Vector

Electronic earth leakage protection relay

RDA-MT, RDA-C-MT



INSTRUCTION MANUAL

(M982285VM-03-25A)

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.

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

DISCLAIMER

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

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

www.vectorenergy.com

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

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REVISION LOG

Table 1: Revision log.

Date	Revision	Description
11/21	M982285VM-03-21A	Initial version
01/25	M982285VM-03-21A	Changes in the following sections: 2.- 4.6.- 5

SYMBOLS

Table 2: Symbols.

Symbol	Description
CE	In compliance with the relevant European directive.
	In accordance with the CMiM directive.
UK CA	In accordance with the UKCA directive (UK Conformity Assessed)
	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.

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

2.- DESCRIPTION OF THE PRODUCT

The **RDA-MT** is a type A earth leakage protection device. It has 2 output relays: The main one, to control the circuit breaker and provide earth leakage/overcurrent protection and the interlock function, to indicate that the maximum number of reclosings has been reached.



Allows the setting and adjustment of all parameters required for complete protection and maintenance checking in the installation.

The **RDA-MT** measures, calculates and displays the earth leakage current in three-phase, balanced or unbalanced industrial systems.

Measurements are in true effective value, via one earth leakage current input, from the **TDC** families external measuring toroid.

Under normal operating conditions the main values determining earth leakage protection in an installation are shown on the display. These include sensitivity, delay and instant current leakage.

Under normal operating conditions the backlit display is green. However, after any event causing a main relay to trip, the backlight is red, indicating the reason.

Main features:

- Measuring in true effective value-
- Type A differential (IEC 61008-1)
- Insulation against transients (IEC 61008.1)
- High frequency filtering (IEC 61008.1)
- Trip setting between 80 and 100% IΔn
- Inverse curve (IEC 61008.1)
- Associated standard: IEC 61008.1, IEC755
- 3 modules. DIN rail. In a panel using front accessory
- Displaying instant leakage values.
- Backlit LCD display.
- **RDA-C-MT:** RS - 485 communication (Modbus RTU®).

The measurement of the earth leakage current that actuates the **RDA-MT/RDA-C-MT**, indicating the instantaneous leakage current, is determined by the earth leakage transformers of the **TDC** series. The inner diameter of the transformer is defined by the wiring dimensions of the installation.

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 **RDA-MT** 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.

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 device is installed on a DIN rail or on a panel (drilled panel 67^{+1} x 67^{+1}mm, according to DIN 43 700 using accessory). All connections must remain inside the electrical board.

The device has to be connected to a power circuit protected with gL fuses (IEC 60269) or type M fuses between 0.5 and 2 A. The power circuit, in turn, must be fitted with a circuit breaker or equivalent device to disconnect the device from the mains supply.

Twisted cable should be used if connecting the earth leakage transformer over long distances.

3.2.1.- INSTALLATION OF DEVICE IN PANEL

A 72x72 mm front adapter accessory is used to install the device on a panel. All connections must remain inside the electrical board.

The front adapter accessory has a base, a frame two tabs and three screws, **Figure 1**.



Figure 1:Adapter accessory.

The steps to follow to perform the installation of the adapter accessory are:

1.- The base is mounted on top of the device.

2.- The device is attached by screwing the holes in the device on the upper right corner and lower left corner on the front of device.
3.- The front frame is attached to cover the mounting points.

4.- Three green pressure tabs on the side runners of the base are attached.

5.- The device is mounted in the hole in the panel with the adapter.

6.- The tabs run towards the panel to obtain the mounting pressure.



Figure 2: Installation of adapter accessory.

3.3.- TERMINALS OF THE DEVICE

Table 3:Terminal description RDA-MT.

Terminal description	
1: Trigger input - External reset	**9:** Interlock relay (NC)
2: Trigger input - External reset	**10: A1,** Power supply
3: Transformer current input 1S2	**11: A2**, Power supply / State of the circuit breaker
4: Transformer current input 1S1	**12:** State of the circuit breaker
5: Trip Contact, Coil (Common)	**13:** Motor output contact (OFF)
6: Trip Contact, Coil (NO)	**14:** Motor output contact (Common)
7: Interlock relay (NO)	**15:** Motor output contact (ON)
8: Interlock relay (Common)	

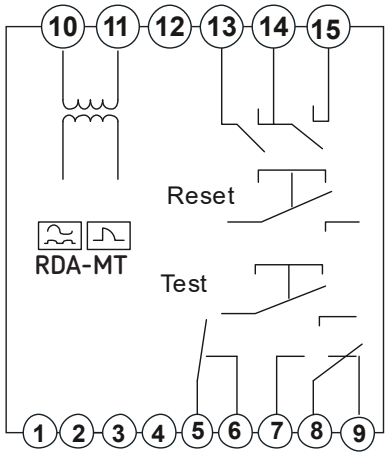


Figure 3: RDA-MT Terminals.

3.3.1.- COMMUNICATIONS CONNECTIONS ON THE RDA-C-MT

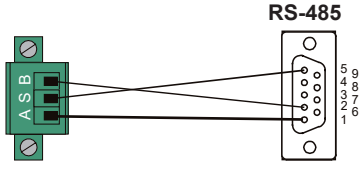


Figure 4: RS-485 Communications (RDA-C-MT Model).

3.4.- CONNECTION DIAGRAMS

3.4.1.- CONNECTION WITH TDC + MOTORIZED CIRCUIT BREAKER WITH TRIP COIL

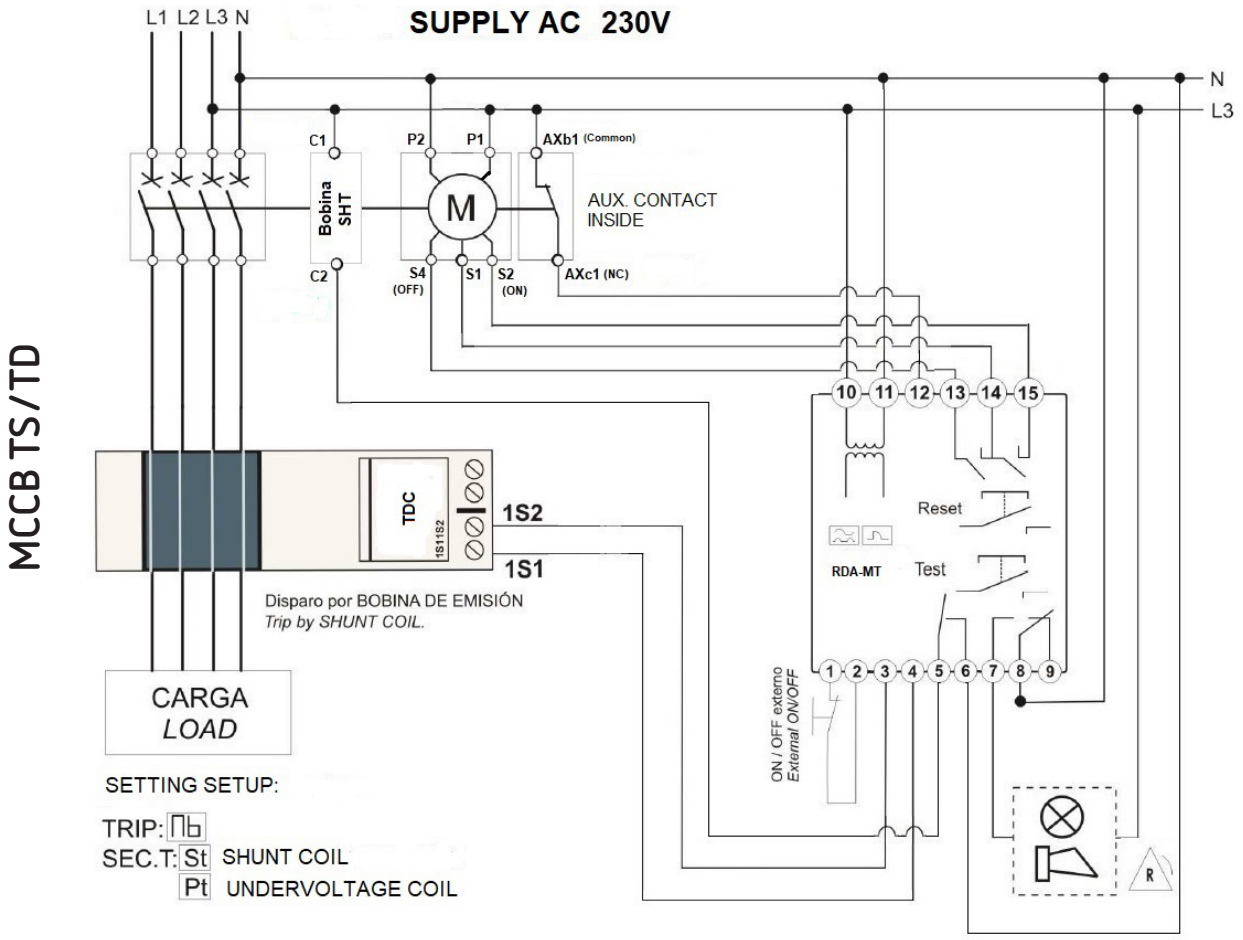


Figure 5: RDA-MT: Connection diagram.

4.- OPERATION

4.1.- GENERAL DESCRIPTION

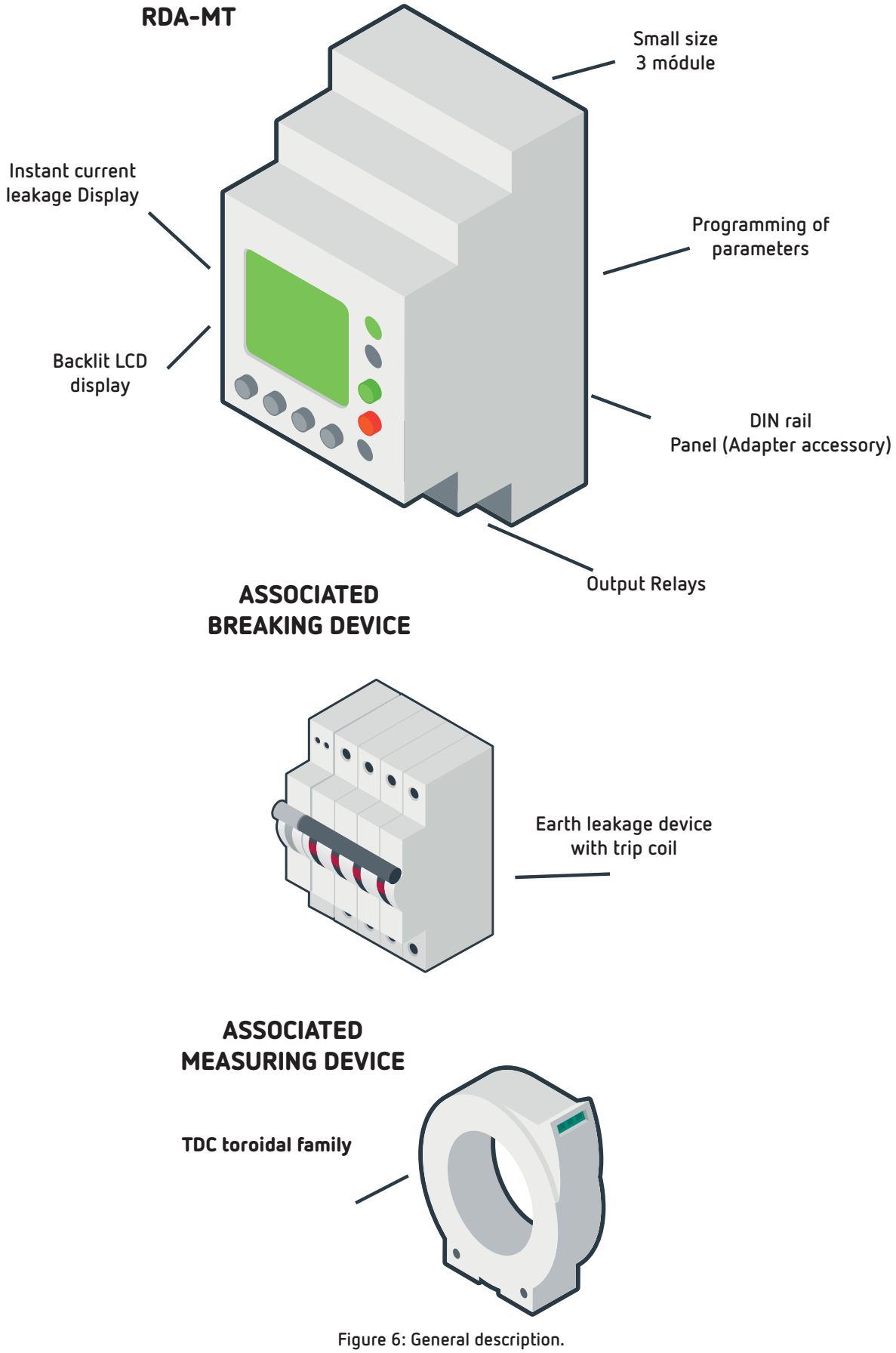


Figure 6: General description.

4.2.- DESCRIPTION OF THE DEVICE

The front of the equipment which is formed by the display, buttons and LEDs, is protected with a sealable plastic cover which has the appropriate holes to access the **RESET**, **TEST** and **PROG/PAG** keys.

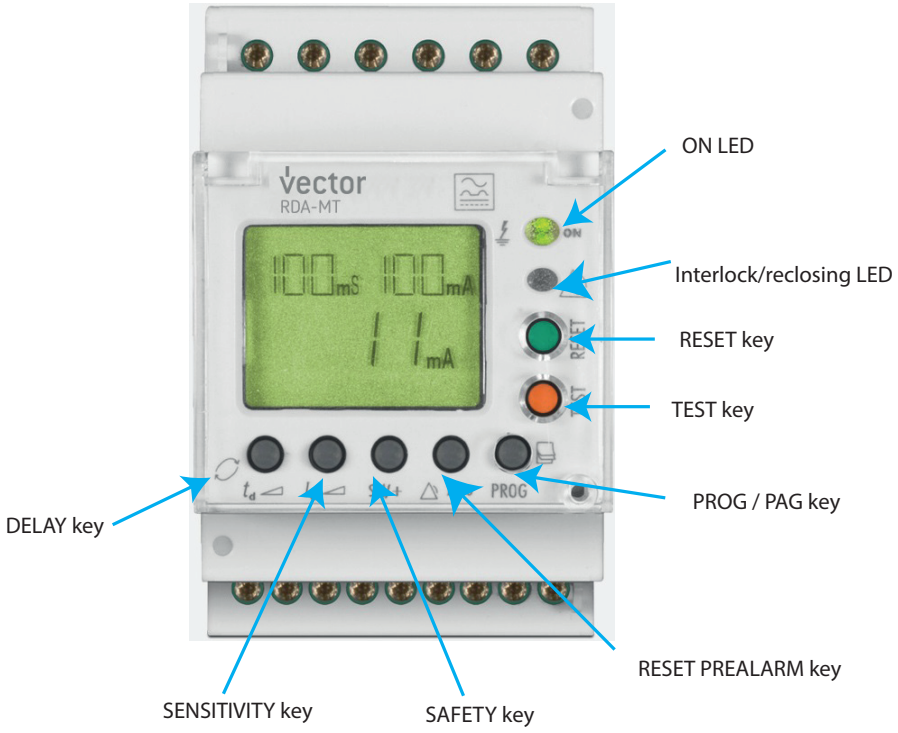


Figure 7: Description LEDs and button.

4.3.- LEDs INDICATORS

The device has 2 indicators LEDs, **Figure 7**.

Table 4: LEDs description: ON LED.

ON LED	
State	**Description**
Off	The device is not operating or is not receiving power supply voltage.
Green	The device is operating.
Red	The device has tripped.

Table 5: LEDs description:INTERLOCK/RECLOSING LED.

INTERLOCK/RECLOSING LED	
State	**Description**
Off	No interlocking or reconnection
On	Interlock produced by exceeding the number of reconnections.
On flashing	Device timing for reconnection.

4.4.- KEYBOARD FUNCTIONS

The device has 7 keys, **Figure 7**.

1.- Keys accessible with sealed cover and tool

✓ **RESET**, Starts the device after a trip.

✓ **TEST**, Carries out a trip to check the proper operation of the relay.

✓ **PROG/PAG**, dual-function key:
- A short press displays earth leakage or overcurrent reclosings.
- A long press opens the device programming menu.

2.- Keys accessible with cover open

Keys with dual function. With a long press, the device is entered to set the values. With a short press, the option within a series of values defined in the device is selected.

✓ **SENSITIVITY ($I_{\Delta n}$)**, It allows to choose between the values of 30, 100, 300, 500 mA , 1 and 3 A
- Specifying the expanded scale in the settings adds 5, 10 and 30 A to the list of values above.

✓ **DELAY (td)**, It allows to choose between the values of 20, 100, 200, 300, 400, 500, 750 ms and 1 s.
- Specifying the expanded scale in the settings adds 5, 10 and 30 A to the list of values above.
- This key can also be used to navigate inside the programming menu.

3.- Keys accessible with cover open and tool

Flush buttons.

✓ **SAFETY (Std/+)**, used to configure the polarity of the contacts on the interlock relay (Terminals 7, 8 and 9).
- With normal safety (Std) the relay is activated with a fault, the status is NO.
- With positive safety (+) the relay is activated on supplying the device and is deactivated with the fault, the status is NC.

✓**REC**, used to enable or disable the overcurrent and earth leakage reclosing.
- When in the reclosings screen, it is used to change the number of maximum overcurrent and earth leakage reclosings.

4.5.- DISPLAY

The device has a backlit display with **green** or **red** light, depending on the state of the device.

The background to the screen in normal mode is **green**. The parameters required for earth leakage protection, sensitivity and delay in its associated units are displayed. It also displays the current leakage current.

If the device trips through any event, the screen's background changes to **red** and the reason for the trip is displayed.

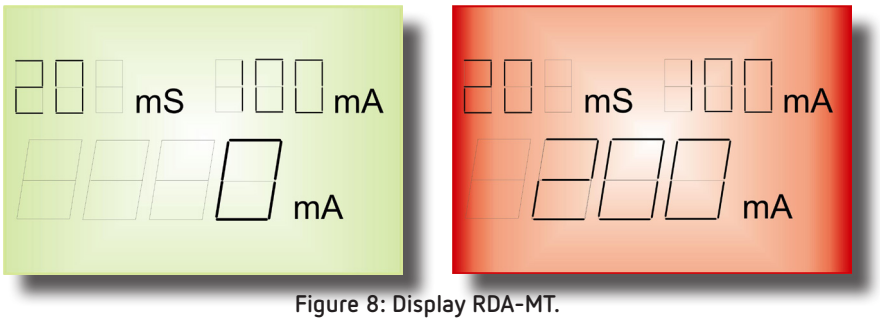


Figure 8: Display RDA-MT.

Display messages by device trip, **Table 6**.

Table 6: Display messages by device trip.

Message	Cause of trip
TESt	Test
EXT	Remote signal ON/OFF
REM	RS-485 communications
DIF / Valor	Differential
MAG	Circuit breaker

Other display messages, **Table 7**.

Table 7: Other display messages.

Message	Description
SAVE	Validate configuration values
EXIT	Exits programming mode
ERRt	Poor toroid connection
OVR	Current leakage reading off scale

4.6.- OPERATION

When the device is powered at its rated voltage, the green LED **ON** the front is on, the backlit LCD is green indicating the software and hardware version. After a short while, the version disappears and the default display values appear on the display.



Figure 9:Initial screens.

The display shows the delay and sensitivity settings as well as the instant leakage current reading.

While the device is operating, the display shows the following symbols while the device is being programmed and set, **Figure 10**.

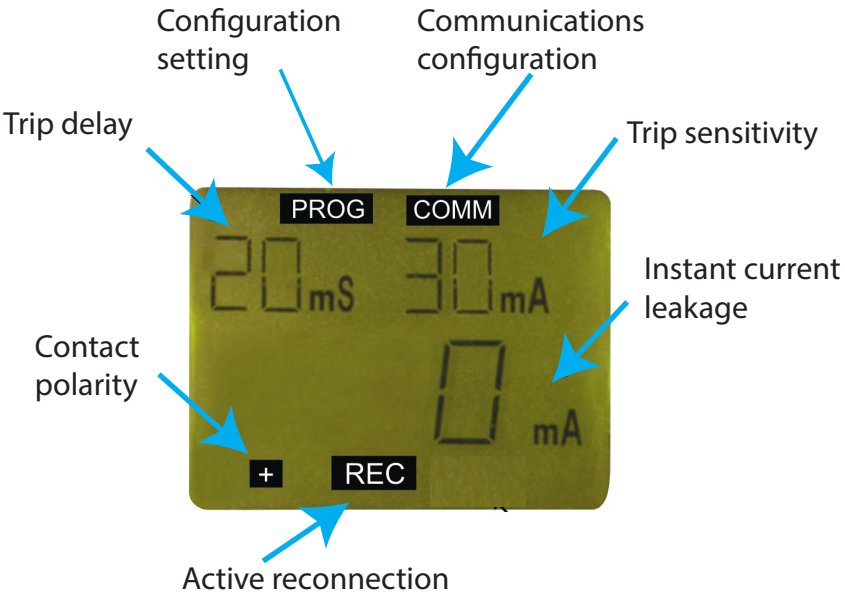


Figure 10: Description display.

In normal operating status the display shows the following parameters associated with the earth leakage protection, **Table 8.**

Table 8: Parameters visible by display.

Parameter	Units
Instant current leakage	mA / A
Programmed trip delay, td	ms / s
Programmed sensitivity of trip, In = IΔN	mA / A

The **RDA-MT/RDA-C-MT** lets you display and program all the parameters required to finish setting up the earth leakage/overcurrent protection and communications, **Table 9**.

Table 9: Adjustment parameters.

Parameter	Units
Contact status: Interlock relay	+ (contact 8-7 NO) / nothing (contact 8 - 7 NC) + (contact 8-9 NC) / nothing (contact 8 - 9 NO)
Working frequency (1)	Hz
No. of peripheralss (1)	-
Communication baudrate (1)	Bauds
Parity (1)	-

(1) For the **RDA-C-MT** model only.

4.6.1.- DISPLAY SCREENS

To display all the parameters, the device uses 4 screens: 2 fixed and 2 floating.
To switch between them, short press the **PROG** key.

✓ **Fixed screens**

These screens display the delay, the programmed nominal current, the current leakage current and the total number of reclosings.
Once this type of screen is selected, to switch to another display, short press the **PROG** key.

✓ **Floating screens**

They indicate the number of earth leakage and overcurrent reclosings. They time out after a certain period to show the fixed screens again.

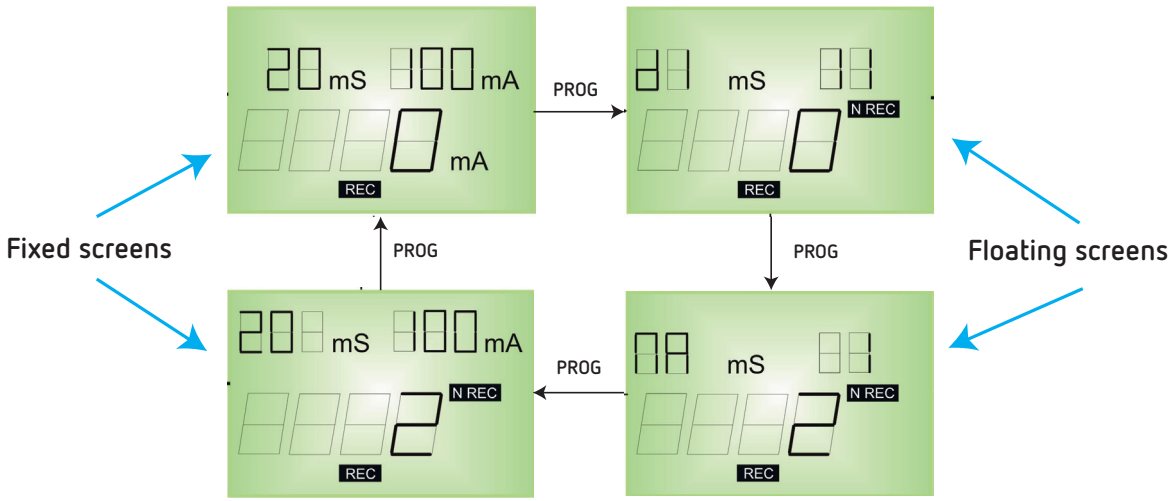


Figure 11:Display screens.

4.7.- TROUBLESHOOTING OR REASONS FOR TRIPPING

In the event of an earth leakage current trip due to a fault, test or error of the earth leakage transformer.

1.- Look at the red display for the cause of the trip.
2.- The device starts a timer based on the sequence selected in the event of a trip.
3.- The device reconnects by applying voltage to the motor (ON).

4.7.1.- POOR TOROID CONNECTION ALARM

After a certain time the device will carry out a test to detect the presence of the sensor or associated earth leakage transformer.
Also the "**ERRt"** error message will permanently appear on the **RDA-MT** display.

A short-circuit in the transformer secondary will also be detected as an error.

When this error is detected, the correct connection with the earth leakage transformer has to be ensured and a **RESET** made to re-establish proper working. If the transformer is detected again, normal status is returned and the error message disappears.

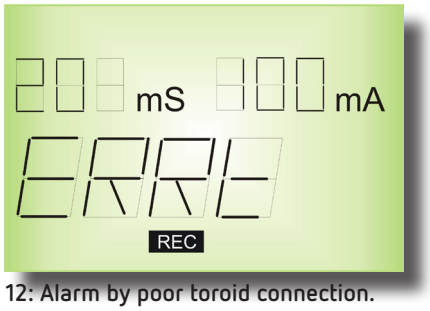


Figure 12: Alarm by poor toroid connection.

4.7.2.- TRIP ON DIFFERENTIAL FAILURE

When the device trips due to a fault current, the red LED is on continuously, the yellow LED flashes, and the LCD is backlit red. The display shows the current of the last cycle that tripped the relay, and shows a "**DIF**" message.

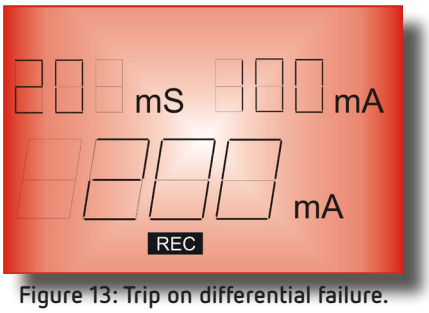


Figure 13: Trip on differential failure.

4.7.3.- TRIP ON CIRCUIT BREAKER FAILURE

When the device trips due to a circuit breaker, the red LED is on continuously, the yellow LED flashes, and the LCD is backlit red. The display shows a "**MAG**" message, indicating the circuit breaker fault.

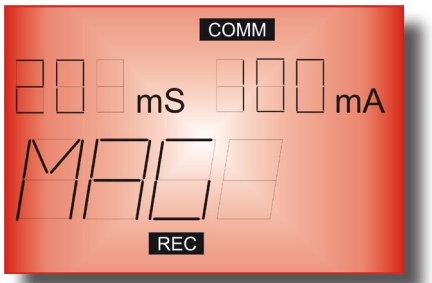


Figure 14: Trip on circuit breaker failure.

4.7.4.- REMOTE TRIP

When a trip is forced (input terminals **1-2**, using an external contact) the device is tripped and disabled and an "**EXT**" message is shown on the display in red and also the LED is on. It has to remain permanently in this situation until the change in status no longer exists. It is not possible to manually reset or reset using communications.

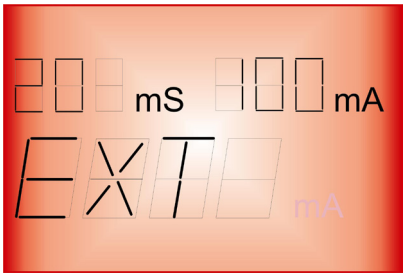


Figure 15: Remote trip.

When it is remotely reset (input terminals **1-2**) the device is reconnected with the display backlit in green, LED **ON** in green as in normal status.

In the case of the **RDA-C-MT,** the device can be tripped/rearmed remotely using RS-485 communications. The device is tripped, as shown by the "**REM**" message shown on the display in red, and the **ON** LED is red. It has to remain permanently in this situation until there is a change in status.

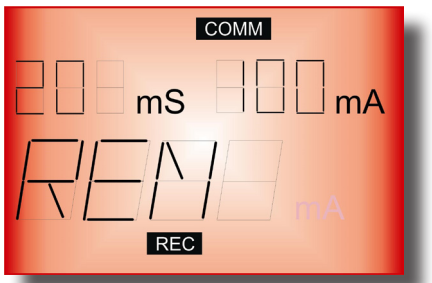


Figure 16: Remote trip through communications.

It is rearmed when the device is rearmed using **RS-485** communications, by opening the connection at remote input **1-2** or by pressing the reset button. The device is reconnected and the display backlight turns green again, as does the **ON** LED.

5.- CONFIGURATION: DIRECT SETTINGS

By pressing for a long time on any of the direct setting buttons, **Configuration** mode is entered and the relay's setting may be changed. **PROG** will be shown on the display.

While in **Configuration** mode if any other direct function is used (**In, td or Std/+**), the parameter for the displayed relay can also be set.

The device exits Setup mode if no keys are pressed for some time, saving the last adjustment made.

5.1.- SETTING THE SENSITIVITY TRIP

Pressing **Id** for more than one second, **Configuration** appears and a setting from the list is increased with every press. The current setting is seen in small figures and the new setting in the main figures.

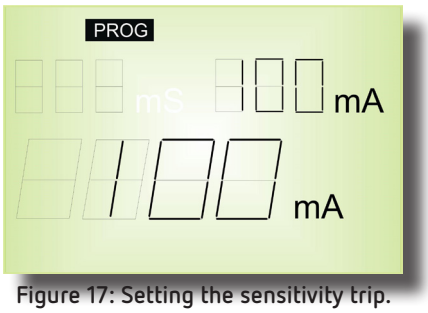


Figure 17: Setting the sensitivity trip.

Possible setting values are: **30 mA, 100 mA, 300 mA, 500 mA, 1 A, 3 A, 5 A, 10 A** and **30 A**.
Only one scale is displayed. To change the scale, see Section *"6.2.2.- LIMIT OF THE SCALES"*.
By default, the device is on scale **3 A**.

5.2.- DELAY SETTING AND MAIN RELAY CURVE

Pressing **td** for more than one second, **Configuration** appears and a setting from the list including curve types is increased with every press.
The current setting is seen in small figures and the new setting in the main figures.

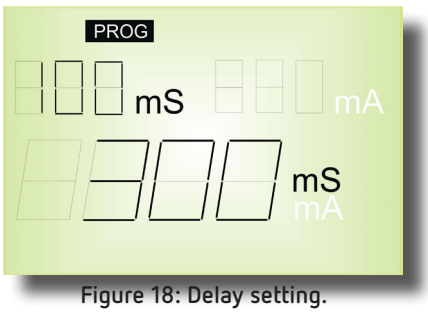


Figure 18: Delay setting.

Only one scale is displayed. To change the scale, see Section *"6.2.2.- LIMIT OF THE SCALES"*.
By default, the device is on scale **1 s**.

Possible setting values are: **Curva INS, Curva SEL [S], 20, 100, 200, 300, 400, 500, 750 ms, 1, 3, 5** and **10 s.**
If the $I_{\Delta n}$ setting is **30 mA**, only instantaneous adjustments of: **20 ms**, **Curve INS** or **SEL** are allowed.

5.3.- POSITIVE SAFETY SETTING OF THE INTERLOCK RELAY

"**Std"**, contacts are on standby: terminals 7 (NO), 8 (Common) and 9 (NC).
"**+**", contacts change status on powering the device, the **+** sign is displayed.. Terminals 7 (NC), 8 (Common) and 9 (NO).

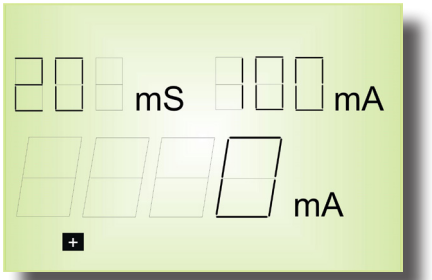


Figure 19: Positive security setting.

6.- CONFIGURATION: ADJUSTMENTS USING SETUP MENU

To access the setup menu, long press the **PROG** key. **PROG** will be shown on the display.

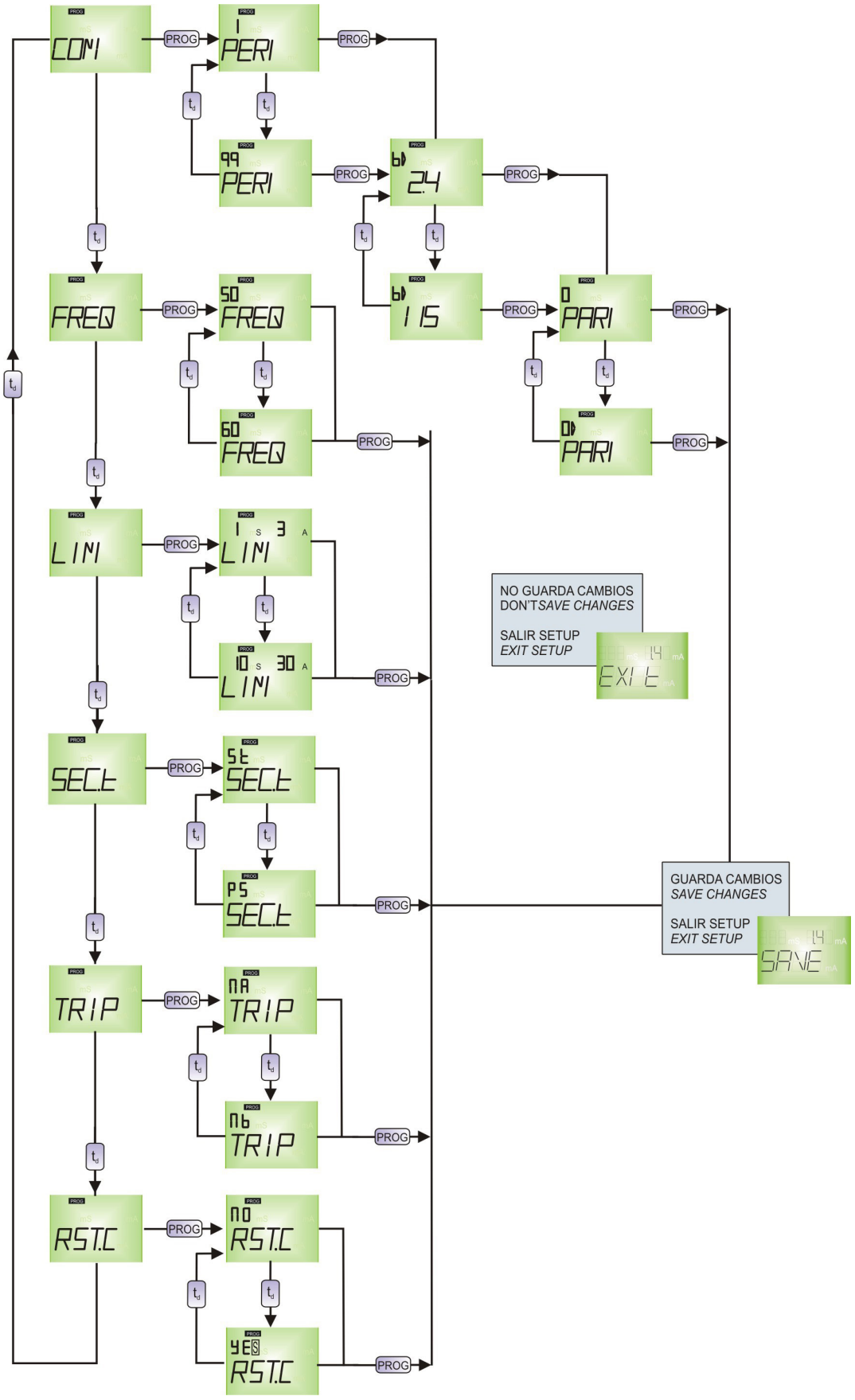


Figure 20: Setup menu.

The device does not save changes to the settings until they are validated using the **PROG** key.

When the keyboard is inactive for a certain period, the device exits the programming menu. "**EXIT**" is shown on the display and the changes are not saved.

6.1.- COMMUNICATIONS SETTINGS

Note: *The communications menu is only shown in the **RDA-C-MT** model.*

When you go into the communications menu, the menu's home screen is displayed, **Figure 21**.

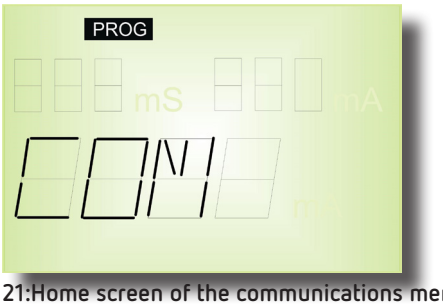
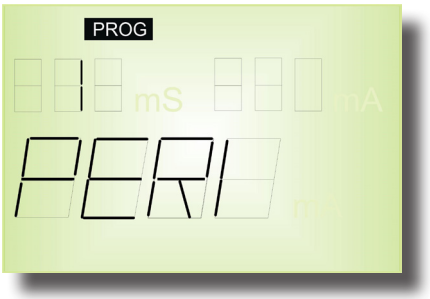


Figure 21:Home screen of the communications menu.

Press the **PROG** key to access the configuration parameters.

6.1.1.- PERIPHERAL NUMBER

To edit the peripheral number, press the **td** key repeatedly to increase the value of the digit.



When the desired value is shown on the screen, validate the number by pressing the **PROG** key.

Minimum programming value: 1
Maximum programming value: 99

6.1.2.- TRANSMISSION BAUDRATE

To change the transmission speed, press the **td** key repeatedly. The transmission baudrate is displayed in units of thousands.

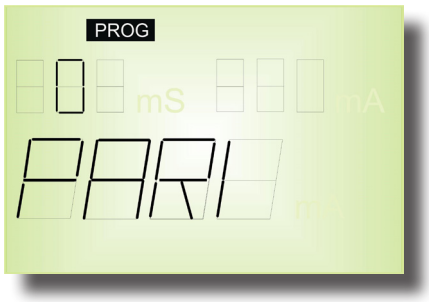


When the desired value is shown on the screen, validate the number by pressing the **PROG** key.

Programming values: **2.4** *(2400 bauds)*, **4.8** *(4800 bauds)*, **9.6** *(9600 bauds)*, **19.2** *(19200 bauds)*, **38.4** *(38400 bauds)*, **54.6** *(54600 bauds) and* **115** *(115000 bauds).*

6.1.3.- PARITY

To change the parity, press the **td** key repeatedly.

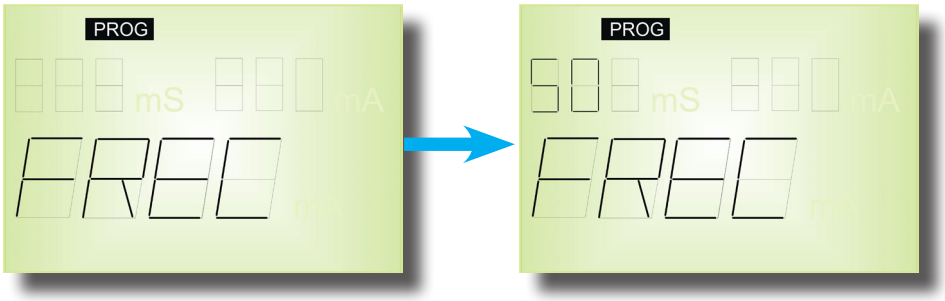


When the desired value is shown on the screen, validate the number by pressing the **PROG** key.

6.2.- MEASUREMENT CONFIGURATION

6.2.1.- WORKING FREQUENCY

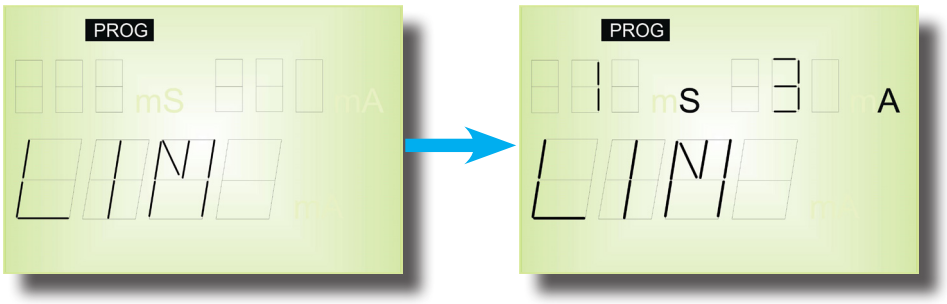
The display shows **FREC**. To change the value, press the **PROG** key. The currently set frequency value is shown at the top left of the screen.



To change the working frequency, press the **td** key repeatedly.
When the desired value is shown on the screen, validate the number by pressing the **PROG** key. The device exits the programming menu, and shows a screen with the **"SAVE"** message.

6.2.2.- LIMIT OF THE SCALES

The display shows **LIM**. To change the value, press the **PROG** key. The screen shows the end values of 2 scales, Trip sensitivity and delay.



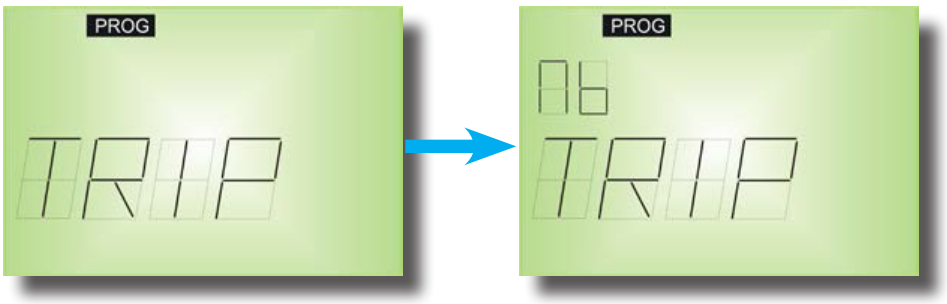
To change the scales, press the **td** key repeatedly.

Programming values: **10s - 30 A** or **1s - 3 A.**

When the desired value is shown on the screen, validate the number by pressing the **PROG** key. The device exits the programming menu, and shows a screen with the **"SAVE"** message.

6.2.3.- CIRCUIT BREAKER

The display shows **TRIP.** To change the value, press the **PROG** key. The display shows the current circuit breaker.



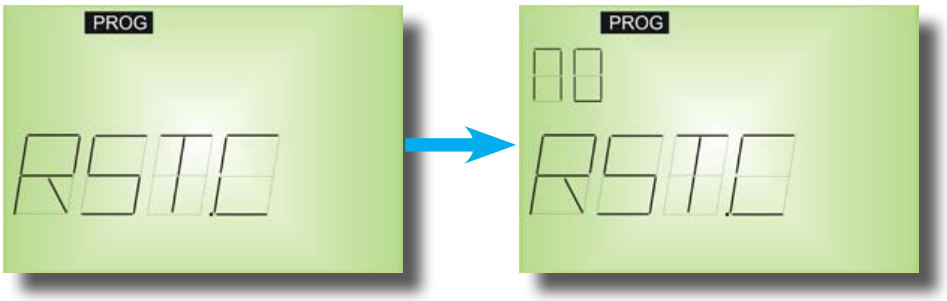
To change the circuit breaker, press the **td** key repeatedly.

Programming values: **Mb** (coil trip) or **Ma (**magnetothermic trip**).**

When the desired value is shown on the screen, validate the number by pressing the **PROG** key. The device exits the programming menu, and shows a screen with the **"SAVE"** message.

6.2.4.- RESETTING THE PARTIAL METER

The display shows **RST.C**. To change the value, press the **PROG** key. The screen shows the option to reset the meter or not.



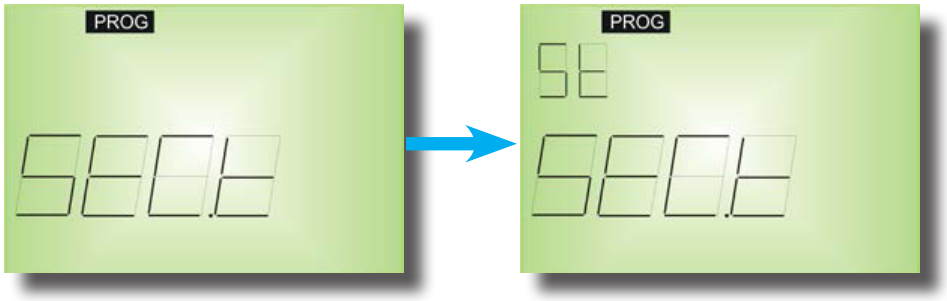
To switch between the alternatives, press the **td** key repeatedly.
Programming values: **YES** or **NO.**

When the desired value is shown on the screen, validate the number by pressing the **PROG** key. The

device exits the programming menu, and shows a screen with the **"SAVE"** message.

6.2.5.- STATUS OF THE CONTACTORS ON THE COIL

The display shows **SEC.T**. To change the value, press the **PROG** key.



To modify the status of the contactors on the coil, press the **td** key repeatedly.

Programming values: **St (**standard**)** or **PS** (positive signal)**.**

When the desired value is shown on the screen, validate the number by pressing the **PROG** key. The device exits the programming menu, and shows a screen with the **"SAVE"** message.

7.- CONFIGURATION: ADJUSTMENTS BY DIFFERENTIAL AND MAGNETOTHERMIC

While the screens of differential and magnetothermic are displayed, floating screens, it is possible to view or modify:

- ✓ The number of partial and total reclosings.
- ✓ Assign the maximum number of reclosings.
- ✓ Disable reclosings.



Figure 22:Adjustments by differential and magnetothermic

8.- RS-485 COMMUNICATIONS

8.1.- MODBUS CONNECTION

The RS-485 connection must be wired using twisted pair cable with a mesh shield (minimum 3 wires), with a maximum distance of 1200 meters between the **RDA-C-MT** and the master unit. A maximum of 32 slave devices can be connected to this bus.

8.2.- MODBUS PROTOCOL

The **RDA-C-MT** model communicates using the MODBUS RTU© protocol (query/reply polling).
Within the Modbus protocol, RTU (Remote Terminal Unit) mode is used; each 8-bit byte in a message contains two 4-bit hexadecimal characters. The format for each byte in RTU mode

Code: 8 binary bits, hexadecimal 0-9, A-F
2 hexadecimal characters contained in each 8-bit field of the message.
Bits per byte: 8 data bits
Check-Error: CRC (Cyclical Redundancy Check) type

Modbus functions used:
Function 0x03: Read
Function 0x06: Write

8.2.1.- READING EXAMPLE

Query:

Peripheral Nº	Function	Initial register	Nº of registers	CRC
0A	03	0000	000A	7176

Peripheral number: 0A, 10 in decimal
Read function: 03
Register where you want the reading to start: 00 00
Number of registers to read: 00 0A , 10 in decimal
CRC character: 71 76

Response:

Peripheral Nº	Function	Nº of bytes	Reading	CRC
0A	03	14	00 0A 00 02 00 00 00 32 00 00 00 01 00 00 00 01 00 14 00 00	7EC9

Peripheral number: 0A, 10 in decimal
Read function: 03
Number of bytes received: 14, 20 in decimal
Registers: 00 0A: Address 0000: Peripheral number (10)
00 02: Address 0001: Communication baud rate (2- 9600 bauds)
00 00: Address 0001: Parity type (0 - None)

00 32: Address 0003: Working frequency (50 Hz)
00 00: Address 0004: Programmed trip current (0-30mA)
00 01: Address 0005: Time programmed for trip delay (1-INS)
00 00: Address 0006: Output polarity of trip relay (0-standard)
00 01: Address 0007: % IΔn pre-alarm trip. (1-50%)
00 14: Address 0008: Time programmed for pre-alarm delay. (1-20 ms)
00 00: Address 0009: Output polarity of interlock relay (0-Standard)

CRC character: 7E C9

8.2.2.- WRITE EXAMPLE

Query:

Peripheral N°	Function	Initial register	N° of registers	N° of bytes to write	Registers to write	CRC
01	10	0000	0005	0A	00 01 00 03 00 00 00 3C 00 00	FF 64

Peripheral number: 01
Write function: 10, write multiple registers
Register where you want the write to start: 00 00
Number of registers to write: 00 05
N° of bytes to write: 0A, 10 in decimal
Registers to write:
00 01: Address 0000: Peripheral number
00 03: Address 0001: Communication baud rate (3 – 19200 bauds)
00 00: Address 0002: Parity type (0 -None)
00 3C: Address 0003: Working frequency (3C- 60 Hz)
00 1E: Address 0004: Trip current (0 - 30mA)
CRC character: FF 64

Response:

Peripheral N°	Function	Initial register	N° of registers	CRC
01	10	0000	0005	00 0A

Peripheral number: 01
Write function: 10, write multiple registers
Register where you want the write to start: 00 00
Number of registers to write: 00 05
CRC character: 00 0A



Each modbus frame has a limit of 26 registers.

8.3.- MODBUS MEMORY MAP

Table 10: Modbus memory map.

Parameter	Function	Address	Values	Units
Peripheral number	03/06	0000	1 ... 99	-
Communication baudrate	03/06	0001	**0:** 2400, **1:** 4800, **2:** 9600, **3:** 19200, **4:** 38400, **5:** 57600, **6:** 115200	bauds
Parity type	03/06	0002	**0:** None, **1:** odd, **2:** even	-
Working frequency	03/06	0003	**0:** 50, **1:** 60	Hz
Main relay trip current	03/06	0004	**0:** 0.03, **1:** 0.1, **2:** 0.3, **3:** 0.5, **4:** 1 **5:** 3, **6:** 5, **7:** 10, **8:** 30	A
Main relay delay time	03/06	0005	**1:** INS, **2:** SEL, **0:** 0.02, **3:** 0.1, **4:**0.2, **5:** 0.3, **6:** 0.4, **7:** 0.5, **8:** 0.75, **9:**1, **A:** 3, **B:** 5, **C:** 10	s
Latch Relay Contacts Polarity	03/06	0009	**0:** Standard, **1:** Positive	-
Total number of reconnections	03/06	0008	0 ... 9999	-
Device version	03	000D	0 ... 100	-
Status of relay contacts	03	0014	Off - On	-
RMS value of leakage current	03	0015	0 ... 65000	mA
RMS value of the tripping current	03	0016	0 ... 65000	mA
Trip and external reset	06	0019	**0000:** Reset **FFFF:** Test	-
Enable recording settings	06	001A	**0000:** Enable **FFFF:** Record	-
Reconnection enabled	03	000A	**0:** Null, **1:** REC	-
Circuit breaker typw	03	000E	**1:** Circuit breaker without coil **2:** Circuit breaker with coil	-
Differential reconnection sequence	03/06	0010	0 ...14	-
magnetothermic reconnection sequence	03/06	0011	0 ...8	-

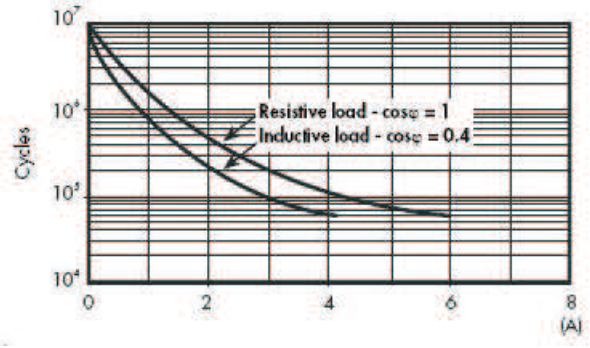
9.- TECHNICAL FEATURES

Power supply AC [2]	
Rated voltage	230 V ~ ± 20% , 110 V ~ ± 20%
Frequency	50 - 60 Hz
Consumption	6 VA
Installation category	CAT III 300 V

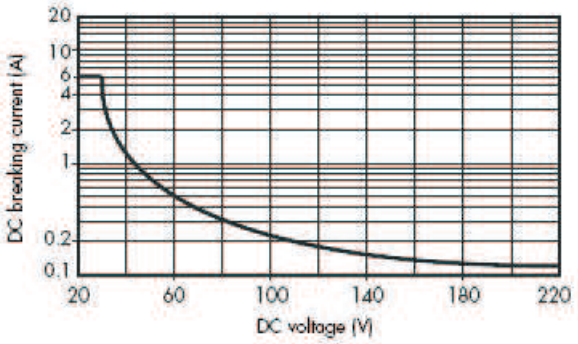
Power supply DC [2]	
Rated voltage	24 ... 125 V ± 20% ⎓
Consumption	4 W
Installation category	CAT III 300 V

[2] Depending on model

Relay output	
Quantity	3
Type	Electronic class A
Rated voltage	230 V ~
Rated current	6 A ~
Instantaneous maximum current	10 A ~
Rated load in AC	2500 VA
Contacts protected by varistor	Maximum voltage 275 V ~
Mechanical useful life	10 x 10^6 operations



Electrical useful life for AC loads. N° of cycles



Cut-off power for DC loads.
Maximum opening current

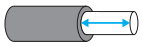
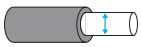
External trip/reset input	
Type	Not opto-isolated, voltage-free

Earth leakage current measurement circuit		
Scale range	Full scale	Display resolution
30 mA	75 mA	± 1 mA
300 mA	750 mA	± 1 mA
3 A	7.5 A	± 0.1 A
30 A	75 A	± 1 A

User interface	
Display	LCD
Keyboard	7 keys
LED	2 LEDs

RS-485 Communications (RDA-C-MT Model)	
Bus	RS-485
Communications protocol	Modbus RTU
Baud rate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Parity	none - even - odd

Environmental features	
Operating temperature	-10°C ... +50°C
Storage temperature	-20°C ... +55°C
Humidity (without condensation)	5 ... 95%
Maximum altitude	2000 m
Protection degree	Assembled device: IP41 (Front) Unmounted device: IP20 (Sides and back cover)

Mechanical features				
Dimensions	Figure 23			
Weight	168 g.			
Enclosure	V0 Polycarbonate plastic			
Fixing	DIN Rail - Panel by accessory			
Terminals				
	7 mm	0.127 ... 2.082 mm^2	0.5 ... 0.6 Nm	Bar 0.4x2.5x80 mm Length: 160 mm

Standars	
Safety requirements for electrical equipment for measurement, control, and laboratory use	UNE-EN 61010
Low-voltage switchgear and controlgear - Part 2: Circuit-breakers	UNE-EN 60947-2-M
General requirements for residual current operated protective devices	IEC 60755
Protection against electric shock by class II double insulation	

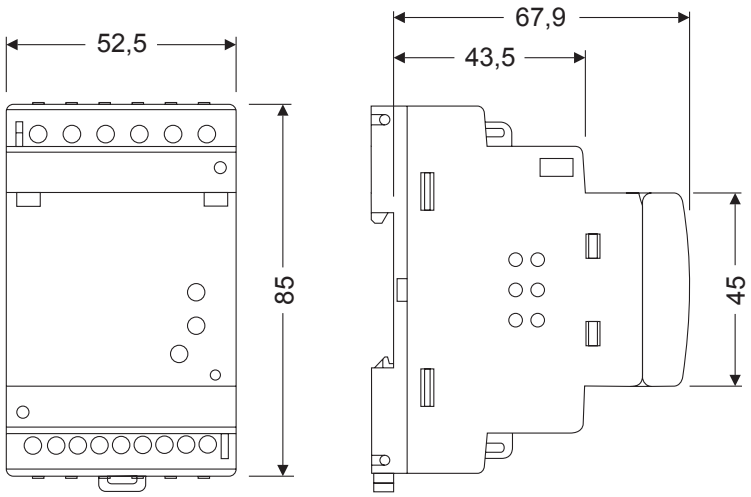


Figure 23: RDA-MT Dimensions.

10.- TECHNICAL SERVICE

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

Technical Assistance Service
C/ Montcada 7, Pol. Ind. Les Pereres
08130 - Santa Perpètua de Mogoda (Barcelona)
Tel: (+34) 935 748 206
email: info@vectorenergy.com

11.- WARRANTY

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

Vector 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.
• **Vector** 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.

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