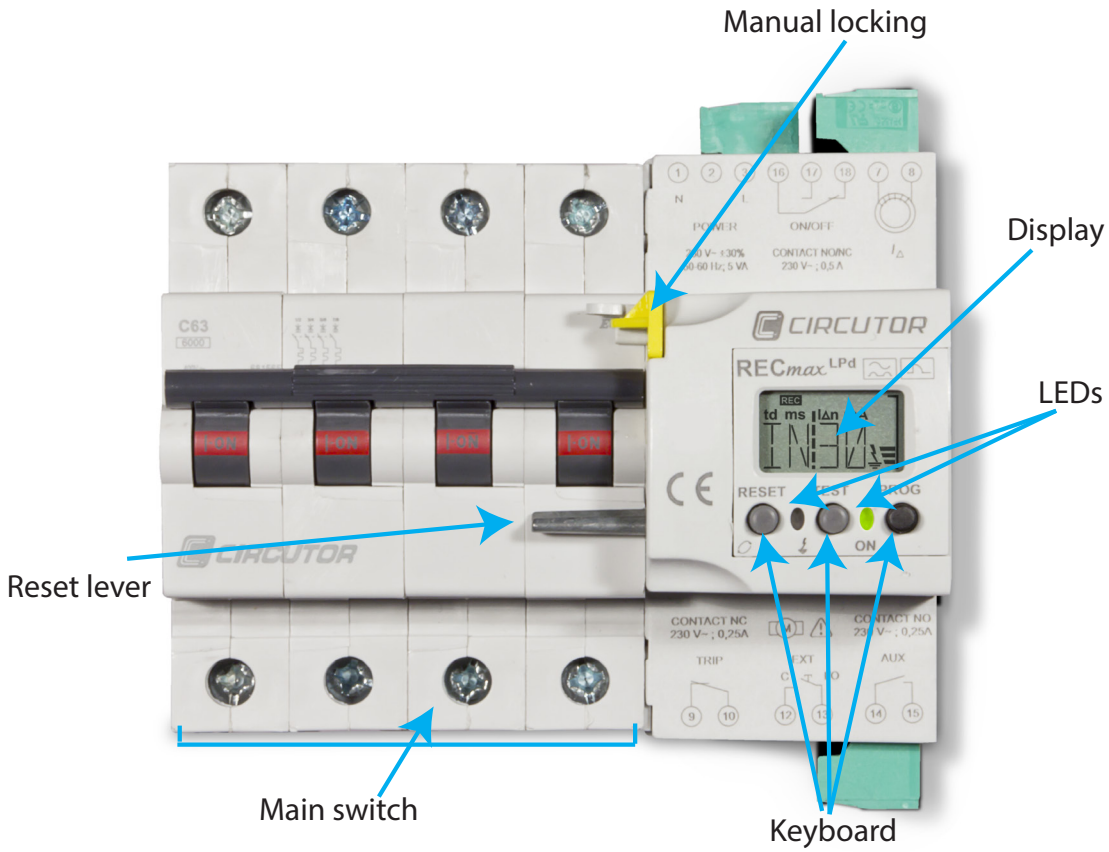


Figure 6: General description of the device.

4.3.- KEYBOARD FUNCTIONS

The **RECmax Lpd** has 3 keys, **Figure 7**:

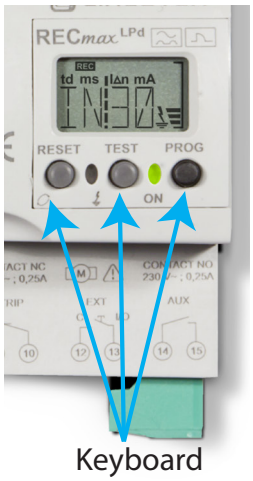


Figure 7: Keyboard.

✓ **TEST**, pressing this key causes a forced trip of the earth leakage protection. If the device has already tripped, pressing does not cause any action.

⚠	Pressing the **TEST** key disables the automatic reclosing system, as it is considered that the person who performs the local TEST will generate the reset for rearming the protection.

✓ **RESET**, the function of the key depends on the status of the device:

Table 5: Operation of the RESET key.

Key	Operation
RESET	**Normal operating status**
	Display of the home screen of the device with description of the firmware model and version.
	Trip status
	System restart and reclosing the device.
	Configuration
	Browsing the setup menu. Jumping between the different Configuration options.

✓ **PROG**, the function of the key depends on how long it is pressed. The **PROG** key is physically sealable, see ***"6.3.1.- PHYSICAL LOCKING".***

Table 6: Operation of the PROG key.

Key	Operation
PROG	**Short press (< 3 s)**
	Saves the configured values and exits the setup menu.
	Long press (> 3 s)
	Accesses the setup menu

4.4.- DISPLAY

The device has a backlight display with green or red light, according to the status of the device. The backlight is green and in trip conditions it is red under normal operating conditions.

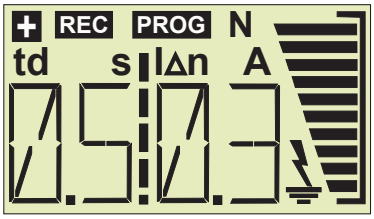


Figure 8: RECmax Lpd display.

The device display shows different symbols that indicate the operating status of the device:

The **leakage symbol** with the bars is activated when a leakage current is detected. The number of bars is proportional to the instantaneous value of the leakage current, scaled with respect to the trip current IΔn.

REC The **REC** symbol is displayed when automatic reclosing is possible.

+ The **+** symbol indicates that the **TRIP output** is configured for positive safety.

PROG The **PROG** symbol is displayed on the setup screens of the device.

4.5.- LED INDICATORS

The device has 2 indicator LEDs, **Figure 9**.

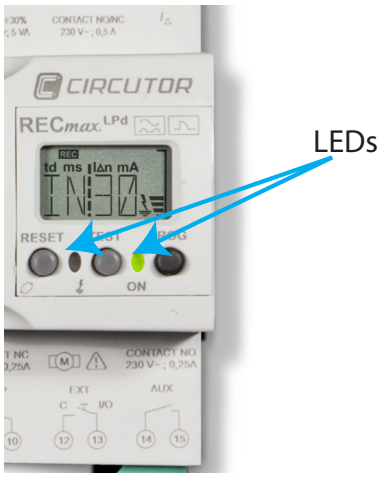


Figure 9: RECmax Lpd LED indicators.

Table 7: Description of the LEDs: Normal operating status.

Normal operating status	
LED	**Description**
Green	**On:** Powered device.
Red	**Off**

Table 8: Description of the LEDs: Trip status.

Trip status	
LED	**Description**
Green	**Off**
Red	**Flashing:** The device is waiting for the time needed for an automatic reclosing attempt. **Permanent:** Automatic reclosing is not possible.

	The flashing or simultaneous switching on of the **Red** and **Green** LEDs indicates that the device is not working correctly, either because of an intrinsic problem in the device or due to improper installation.

Note: *One of the most frequent causes of improper installation is that the earth leakage transformer has not been connected. In that case the* ***Red*** *LED comes on and the* ***Green*** *LED flashes rapidly.*

4.6.- INPUTS

The **RECmax Lpd** has one key:

✓ **EXT input** (terminals 12 and 13 in **Table 4**) enables the remote control of the main switch, trip or reset of the switch depending on its status.
The input is activated when terminals 12-13 are short circuited with an external contact (voltage-free), for example a button. **EXT** input acts as an edge-triggered bistable, T-type input, i.e., the status of the main switch changes on each pulse, if the switch is open it closes, if it is closed it opens.

Table 9: Inputs.

Inputs	Type	Activation mode
EXT	Voltage-free	200 ms pulses

4.7.- OUTPUTS

The **RECmax Lpd** has three outputs:

✓ **TRIP locking alarm** (terminals 9 and 10 in **Table 4**) indicates that the device is locked, i.e. that it cannot be automatically reclosed and needs a manual or external reset to recover its normal operation.

Table 10: TRIP locking alarm.

Automatic reclosing	TRIP locking alarm
	Contact 9 - 10
✓	Open
X	Closed

Note:** The **TRIP locking alarm** has the **Positive safety** Configuration; loss of power is treated as an alarm. This type of operation can be configured, see **"6.2.4.- POLT: CONFIGURATION OF THE TRIP OUTPUT".

If configured ***without positive safety*** and the device loses power, the device may be locked and the **TRIP** output won't be activated.

✓ **AUX fault alarm** (terminals 14 and 15 in **Table 4**) indicates whether there is any power or not.

Table 11: AUX fault alarm.

Power supply	AUX fault alarm
	Contact 14 - 15
✓	Closed
X	Open

Note: *The contact is controlled by the internal microprocessor and therefore, if there is a fault with the microprocessor the relay will not close.*

✓ **ON/OFF output** (terminals 16, 17 and 18 in **Table 4**) indicates status of the main switch.

Table 12: ON/OFF output.

Main switch	ON/OFF output	
	Contact 16 - 17	Contact 16 - 18
Closed	Open	Closed
Open	Closed	Open

4.8.- RESET LEVER AND MANUAL LOCKING

The device has a **reset lever (see Figure 6**), its default position is down. In case of reclosing, the motor lever is raised actuating the switch. After the reset, the motor lever returns to its downward position.

The device also has a **manual locking system** to prevent the possibility of automatic reclosing. The lever is sealable.

Reclosing of the device can be completely prevented through manual locking. The operation is performed by moving the **reset lever** downwards and moving **the manual locking system** (yellow catch) to the left.

In case of manual locking, although the green LED is not ON, the device is connected to the power supply. Therefore, there is a risk of electric shock if the power supply is not cut off.

4.9.- NORMAL OPERATING STATUS

In normal operating conditions, powered device and without tripping, the status of the device is shown in **Table 13.**

Table 13: Normal operating conditions.

Normal operating conditions			
Main switch	**Reset lever**	**Green LED**	**Red LED**
Closed (Lever up)	Down	Power on	Off
Display	**TRIP Alarm**	**AUX Alarm**	**ON/OFF output**
Green	open contact	closed contact	contact 16-17: open contact 16-18: closed

4.10.- TRIP STATUS

The device may be tripped due to:

✓ **Actuation of the protection** due to an installation defect**,** whether the earth leakage protection or protection against overloads or a short-circuit.

✓ **Manual opening of the main switch,** lowering the switch lever.

✓ **Pressing** of the **TEST** key.

✓ **External order,** after the **EXT** remote control input.

	Whatever the case, if after the trip some maintenance check or action in the electrical installation is required, it is advisable to activate the **mechanical lock** to prevent accidental reclosing during operation.

	If the trip was caused by **actuation of the protection**, **NEVER** reclose the switch manually, always do so by pressing the **RESET** key.

The trip gives rise to one of 2 possibilities:

✓ **Automatic reclosing is possible**
✓ **Automatic reclosing is not possible**

4.10.1.- AUTOMATIC RECLOSING IS POSSIBLE

Immediately after the trip, the device begins a sequence of reclosing attempts with the programmed time intervals.
In this situation the status indicators are shown in **Table 14.**

Table 14: Trip status: Automatic reclosing possible.

Trip status: Automatic reclosing is possible			
Main switch	**Reset lever**	**Green LED**	**Red LED**
Open (Lever down)	Down	Off	Flashing
Display	**TRIP Alarm**	**AUX Alarm**	**ON/OFF output**
Red	Open	Closed contact(1)	Contact 16-17: closed Contact 16-18: open

(1) If the power supply fails, the contact is open.

If the trip is caused by an earth leakage protection fault, the display will alternate between two screens indicating the trip current and number of reclosing attempts per earth leakage relay. (See **Figure 10** and ***"5.2.1.- EARTH LEAKAGE PROTECTION TRIP"***)

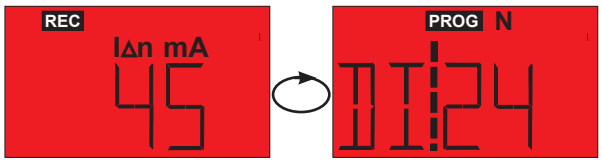


Figure 10: Screens after an earth leakage protection trip.

If the trip is caused by a fault in the protection due to overloads or a short circuit, a screen will appear indicating the number of reclosing attempts carried out by the circuit breaker. (See **Figure 11** and ***"5.2.2.- CIRCUIT BREAKER TRIP"***)

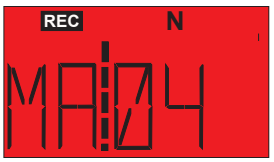


Figure 11: Screen after a circuit breaker trip.

	After an automatic reclosing sequence, the partial reclosing meters restart after 15 or 30 minutes after the last reclose, according to the value configured (see "***6.2.1.- SDR: EARTH LEAKAGE RECLOSING SEQUENCE"*** and ***"6.2.2.- SRM: CIRCUIT BREAKER RECLOSING SEQUENCE"***)

4.10.2.- AUTOMATIC RECLOSING IS NOT POSSIBLE

Automatic reclosing may not be possible for one of the following reasons:

1.- Reclosing has been disabled when programming the device. The display will show the cause of the trip without the **REC** symbol.
The reset is only possible by modifying the Configuration of the device, see ***"6.2.1.- SDR: EARTH LEAKAGE RECLOSING SEQUENCE"*** AND ***"6.2.2.- SRM: CIRCUIT BREAKER RECLOSING SEQUENCE"***

2.- The number of reclosing attempts has been exhausted. The display will show the cause of the trip without the **REC** symbol.
In this case, the reset is only possible by pressing the **RESET** key or by an external order of the **EXT** input.
Reclosing the device with the **RESET** key or the **EXT** input restarts the partial reclosing meters.

3.- The device was tripped manually by pressing the **TEST** key. The display will show the "**TEST**" text, see ***"5.2.3.- TRIPPING WITH THE TEST KEY"*.**
In this case, the reset is only possible by pressing the **TEST** key again.

4.- The trip was caused by the **EXT** remote control input. The display will show the "**EXT**" text, see ***"5.2.4.- TRIP DUE TO EXT ON/OFF INPUT"***
In this case, reclosing is only possible with another external order of the **EXT** remote control input.

In this situation the status indicators are shown in **Table 15.**

Table 15: Trip status: Automatic reclosing is not possible.

Trip status: Automatic reclosing is not possible			
Main switch	**Reset lever**	**Green LED**	**Red LED**
Open (Lever down)	Down	Off	Permanently on
Display	**TRIP Alarm**	**AUX Alarm**	**ON/OFF output**
Red	Closed	Closed contact(2)	Contact 16-17: closed Contact 16-18: open

(2) If the power supply fails, the contact is open.

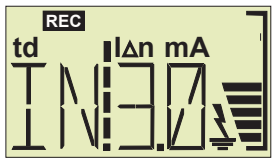
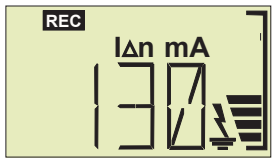
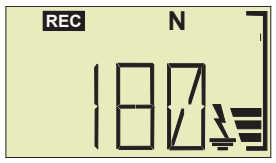
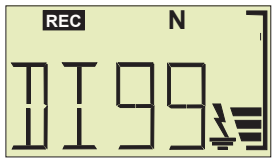
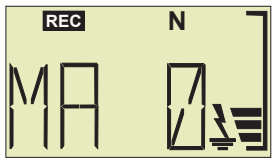
5.- DISPLAY

5.1.- NORMAL OPERATING STATUS

In the normal operating status, the device shows 5 information screens on the protection of the device.

Press the **PROG** key to move between the different screens.

Table 16: Display screens: Normal operating status.

Display screens: Normal operating status.
 **Delay and Sensitivity**
 **Leakage current**
 **Total no. of trips**
 **No. of earth leakage protection trips** (3) (4)
 **No. of trips due to protection against overloads and short circuits through a circuit breaker**. (3) (4)

(3) Temporary screen, after 5 seconds of keyboard inactivity it jumps to the **Delay and Sensitivity** screen.
(4) The partial re-closure counters display the number of attempts made before the last successful re-closure.

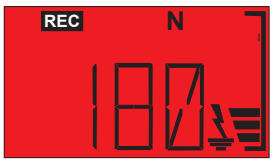
5.2.- TRIP STATUS

When the trip occurs the device shows the display screens in red.

5.2.1.- EARTH LEAKAGE PROTECTION TRIP

Press the **PROG** key to move between the different screens.

Table 17: Display screens: Earth leakage protection trip.

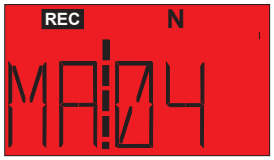
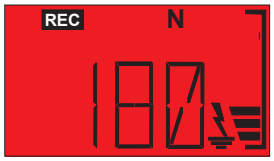
Display screens: Earth leakage protection trip
 **Delay and Sensitivity**
 Value of the **leakage current** which caused the trip. (5) ***Note:*** *If the current is out of range, the message* OVR appears.
 **No. of trips** which have occurred due to earth leakage protection. (5)
 **Total no. of trips**

(5) The leakage current and no. of trips screens are displayed alternately.

5.2.2.- CIRCUIT BREAKER TRIP

Press the **PROG** key to move between the different screens.

Table 18: Display screens: Circuit breaker trip.

Display screens: Circuit breaker trip
 **Delay and Sensitivity**
 **No. of trips** which have occurred due to circuit breaker.
 **Total no. of trips**

5.2.3.- TRIPPING WITH THE TEST KEY

When tripping the device by pressing the **TEST** key, the device will display the normal operating status screens, **Table 16**, but instead of displaying the **leakage current**, it will display the screen in **Figure 12.**

Figure 12: Trip due to TEST.

5.2.4.- TRIP DUE TO EXT INPUT

When tripping the device with the **EXT** input, the device will display the normal operating status screens, **Table 16**, but instead of displaying the **leakage current**, it will display the screen in **Figure 13.**

Figure 13: Trip due to EXT.

6.- CONFIGURATION

	The correct operation of the **RECmax Lpd** depends on its correct adjustment. Since it is a protection device, erroneous adjustment can compromise the protection of property and people. That is why it is very important that it is adjusted by a trained technician to decide on the most appropriate type of protection in each installation. **CIRCUTOR** accepts no responsibility for incorrect working of the device due to erroneous adjustment

6.1.- EARTH LEAKAGE PROTECTION

To configure the earth leakage protection, press the **PROG** key for more than 3 seconds, while the **Delay and Sensitivity** screen is displayed, **Figure 14**.

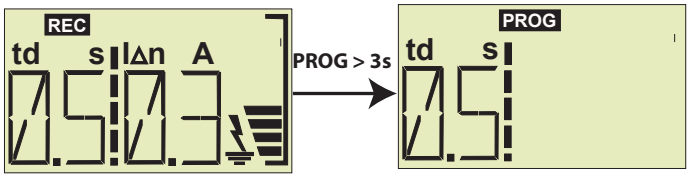
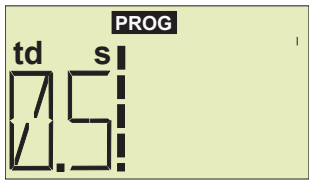


Figure 14: Configuration: Earth leakage protection.

6.1.1.- ACTIVATION DELAY

Configure the activation delay value on this screen, **Δt(td)**.



Press the **RESET** key to modify the value. The possible values are:

INS, reverse curve according to the leakage current intensity measured, **IΔ**, with instantaneous programming. **Table 19** shows the activation times.

SEL, reverse curve according to the leakage current intensity measured, **IΔ**, with selective programming. **Table 19** shows the activation times.

0.1s, 0.2s, 0.3s, 0.4s, 0.5s, 0.6s, 0.8s, 1s, fixed values.

Table 19: Activation times of the reverse curve.

		Maximum operating time for IΔ			
Type	**IΔn**	**IΔ : 1 x IΔn**	**IΔ : 2 x IΔn**	**IΔ : 5 x IΔn**	**500 A**
INStantaneous	All the values	0.3 s	0.15 s	0.04 s	0.04 s
SELective	> 0.03 A	0.5 s	0.2 s	0.15 s	0.15 s

Note: *Standard values of the IEC 61008-1.*

When the value on the screen is the desired value, press the **PROG** key to jump to the next programming point.

If you do not press any key for 5 s, the screen shown in **Figure 15** appears and the device opens the **Delay and Sensitivity** screen, without saving the changes made.

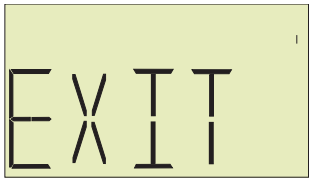
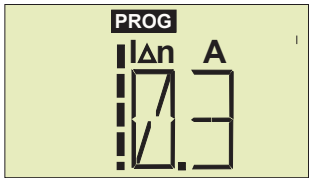


Figure 15: Screen indicating that the programming menu has been exited.

Default value: **INS**

6.1.2.- SENSITIVITY CURRENT, $I_{\Delta N}$

On this screen configure the current above which the earth leakage will be tripped, $I_{\Delta N}$.



Press the **RESET** key to modify the value. The possible values are:

30 mA, 0.1 A, 0.3 A, 0.5 A, 1A.

⚠	Earth leakage protection for people must be adjusted to 30 mA and automatically means an instantaneous delay adjustment. Therefore, whenever $I_{\Delta N}$ is configured to 30 mA, the device will prevent any other adjustment of the delay.

Press the **PROG** key to save the modified values and exit the setup menu; when exiting, the screen in **Figure 16** is displayed for a few seconds.

Figure 16: Screen indicating that the data has been saved.

If no key is pressed for 5 s, the screen in **Figure 15** appears and the device exits the setup menu without saving the changes made.

Default value: **30 mA**

6.2.- AUTOMATIC RECLOSING

To configure the automatic reclosing parameters, press the **PROG** key for more than 3 seconds, while the **Leakage current** or **Total no. of trips** screen is displayed.

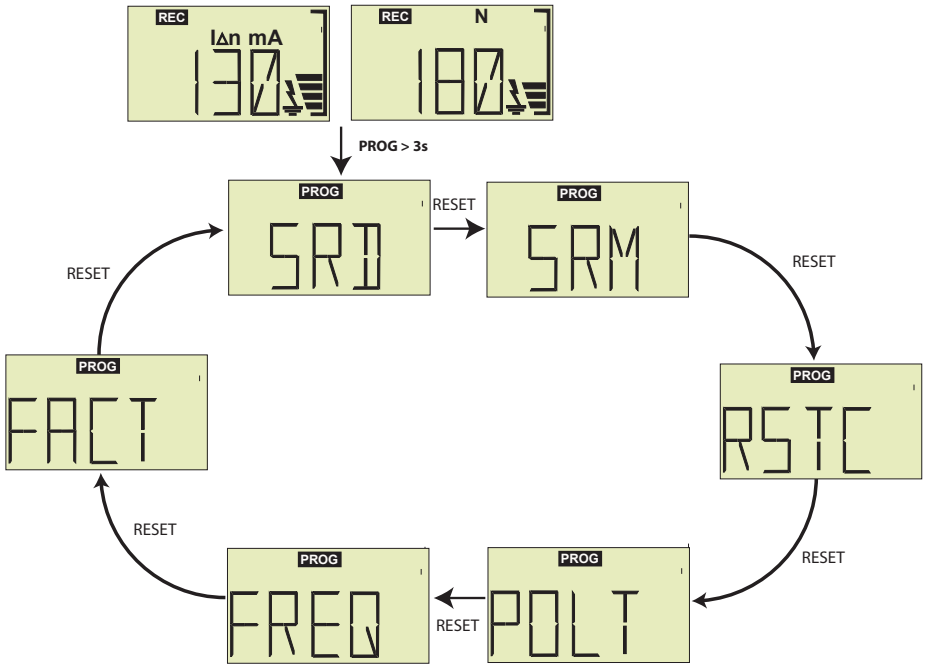
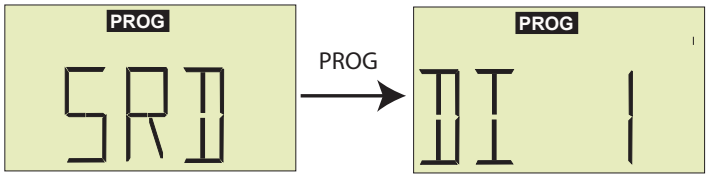


Figure 17: Configuration: Automatic reclosing.

6.2.1.- SRD: EARTH LEAKAGE RECLOSING SEQUENCE

The reclosing parameters are configured on this screen after an earth leakage protection trip.



Press the **RESET** key to move between the different sequences available (**DI**).
Each sequence determines the maximum no. of reclosing attempts (**NR**), the timer (**ST**) and the reset time of the partial meter (**TR**). **Table 20** shows the different sequences.

Table 20: Available sequences (SDR).

SDR: Available sequences			
DI	**NR**	**ST**	**TR**
DI 0	Automatic reclosing is disabled by earth leakage relay		
DI 1	6	8, 16, 30, 59, 115 and 224s	15 min.
DI 2	30	20s, 40s and 5 min. the rest	15 min.
DI 3	8	30s, 1, 2, 3, 4, 5, 6, and 7 min.	15 min.
DI 4	6	10, 20, 30, 60, 130 and 600s.	15 min.
DI 5	6	2, 4 and 8 min. the rest	15 min.
DI 6	7	30s, 1, 2, 3, 4, 8 and 16 min.	30 min.

Table 20 (Cont.): Available sequences (SDR).

SDR: Available sequences			
DI	**NR**	**ST**	**TR**
DI 7	10	1 min.	30 min.
DI 8	10	90 s.	30 min.
DI 9	8	2, 4 and 6 min. the rest	15 min.
DI 10	10	3 min.	30 min.
DI 11	7	2, 4, 8, 16 and 32 min. the rest	15 min.
DI 12	31	2, 4 and 6 min. the rest	60 min.
DI 13	3	2, 4 and 8 min.	15 min.
DI 14	Free space for personalising the customer.		

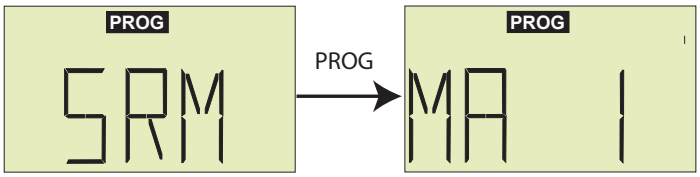
Press the **PROG** key to save the selected sequence and exit the setup menu; when exiting, the screen in **Figure 16** is displayed for a few seconds.

If you do not press any key for 5 s, the screen shown in **Figure 15** appears and the device opens the **Delay and Sensitivity** screen, without saving the changes made.

Default value: **DI 10**

6.2.2.- SRM: CIRCUIT BREAKER RECLOSING SEQUENCE

The reclosing parameters are configured on this screen after a circuit breaker trip.



Press the **RESET** key to move between the different sequences available (**MA**).
Each sequence determines the maximum no. of reclosing attempts (**NR**), the timer (**ST**) and the reset time of the partial meter (**TR**). **Table 21** shows the different sequences.

Table 21: Available sequences (SRM).

SRM: Available sequences			
MA	**NR**	**ST**	**TR**
MA 0	Automatic reclosing is disabled by circuit breaker		
MA 1	2	1 min.	30 min.
MA 2	2	1 min.	60 min.
MA 3	2	90 s	30 min.
MA 4	2	90 s	60 min.
MA 5	2	3 min.	30 min.
MA 6	2	30 s	30 min.
MA 7	6	30 s	30 min.
MA 8	Free space for personalising the customer.		

Press the **PROG** key to save the selected sequence and exit the setup menu; when exiting, the screen in **Figure 16** is displayed for a few seconds.

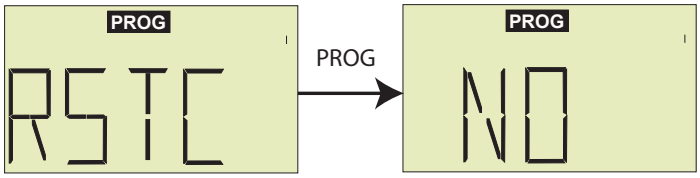
If you do not press any key for 5 s, the screen shown in **Figure 15** appears and the device opens the **Delay and Sensitivity** screen, without saving the changes made.

⚠	If **SRM** and **SRD** have been configured with the number 0 sequence, automatic reclosing will be fully disabled. The **REC** symbol disappears from the display.

Default value: **MA 5**

6.2.3.- RSTC: PARTIAL METER RESETTING

The partial reclosing meters are reset on this screen.



Press the **RESET** key to move between the different options:

NO, the meters are not reset.
YES, the meters are reset.

Press the **PROG** key to save the selected option and exit the setup menu; when exiting, the screen in **Figure 16** is displayed for a few seconds.

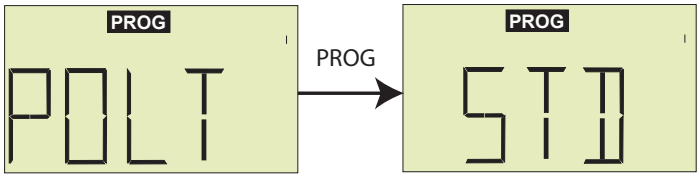
If you do not press any key for 5 s, the screen shown in **Figure 15** appears and the device opens the **Delay and Sensitivity** screen, without saving the changes made.

⚠	In this section only the partial meters are set to zero, i.e., those that separately accumulate the no. of recloses caused by a circuit breaker trip (MA) or by an earth leakage trip (DI). See ***"6.2.6.- FACT: FACTORY CONFIGURATION"*** to reset the total meter.

Default value**: NO**

6.2.4.- POLT: CONFIGURATION OF TRIP OUTPUT

Configure the type of contact of the **TRIP** output on this screen.



Press the **RESET** key to move between the different options:

STD, the contactor of the **TRIP** output acts without positive safety.
POS, the contactor of the **TRIP** output acts with positive safety.

Press the **PROG** key to save the selected option and exit the setup menu; when exiting, the screen in **Figure 16** is displayed for a few seconds.

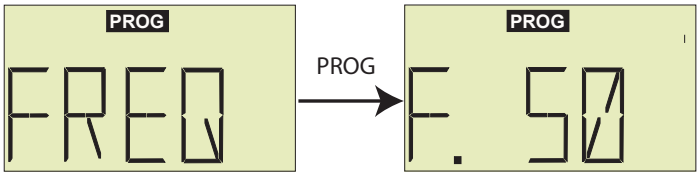
If you do not press any key for 5 s, the screen in **Figure 15** appears and the device opens the **Delay and Sensitivity** screen, without saving the changes made.

Note: *If the positive safety of the contactor has been programmed, the + symbol will appear on the display.*

Default value: **POS**

6.2.5.- FREQ: NOMINAL FREQUENCY

Configure the nominal operating frequency of the device on this screen.



Press the **RESET** key to move between the different options:
F. 50, nominal frequency 50 Hz.
F. 60, nominal frequency 60 Hz.

Press the **PROG** key to save the selected option and exit the setup menu; when exiting, the screen in **Figure 16** is displayed for a few seconds.

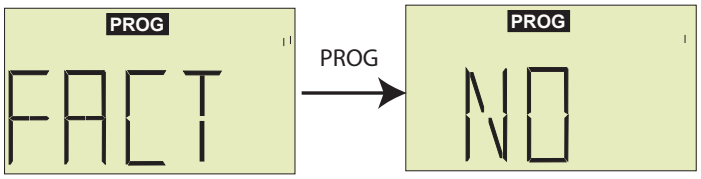
If you do not press any key for 5 s, the screen in **Figure 15** appears and the device opens the **Delay and Sensitivity** screen, without saving the changes made.

	Configuring the frequency is essential for being able to correctly calculate and display the instantaneous value of the leakage currents and the trip current. Incorrect Configuration of the frequency causes unstable measurements with wild swings, so the earth leakage protection may not work correctly.

Default value: **F. 50**

6.2.6.- FACT: FACTORY CONFIGURATION

The factory default Configuration can be restored on this screen.



Press the **RESET** key to move between the different options:

NO, the factory values are not restored.
YES, the factory values are restored.

	Selecting the option **YES** means a **total reset**, which includes the control parameters for the protection trigger. Its use is therefore only advised when the downstream loads are out of service.

Press the **PROG** key to save the selected option and exit the setup menu; when exiting, the screen in **Figure 16** is displayed for a few seconds.

If you do not press any key for 5 s, the screen in **Figure 15** appears and the device opens the **Delay and Sensitivity** screen, without saving the changes made.

Default value: **NO**

6.3.- LOCKING THE CONFIGURATION

After configuring the device, you can lock the Configuration of the parameters. There are two locking methods:

- ✓ Physical locking,
- ✓ Program locking,

6.3.1.- PHYSICAL LOCKING

The **PROG** key has a hole through which a sealing wire can be passed, so that it is physically impossible to press it.
With the physical locking option you cannot access all the display screens or the Configuration of the device.
This means that before locking the key, you must choose the fixed screen that will display the device.

6.3.2.- PROGRAM LOCKING

With the program locking option you can access all the display and Configuration screens but you cannot modify any data.

To lock the Configuration of the device, hold down the **PROG** and **RESET** keys at the same time for more than 3 seconds, and the screen in **Figure 18** will appear.

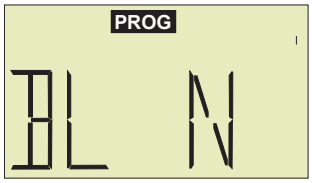


Figure 18: Locking screen

Press the **RESET** key to move between the different options:

BL N, removes the Configurations locking

BL Y, activates the Configuration locking.

Press the **PROG** key to save the selected option and exit the setup menu; when exiting, the screen in **Figure 16** is displayed for a few seconds.

If you do not press any key for 5 s, the screen in **Figure 15** appears and the device opens the **Delay and Sensitivity** screen, without saving the changes made.

Default value: **BL N**

7.- TECHNICAL FEATURES

Power supply	
Rated voltage	230 V ~ ± 30%
Frequency	50 / 60 Hz
Power	5 VA
Uimp	4kV
Installation category	CAT III 300V

Earth leakage protection	
Sensitivity, IΔn	30 mA - 0.1 A - 0.3 A - 0.5 A - 1 A (programmable)
Trip delay (IEC 60947-2-M)	Programmable
External earth leakage transformer	
CIRCUTOR compatible type	WG / WGS / WGC
Internal diameters (mm)	20 - 25 - 30 - 35
Rated current, In (4 poles)	63 A
Trip current, IΔn	30 mA
Maximum current, Imax	378 A

⚠	All the live conductors feeding the load to be protected must pass through the core of the earth leakage transformer. The earth protection conductor must never pass through the earth leakage transformer.

Circuit breaker protection			
Rated current. In	6 - 10 - 16 - 20 - 25 - 32 - 40 - 50 - 63 A ~		
Rated voltage, Un	240 / 415 V ~		
Magnetic trip curves	C / D		
Cross-section	**Flexible cable**	**Rigid cable**	
	25 mm²	35 mm²	
Number of poles	**RECmax Lpd 2-pole**	**RECmax Lpd 4-pole**	
	2	4	
Residual earth leakage current	0.851 **IΔn**		
Breaking capacity (EN 60898)	**Poles**	**Voltage**	**Icn / Ics**
	1 - 4	230 / 400 V	6 kA
Breaking capacity (EN 60947-2) ⎓	**Poles**	**Voltage**	**Icu / Ics**
	2	< 125 V	30 kA
Breaking capacity (EN 60947-2) ~	**Poles**	**Voltage**	**Icu**
	2	127 V	30 kA
		240 V	20 kA
		415 V	10 kA
	4	240 V	20 kA
		415 V	10 kA

Automatic reclosing	
Successive attempts by earth leakage	programmable (by default: 10)
Successive attempts by circuit breaker	programmable (by default: 2)
Timer between successive attempts	programmable (by default: 3 min.)
Meter reset time after last reclosing	programmable (by default: 30 min.)

⚠	After exhausting the successive re-closing attempts unsuccessfully, the device is definitively switched OFF. Reset from this status must be either by manual RESET or by remote reset through input EXT.

Input / Output contacts	
EXT input	Voltage-free
AUX output (6)	0.25 A - 230 V
TRIP output (6)	0.25 A - 230 V
ON/OFF output (6)	0.5 A - 230 V
Frequency	50 / 60 Hz
(6) **Installation category**	**AUX, TRIP** : CAT II 300V - **ON/OFF**: CAT III 300V

User interface	
Display	LCD
Keyboard	3 keys
LED	2 LEDs

Environmental features	
Operating temperature	-20ºC ... +70ºC
Storage temperature	-40ºC ... +75ºC
Relative humidity (without condensation)	5 ... 95%
Maximum altitude	2000 m
Protection degree	IP20 - IP41 (cabinet panel mounted)

Mechanical features		
Self-extinguishing capability	V0 (UL)	
Screws	M3	
Insertion force per pole	max 3N	
Withdrawal force per pole	min 5N	
Recommended torque	0.5 / 0.6 Nm	
Length of stripped insertion cable	6 - 7.5 mm	
Maximum cross-section	**Flexible cable**	**Rigid cable**
	0.05 - 1.5 mm^2	0.05 - 2.5 mm^2
Attachment	DIN rail	
Dimensions	**RECmax Lpd 2 pole**	**RECmax Lpd 4 pole**
	Figure 19	**Figure 20**
Weight	550 g.	800 g.
Enclosure	PC + FV	

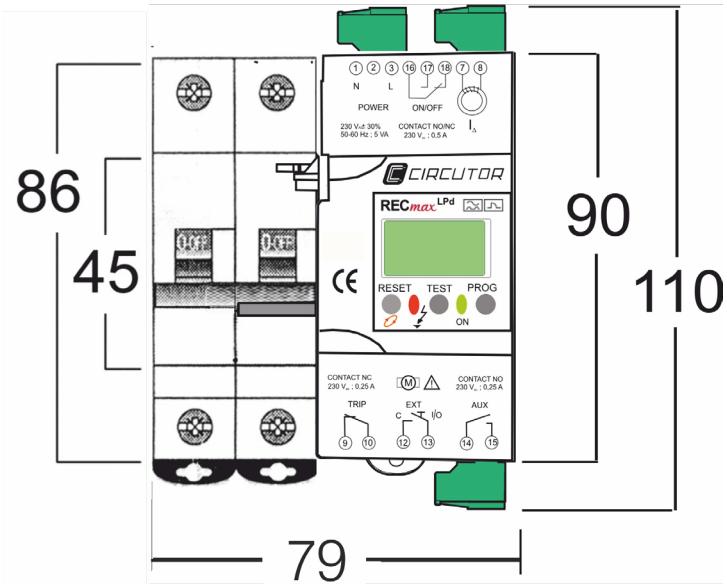


Figure 19: Dimensions of the RECmax Lpd 2-pole.

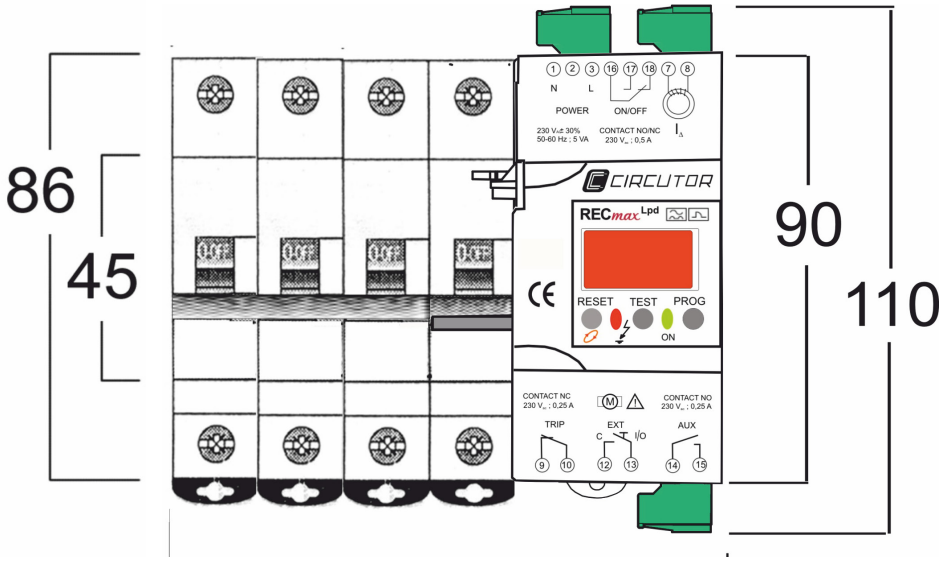


Figure 20: Dimensions of the RECmax Lpd 4-pole.

Standards	
General requirements for residual current operated protective devices	IEC TR 60755:2008
Electrical accessories - Circuit breakers for overcurrent protection for household and similar installations -- Part 1: Circuit-breakers for a.c. operation	UNE-EN 60898-1:2004
Specification for low voltage switchgear and control gear for industrial use. Mounting rails. Top hat rails 35 mm wide for snap-on mounting of equipment	DIN EN 50022
Low-voltage switchgear and controlgear -- Part 2: Circuit-breakers	UNE-EN 60947-2: 2007 annex M

8.- TECHNICAL SERVICE

In the case of any query in relation to device operation or malfunction, please contact the **CIRCUTOR, SA** Technical Support Service.

Technical Assistance Service
Vial Sant Jordi, s/n, 08232 - Viladecavalls (Barcelona)
Tel: 902 449 459 (España) / +34 937 452 919 (outside of Spain)
email: sat@circutor.com

9.- WARRANTY

CIRCUTOR guarantees its products against any manufacturing defect for two years after the delivery of the units.

CIRCUTOR will repair or replace any defective factory product returned during the guarantee period.

• No returns will be accepted and no unit will be repaired or replaced if it is not accompanied by a report indicating the defect detected or the reason for the return.
•The guarantee will be void if the units has been improperly used or the storage, installation and maintenance instructions listed in this manual have not been followed. “Improper usage” is defined as any operating or storage condition contrary to the national electrical code or that surpasses the limits indicated in the technical and environmental features of this manual.
• **CIRCUTOR** accepts no liability due to the possible damage to the unit or other parts of the installation, nor will it cover any possible sanctions derived from a possible failure, improper installation or “improper usage” of the unit. Consequently, this guarantee does not apply to failures occurring in the following cases:
- Overvoltages and/or electrical disturbances in the supply;
- Water, if the product does not have the appropriate IP classification;
- Poor ventilation and/or excessive temperatures;
- Improper installation and/or lack of maintenance;
- Buyer repairs or modifications without the manufacturer’s authorisation.

CIRCUTOR, SA – Vial Sant Jordi, s/n
08232 Viladecavalls (Barcelona) Spain
(+34) 937 452 900 – info@circutor.com

(ES) DECLARACIÓN UE DE CONFORMIDAD

La presente declaración de conformidad se expide bajo la exclusiva responsabilidad de CIRCUTOR con dirección en Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelona) España

Producto:

Equipo completo protección y reconexión magnetotérmica y diferencial

Serie:

RECmax-LPD

Marca:

CIRCUTOR

EL objeto de la declaración es conforme con la legislación de armonización pertinente en la UE, siempre que sea instalado, mantenido y usado en la aplicación para la que ha sido fabricado, de acuerdo con las normas de instalación aplicables y las instrucciones del fabricante

2014/35/UE: Low Voltage Directive 2014/30/UE: Electromagnetic Compatibility Directive
2011/65/UE: RoHS2 Directive

Está en conformidad con la(s) siguiente(s) norma(s) u otro(s) documento(s) normativos(s):

IEC 60947-2:2006 Annex M

Año de marcado "CE":

2011

(EN) EU DECLARATION OF CONFORMITY

This declaration of conformity is issued under the sole responsibility of CIRCUTOR with registered address at Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelona) Spain

Product:

Earth leakage circuit breaker with self-reclosing system

Series:

RECmax-LPD

Brand:

CIRCUTOR

The object of the declaration is in conformity with the relevant EU harmonisation legislation, provided that it is installed, maintained and used for the application for which it was manufactured, in accordance with the applicable installation standards and the manufacturer's instructions

2014/35/UE: Low Voltage Directive 2014/30/UE: Electromagnetic Compatibility Directive
2011/65/UE: RoHS2 Directive

It is in conformity with the following standard(s) or other regulatory document(s):

IEC 60947-2:2006 Annex M

Year of CE mark:

2011

(FR) DÉCLARATION UE DE CONFORMITÉ

La présente déclaration de conformité est délivrée sous la responsabilité exclusive de CIRCUTOR dont l'adresse postale est Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelone) Espagne

Produit:

Équipement complet de protection et réenclenchement magnétothermique et différentiel

Série:

RECmax-LPD

Marque:

CIRCUTOR

L'objet de la déclaration est conforme à la législation d'harmonisation pertinente dans l'UE, à condition d'avoir été installé, entretenu et utilisé dans l'application pour laquelle il a été fabriqué, conformément aux normes d'installation applicables et aux instructions du fabricant

2014/35/UE: Low Voltage Directive 2014/30/UE: Electromagnetic Compatibility Directive
2011/65/UE: RoHS2 Directive

Il est en conformité avec la(les) suivante (s) norme(s) ou autre(s) document(s) réglementaire (s):

IEC 60947-2:2006 Annex M

Année de marquage « CE »:

2011

Viladecavalls (Spain), 13/12/2017
General Manager: Ferran Gil Torné

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(Barcelona) Spain

CIRCUTOR, SA – Vial Sant Jordi, s/n
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(DE)

KONFORMITÄTSERKLÄRUNG UE

Vorliegende Konformitätserklärung wird unter alleiniger Verantwortung von CIRCUTOR mit der Anschrift, Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelona) Spanien, ausgestellt

Produkt:

Leitungsschutz- und Fehlerstromschutzschalter mit automatischer Wiedereinschaltung

Serie:

RECmax-LPD

Marke:

CIRCUTOR

Der Gegenstand der Konformitätserklärung ist konform mit der geltenden Gesetzgebung zur Harmonisierung der EU, sofern die Installation, Wartung undVerwendung der Anwendung seinem Verwendungszweck entsprechend gemäß den geltenden Installationsstandards und der Vorgaben des Herstellers erfolgt.

2014/35/UE: Low Voltage Directive 2014/30/UE: Electromagnetic Compatibility Directive
2011/65/UE: RoHS2 Directive

Es besteht Konformität mit der/den folgender/folgenden Norm/Normen oder sonstigem/sonstiger Regelwerk/Regelwerken

IEC 60947-2:2006 Annex M

Jahr der CE-Kennzeichnung:

2011

(PT)

DECLARAÇÃO DA UE DE CONFORMIDADE

A presente declaração de conformidade é expedida sob a exclusiva responsabilidade da CIRCUTOR com morada em **Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelona) Espanha**

Producto:

Equipamento completo protecção e religação magnotérmica e diferencial

Série:

RECmax-LPD

Marca:

CIRCUTOR

O objeto da declaração está conforme a legislação de harmonização pertinente na UE, sempre que seja instalado, mantido e utilizado na aplicação para a qual foi fabricado, de acordo com as normas de instalação aplicáveis e as instruções do fabricante.

2014/35/UE: Low Voltage Directive 2014/30/UE: Electromagnetic Compatibility Directive
2011/65/UE: RoHS2 Directive

Está em conformidade com a(s) seguinte(s) norma(s) ou outro(s) documento(s) normativo(s):

IEC 60947-2:2006 Annex M

Ano de marcação "CE":

2011

(IT)

DICHIARAZIONE DI CONFORMITÀ UE

La presente dichiarazione di conformità viene rilasciata sotto la responsabilità esclusiva di CIRCUTOR, con sede in **Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcellona) Spagna**

prodotto:

Dispositivi di protezione completa e differenziale riconnessione magnetica termica

Serie:

RECmax-LPD

MARCHIO:

CIRCUTOR

L'oggetto della dichiarazione è conforme alla pertinente normativa di armonizzazione dell'Unione Europea, a condizione che venga installato, mantenuto e utilizzato nell'ambito dell'applicazione per cui è stato prodotto, secondo le norme di installazione applicabili e le istruzioni del produttore.

2014/35/UE: Low Voltage Directive 2014/30/UE: Electromagnetic Compatibility Directive
2011/65/UE: RoHS2 Directive

È conforme alle seguenti normative o altri documenti normativi:

IEC 60947-2:2006 Annex M

Anno di marcatura "CE":

2011

Viladecavalls (Spain), 13/12/2017
General Manager: Ferran Gil Torné

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(PL)

DEKLARACJA ZGODNOŚCI UE

Niniejsza deklaracja zgodności zostaje wydana na wyłączną odpowiedzialność firmy CIRCUTOR z siedzibą pod adresem: **Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelona) Hiszpania**

produk:

Magnetotermiczny wyłącznik różnicowy z automatycznym ponownym załączaniem

Seria:

RECmax-LPD

marka:

CIRCUTOR

Przedmiot deklaracji jest zgodny z odnośnymi wymaganiami prawodawstwa harmonizacyjnego w Unii Europejskiej pod warunkiem, że będzie instalowany, konserwowany i użytkowany zgodnie z przeznaczeniem, dla którego został wyprodukowany, zgodnie z mającymi zastosowanie normami dotyczącymi instalacji oraz instrukcjami producenta

2014/35/UE: Low Voltage Directive 2014/30/UE: Electromagnetic Compatibility Directive

2011/65/UE: RoHS2 Directive

Jest zgodny z następującą(ymi) normą(ami) lub innym(i) dokumentem(ami) normatywnym(i):

IEC 60947-2:2006 Annex M

Rok oznakowania "CE":

2011

Viladecavalls (Spain), 13/12/2017
General Manager: Ferran Gil Torné

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