



**RELAY STATION
CDR-8 SERIES**

INSTRUCTION MANUAL

(M98159101-03 / 06B)

(c) CIRCUTOR S.A.

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1.- CHECKS ON RECEIPT

This manual assists in the installation and handling of the **CDR-8** relay station to obtain the best results from it. On receiving the equipment check the following:

- a) The equipment is the same as the one you ordered.
- b) Check that the equipment has not been damaged during delivery.
- c) Check that it is supplied with the correct instruction manual.
- d) CD with "EasyComm CDR-8" software



For safety reasons, it is vital that people installing or handling the **CDR-8** relay station follow the usual safety procedures as well as the specific warnings contained in this instruction manual.

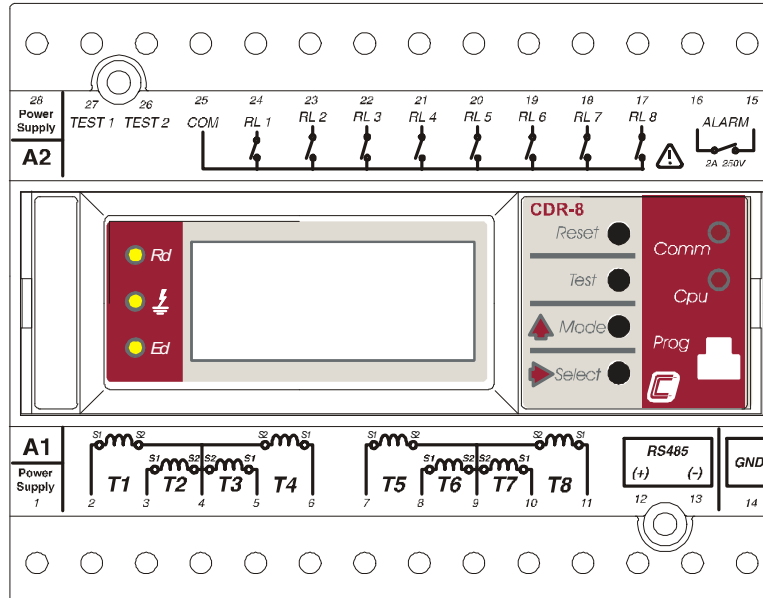


Check the following before connecting the equipment:

- (a) Power supply voltage: see information on the side label.
 - Standard: 230 V AC.** – Single phase, 50 ... 60 Hz
 - Other voltages: on request
- (b) Maximum admissible current: according to toroid used (WG or WGP)

2.- GENERAL FEATURES

The **CDR-8** relay station is programmable DIN rail mounted equipment offering several operational options selected from menus on the equipment itself during set up. Before starting the equipment carefully read the sections **CONNECTION AND SET UP** and select the correct operating mode to obtain the required data.



The **CDR-8** is measuring equipment that calculates and displays the current flowing in true effective values allowing decisions to be made on the operation to be undertaken. It can operate as a maximum and minimum current relay and as earth leakage protection. To do this, it has 8 input channels, 8 operating relay outputs (1 per channel), one alarm output and one test output.

Current is measured by calculating the true effective value of one cycle. If this value exceeds a (preset) threshold for a time period set by the user, then the corresponding operational relay is activated.

The behaviour of the relays can be selected depending on how the **CDR-8** is set up. They can act as blocking relays or with recoverable trip. In current relay mode, selection is done via the keyboard and in earth leakage mode it is activated via the "EasyComm CDR-8" software on the Cd supplied with the equipment.

The **CDR-8** uses an LCD display to show the current or earth leakage and the status of the operational relay for each of the 8 channels.

OTHER FEATURES

- It is a small instrument to be mounted on a DIN rail.
- Measures in TRMS.
- Measurement in 8 independent channels.
- Channels configurable as earth leakage protectors or current relays.
- Alarm relay.
- Operation history logger.
- RS-485 communication for PC.
- Automatic resetting option (in RS-485 earth leakage channels).
- Pre-alarm registers (RS-485).

3.- INSTALLATION AND START UP



This manual contains information and warnings that the user must follow to ensure the safe operation of the equipment and to keep it in a safe condition. It must not be used until it is finally located on the electrical board.

If this equipment is used in a way not specified by the manufacturer, the equipment's protection may be compromised.

If it is likely that safety has been affected (e.g. visible damage) the power supply must be disconnected. In this event, contact a qualified service technician.

3.1- Installing the equipment

Before running voltage through the equipment the following points must be checked:

a.- Power supply voltage: see label on the side of the equipment.

- **Standard power supply:** *Single phase 230 V ~ (AC.)*

Other voltages: on request

- *Frequency* : *50 - 60 Hz*
- *Power supply tolerance* : *+ 15 % -20%*
- *Connection board* : *Terminals 1 - 28 (Power supply)*
- *Consumption* : *4 W*

b.- Maximum admissible current: According to the transformer used.

WGxx 30 mA - 3 A

WGPxx 300 mA - 30 A

c.- Operating conditions:

- Operating temperature : -10 °C to +50 °C
- Relative humidity : 5 to 95 % HR (without condensation)
- Altitude : up to 2000 m

d.- Safety:

- Designed for category III installations - 300 V AC (EN 61010).
- Electric shock protection by class II double isolation.

Installation:



The equipment is to be installed on 46277 DIN rail (EN 50022). All connections are to be inside the electrical casing.

Remember that the terminals can be dangerous if touched when the equipment is connected. Removing covers or parts may give access to parts that are dangerous if touched. The equipment must not be used until it is completely installed.

The equipment must be connected to the power supply circuit with a minimum 1 mm² cable and protected with gl (IEC 269) or M type fuse between 0.5 and 2 A. It must be fitted with a short circuit breaking element or equivalent to disconnect it from the power supply.

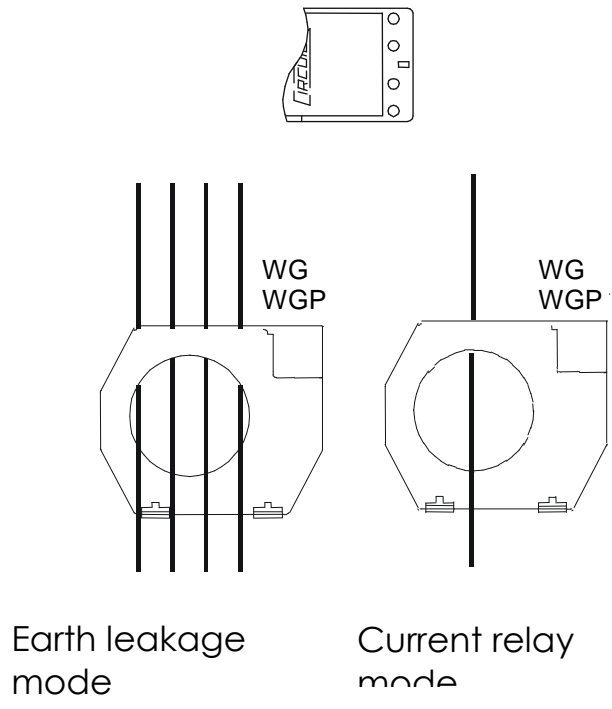
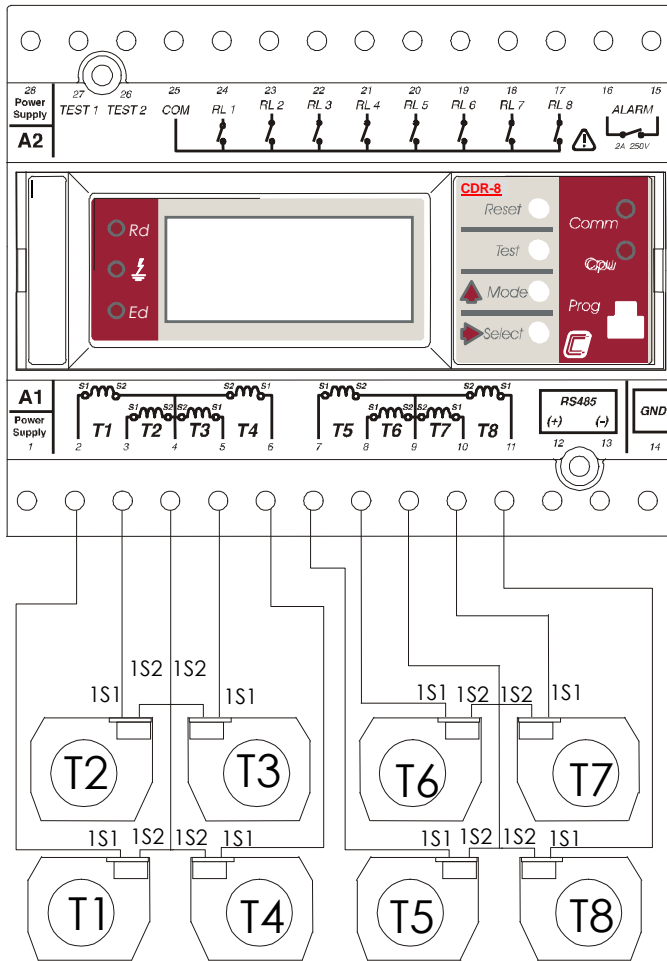
3.2.- CDR-8 terminal ratios (as labels)

Terminal No	Name	Type
1 - 28	Power Supply A1 - A2	Power supply 230 V AC.
27 - 26	Test 1 - Test 2	Test output
25	COM	Common relay outputs
24	RL1	Relay output channel 1
23	RL2	Relay output channel 2
22	RL3	Relay output channel 3
21	RL4	Relay output channel 4
20	RL5	Relay output channel 5
19	RL6	Relay output channel 6
18	RL7	Relay output channel 7
17	RL8	Relay output channel 8
16 - 15	ALARM	Alarm output
14	GND	COM CDR-8 : RS-485 connection to PC.
13	(--)	14 GND -----> 5 converter
12	(+)	13 -- -----> 2 (--) RS-485/RS-232
		12 + -----> 1 (+)
11	T8 - S1	S1 Current transformer channel 8
10	T7 - S1	S1 Current transformer channel 7
9	common - S2	S2 Current transformer channels 5,6,7 and 8
8	T6 - S1	S1 Current transformer channel 6
7	T5 - S1	S1 Current transformer channel 5
6	T4 - S1	S1 Current transformer channel 4
5	T3 - S1	S1 Current transformer channel 3
4	common-S2	S2 Current transformer channels 1,2,3 and 4
3	T2 - S1	S1 Current transformer channel 2
2	T1 - S1	S1 Current transformer channel 1

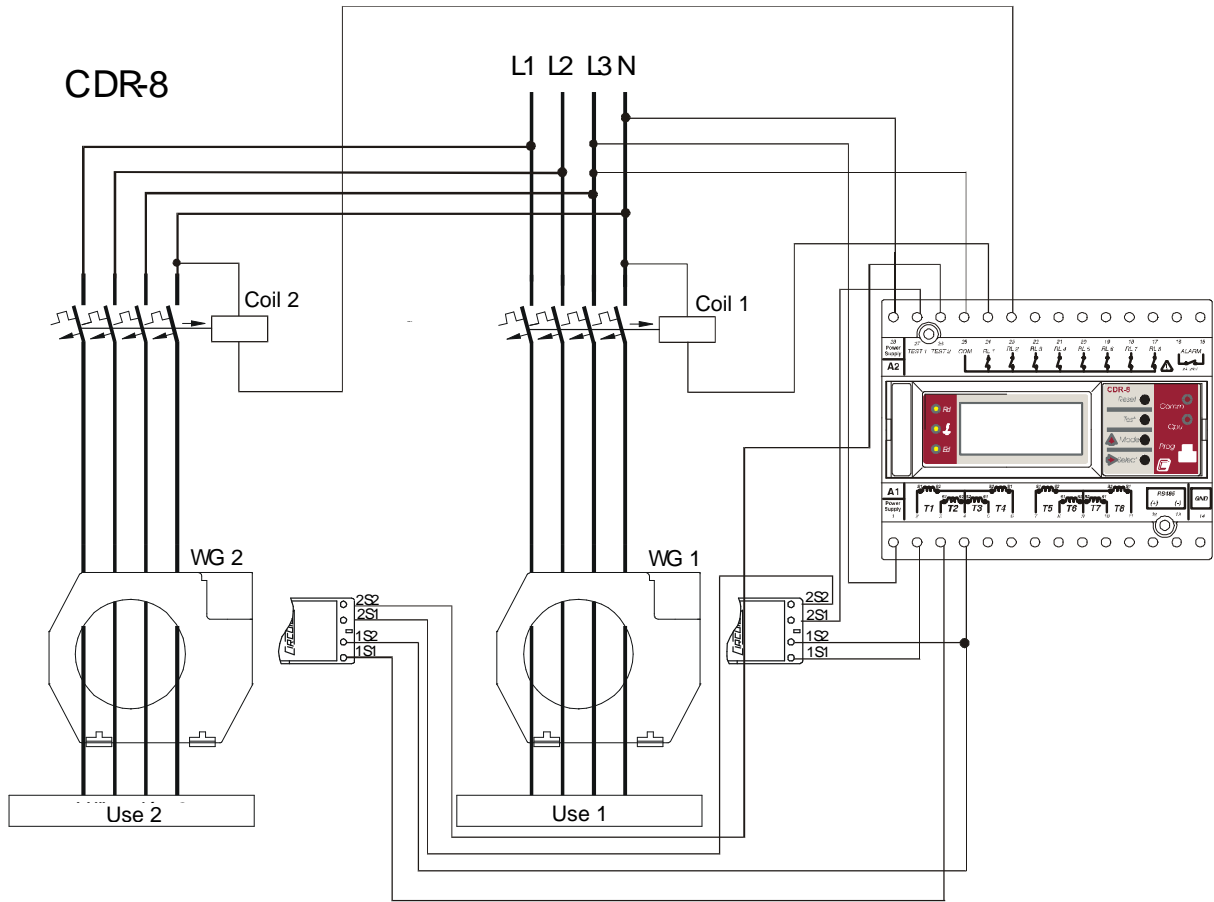
NB: Current inputs are designed for WG or WGP transformers.

3.3.- CDR-8 connection diagram.

3.3.1.- For measuring current:



For earth leakage protection:



4.- OPERATION

The equipment is designed for 50 Hz and 60 Hz installations.

This equipment may be used as for earth leakage measurement or for earth leakage protection. This will depend on the connection (earth leakage protection) or not (earth leakage current measurement) of the operational relay outputs for the different channels.

The **CDR-8** has several operating modes:

- Normal mode: The **CDR-8** continuously measures currents. If the relay outputs are connected it will be used for earth leakage protection or as a current relay.
- Test mode: Checks the status of the connections between the **CDR-8** and toroidal as well as the working of the different LEDs.
- Reset mode: Allows the tripped channels to be reset.
- Set up mode: Allows the relay station to be configured.

*The **CDR-8** will always be in normal mode when it is switched on.*

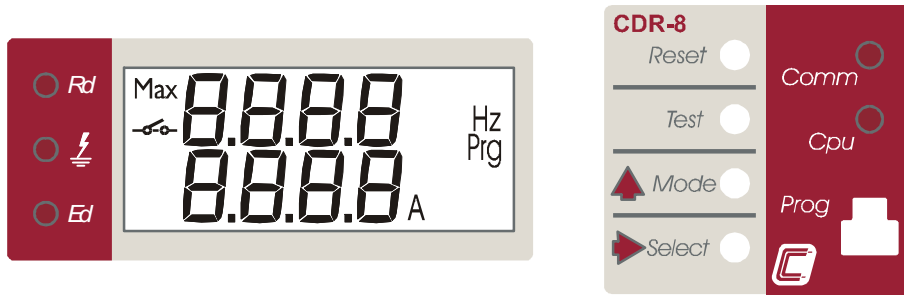
It has 4 buttons and 5 LEDs that have a different following function according to mode.

The **CDR-8** has a non volatile, rotating memory where the 100 most recent events are logged. Each log shows:

- Date
- Channel tripped
- Trip current

4.1.- Normal mode

The equipment has a 2 line LCD display:



When the **CDR-8** is switched on the following information appears on the display for a few moments:

Cdr8	
xxxx	☞ Software version

After a few seconds the equipment is ready to be used and displays one of the possible screens according to the set up.

NB: If the word “**max**” appears on the screen during normal operation, it means that the detected current is higher than the preset range. In the event of this happening the measurement will not be accurate.

⇒ Buttons:


The 4 buttons perform the following operations in this operating mode:

- **RESET button:** Enters Reset mode. By pressing this button for 3 seconds, the **CDR-8** will enter the menu that will unblock one by one all blocked relays. Also, if reclosures are activated the time and reclosure meters are returned to zero.
- **TEST button:** Enters Test mode. By pressing this button for 3 seconds, the **CDR-8** will enter the menu that will self test the selected channel and check the status of the output, the display LEDs, the electronics and the connection between the toroid and the **CDR-8**.
- **MODE button:** Changes the display mode on the LCD. The selected display mode will momentarily appear on the screen:
 - **UIS.1:** Displays the earth leakage current for each channel and the status of the associated relay.
 - **UIS.2:** Displays the earth leakage current of the active channel.
 - **UIS.3:** Indicates the status of each of the channels. The channel status display screen will alternate, if the output is tripped, with another that displays the threshold current of the trip and the current that caused it to trip.
 - **UIS.4:** Shows data for the most recent earth leakage current. The display alternates between the channel number with the detected earth leakage current and the date and time when it happened.
 - **UIS.5:** Shows on one single screen the situation with all the channels. 0 – On, 1 – tripped and P – Pre-alarm.

- **SELECT button:** According to the preset display mode, the function of this button will be:
 - **UIS.2 or UIS.3 mode:** Changes the channel displayed
 - **UIS.4 mode:** Advances within history log.
- **MODE and SELECT button:** Enters set up mode. Depending on the switch situation "PROG" will perform the following operations:
 - **Down:** Enters set up allowing all configuration parameters to be changed.
 - **Up (Blockable position):** Enters set up mode, only allowing the equipment's configuration to be checked. It does not allow the configuration of the equipment to be changed.
- **RESET and SELECT button:** Allows the station to be up dated.

⇒ **LEDs**

The 5 LEDs on the **CDR-8** display the following parameters:

- **CPU LED:** Always flashes when the equipment is working.
- **COMM LED:** Flashes when communication via the RS485 series channel is established.
- **Rd LED:** Is lit when automatic reclosures are permitted.
-  **LED:** Is lit when any channel has tripped. It will always flash when any channel is in pre-alarm and there are no tripped channels.
- **Ed LED:** Is lit when any channel is blocked.

4.2.- Test mode

This is used to check the operation of toroid – **CDR-8** connection, operational relays, the equipment’s electronics and the LEDs.

The equipment does not check the line whilst it is testing

Pressing the “**TEST**” button for three seconds will enter this mode when the equipment is in normal operating mode.

The test is: injecting a current via the test terminals on the transformer. This current is detected by the selected **CDR-8** channel as an earth leakage, tripping it operational relay.

The results of the test of the connection between transformer and the relay station is shown by different messages on the screen:

<p style="text-align: center;">Working correctly</p>	<p style="text-align: center;">Working incorrectly</p>	<ul style="list-style-type: none"> Channel to be tested Test result
--	--	---

If no button is pressed for 30 seconds the equipment automatically goes into normal mode without reconnecting any blocked relay

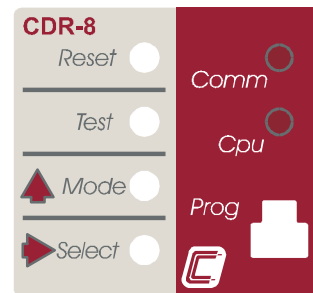
⇒ **Buttons:**

Once in Test mode the functions of the buttons will be:

- **RESET button:** Pressed when this mode is finished and prepares the CDR for normal working.
- **MODE button:** Allows the selection of the channel to be tested.
- **SELECT button:** Starts the testing of the selected channel.

⇒ **LEDs**

The **CDR-8** also checks the working of the LEDs. This test consists of all LEDs being on for all the time it is in Test mode.



4.3.- Reset mode

This is used to reset those relays that have tripped.

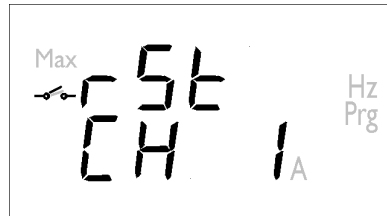
The equipment checks the line whilst it is reset mode

This mode will be entered by pressing the “**RESET**” button for 3 seconds when the equipment is in normal mode.

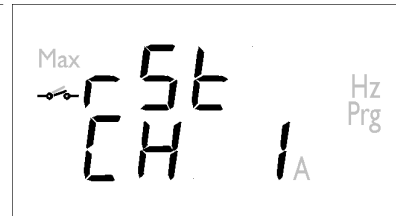
A menu will appear on the screen to select the channel which is to be reset.



No tripped channels



Channel tripped



Channel not tripped

If no button is pressed for 30 seconds the equipment automatically goes into normal mode without reconnecting any blocked relay

⇒ **Buttons:**

In Reset mode the functions of the buttons will be:

- **RESET button:** Ends RESET mode.
- **MODE button:** Allows the channel to be reset to be selected.
- **SELECT button:** Resets the selected channel.

4.4.- Setting mode

This mode allows the relay station to be configured.

To enter this mode, press the **MODE** and **SELECT** keys at the same time in normal mode.

Whilst the equipment is in setting mode it continues checking the line with the parameters in use before entering setting

The earth leakage station has a protection system to prevent changes to the configuration ("PROG" switch).

⇒ **"PROG" switch**

The working of this setting mode depends on the situation with this switch:

- **Up (blockable position):** the **CDR-8** enters setting mode although changing the channel configuration parameters is not permitted.
- **Down:** On entering setting mode all configuration parameters may be changed.

⇒ **Buttons**

When in setting mode:

- **RESET button:** Exits setting mode without making any changes.
- **MODE button:** Changes the selected menu option.
- **SELECT button:** Enters the selected option
- **MODE and SELECT buttons:** returns the equipment to normal operating mode with the new configuration.

5.- SETTING(SET-UP menu)

Setting the **CDR-8** is done via a series of SET UP menus.

☞ To access the setting menu the **MODE** and **SELECT** buttons are pressed at the same time in normal mode (See section 4.4)

Entering **SET UP** shows the screen to select the setting of the features of the different channels or communications.

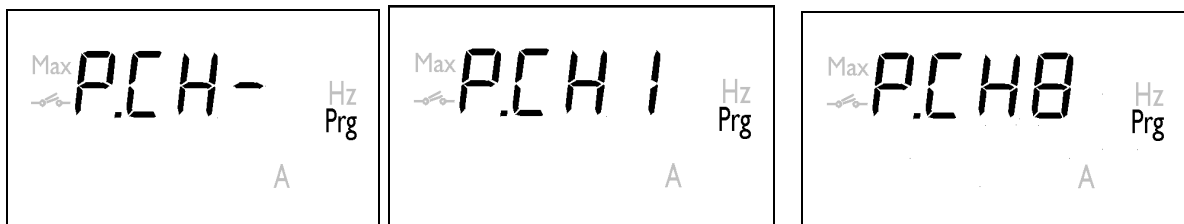
P.CHA	Configuration of the different channels
C.SEr	Configuration of the communications

The selected option will flash.

- **MODE** key moves forward the configurable options
- **SELECT** key enters the selected option.
- **RESET** Exits setting mode without making any changes.
- **MODE** and **SELECT** are used to enter the new setting and to move back to normal operating mode.

5.1.- Channel setting

Once in SET-UP, by using the keyboard the different options may be selected and the variables entered:



Where:

- P.CH - :shows common configurable parameters
- P.CH1 ... P.CH8: Configuration of each channel.

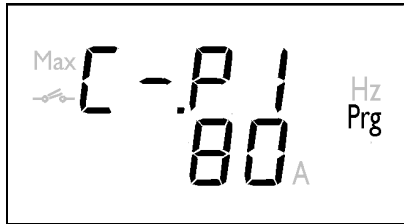
5.1.1.- Setting common parameters

The different options are now described in sequence:

- 1. Pre-alarm threshold.
- 2. Alarm contact status.

Pre-alarm threshold.

The minimum trip threshold of the channels set for earth leakage may be changed between 50 and 100% in intervals of 10%

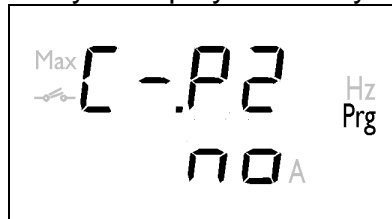


OFF – to disconnect the pre-alarm

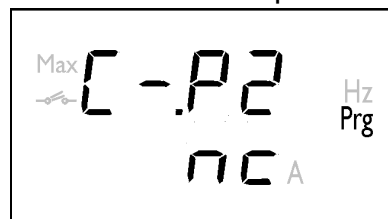
MAIN – 100% trip threshold

Alarm relay output.

The type of relay is displayed. It may be selected from two possible values:



Normally open



Normally closed

5.1.2.- Channel setting:

The following configuration is set for each of the 8 channels available to the earth leakage station.

If the station is to be used only for earth leakage measurement it will only be necessary to select the type of toroid that is connected to each channel and the trip threshold.

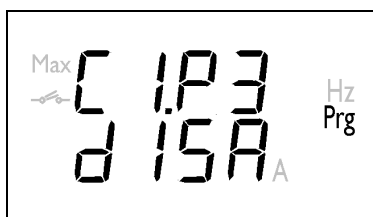
5.1.2.1.- Selecting function.

The first step is to select the function of the selected channel:

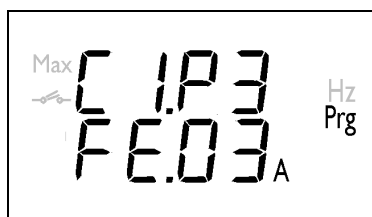


5.1.2.2.- Selection of toroid connected.

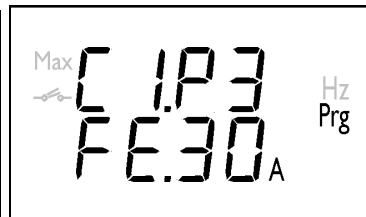
It must be indicated if a toroid is used for each channel, if yes, then which toroid is connected:



Not used



WG 30 mA - 3A



WGP 300 mA - 30A

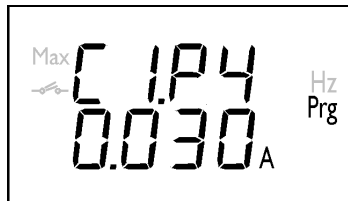
5.1.2.3.- Earth leakage mode:

For equipment only used for earth leakage measurement, it will only be necessary to set the trip threshold.

Trip threshold.

The current at which it will trip must be set (operating relay).

Channels used for earth leakage measurement must be set with the maximum current to be measured. This value is very important because if an extremely high value is set then accuracy will be lost and if a value lower than the measured current is set, the input will be saturated and the measurement will be incorrect.

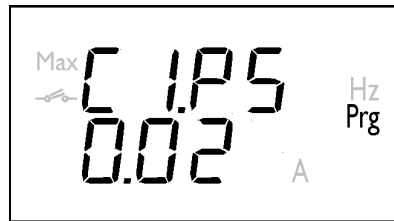


The value set must be one of those predefined values according to the toroid used and the function mode:

30 mA ... 3A		300 mA ... 30A	
30 mA	1 A	300 mA	10 A
50 mA	1,5 A	500 mA	15 A
100 mA	2 A	1 A	20 A
200 mA	2,5 A	2 A	25 A
300 mA	3 A	3 A	30 A
400 mA	3,5 A	4 A	35 A
500 mA	4 A	5 A	40 A
600 mA	4,5 A	6 A	45 A
700 mA	5 A	7 A	50 A
800 mA	5,5 A	8 A	55 A
900 mA	6 A	9 A	60 A

Delay time.

Time during which the earth leakage must exceed the trip threshold to activate the operating relay for the corresponding channel.



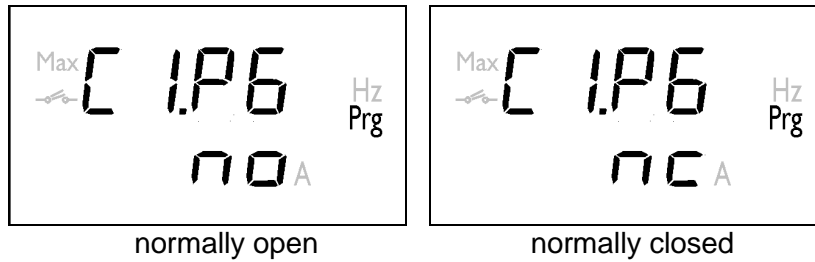
Usual delay times on the equipment are:

INST.	SEL..	0.10 sec.	0.4 sec	0.8 sec.	1 sec.
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Possible delay times for the equipment are those cited in the above table. However, it is possible to set delays up to 10 seconds from the software.

Relay output type.

The required status of the relays when not operating must be specified. There are two possible values:

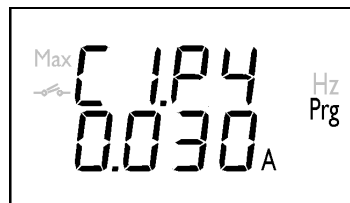


5.1.2.4 - Current relay mode function:

Trip threshold.

The channel trip threshold must be set.

The range closest to the current to be measured must be selected. This value is very important because if an extremely high value is set then accuracy will be lost and if a value lower than the measured current is set, the input will be saturated and the measurement will be incorrect.

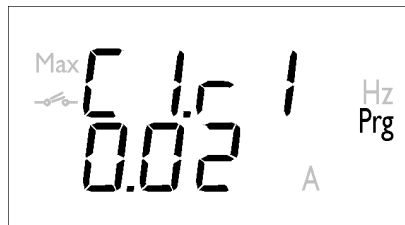


The value set must be one of the values predefined by the toroid used and the function mode:

30 mA ... 3A		300 mA ... 30A	
30 mA	1 A	300 mA	10 A
50 mA	1,5 A	500 mA	15 A
100 mA	2 A	1 A	20 A
200 mA	2,5 A	2 A	25 A
300 mA	3 A	3 A	30 A
400 mA	3,5 A	4 A	35 A
500 mA	4 A	5 A	40 A
600 mA	4,5 A	6 A	45 A
700 mA	5 A	7 A	50 A
800 mA	5,5 A	8 A	55 A
900 mA	6 A	9 A	60 A

Time delay to connection.

Time during which the current flowing through must fulfil the trip condition to activate the operating relay for the corresponding channel.

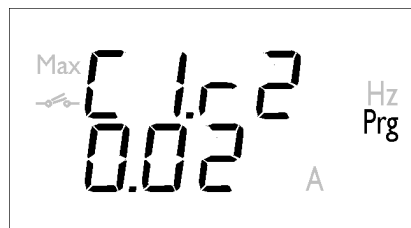


Normal equipment times are:

0.02 sec.	0.04 sec.	0.06 sec.	0.08 sec	0.sec	0. sec
0.80 sec	1 sec	3 sec	5 sec	10 sec	60 sec

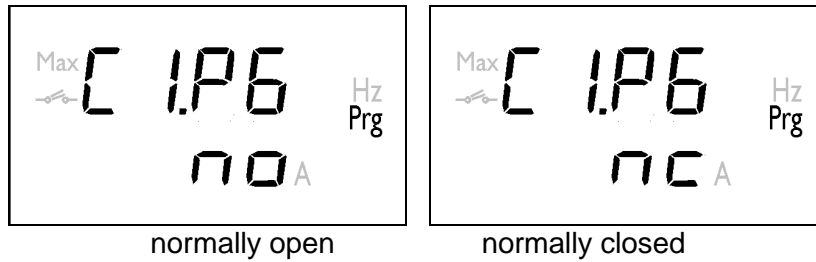
Delay time to disconnection.

Time during which the current flowing through must not fulfil the trip condition to deactivate the operating relay of the corresponding channel. This will only operate if the relay is set as “**NO LATCH**”. Normal times are the same as in the previous table.



Relay output type.

The status where the relays are required to be at rest must be specified. There are two possible values:

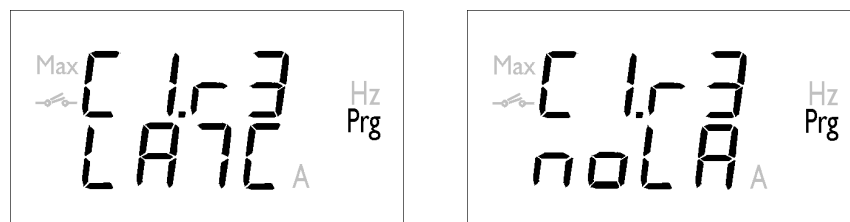


Contact blocked or unblocked.

Whether the tripped contact is to be blocked or unblocked is to be specified on the screen.

In “**LATCH**” mode or blocked the contact remains tripped although the trip condition no longer remains. The rest condition is only regained on pressing “**RESET**”.

In “**NO LATCH**” or unblocked, the contact remains tripped whilst the trip condition is fulfilled and rest condition is regained when the trip condition goes during the “**delay time to disconnection**”.

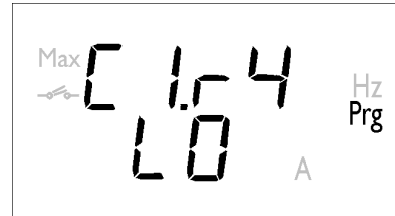
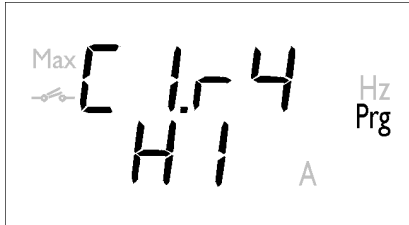


Type of trip.

Two types of trip are specified on this screen:

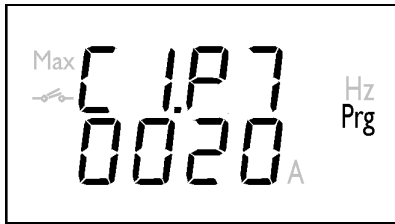
HI : The relay will trip when the current exceeds the threshold.

LO : The relay will trip when the current is below the trip threshold.

**5.1.2.5.- Reclosures**

The options described below only appear if this option has been activated via communication with the "EasyComm CDR-8" software

Time between reclosures.

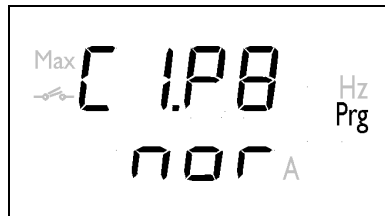


☞ Value between 1 and 900 seconds

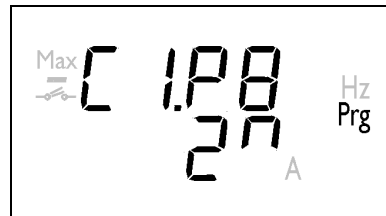
Type of time between reclosures.

Applying time between reclosures creates two reclosure modes:

- **Normal:** Time between two consecutive reclosures is equal to the value preset by the user in the previous parameter.
- **Exponential:** For each reclosure the reclosing time is: $trec_{n+1} = trec \cdot 2^n$, where n is the number of reclosures up to now and $trec$ is the reclosing time selected by the user.

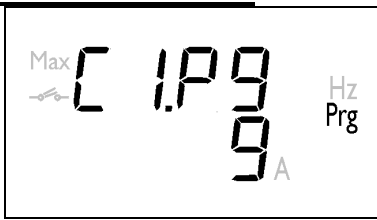


Normal



Exponential

Number of reclosures.



☞ Value between 0 and 10 reclosures.

If, after these attempts, reclosure has not been successful, the relay in question remains blocked and has to be manually or remotely reset to unblock it.

NB:

- If the preset number of reclosures is 0, they remain deactivated.
- Reclosures are returned to zero when double the time between reclosures has elapsed.

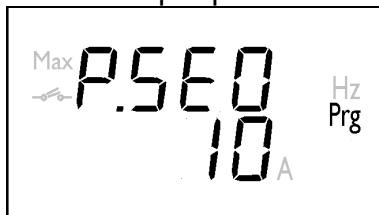
5.2.- Communication configuration

However if the selected option is C.SEr, this allows access to the menus to change the communication series parameters.

The following screens will now appear:

Peripheral number:

The **CDR-8** peripheral number on the MODBUS system.

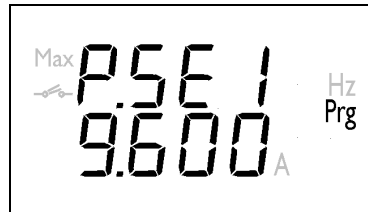


☞ Peripheral No between 1 and 255.

Here the **MODE** key will perform the following functions:

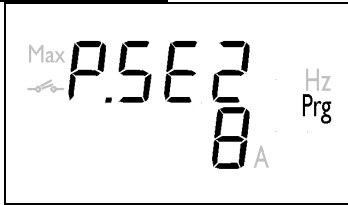
- Short press: Increases the peripheral number 1 by 1:
- Long press: Increases the peripheral number 10 by 10.


Transmitting speed:



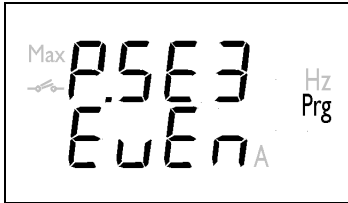
The permitted transmitting speeds are: 4800 – 9600 - 19200 bauds.


Number of data bits:



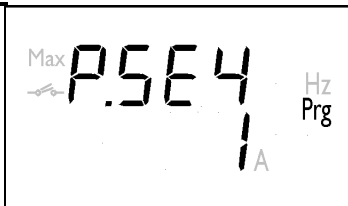
 This value is always 8.

Parity:



 No parity → none
Even → even
Odd → odd

Stop Bits:



 Stop Bits 1 or 2

5.3.- Time setting

To set the internal clock in the **CDR-8** the **RESET and SELECT** buttons must be pressed at the same time.

Then the date and time on the equipment may be changed using:

- **MODE button:** Advances the different menu options.
- **SELECT button:** Enters the selected option.
- **RESET and SELECT buttons:** Enters and ends the time configuration.

6.- TECHNICAL FEATURES**Power supply: see features on the back of the CDR-8**

- CDR-8.... : Single phase: 230 V AC.
 Voltage tolerance: -15 % / +20 %
 Frequency : 50 - 60 Hz

Consumption 4 W

Operating temperature -10° to 50 ° C

Measurement circuit:

Current margin: According to toroidal transformer connected.

WGxx 30 mA - 6 A WGPxx 300 mA – 63 A

Type of measurement: True effective value

Sampling time: 1250µs

Pre-alarm:

Delay: 500 ms

Hysteresis: 50 %

Current accuracy: <5%

Reclosures:

N° reclosures: Programmable 0 ... 10

Time between reclosures: Programmable

→ Normal Mode: 1 ... 900 seconds

→ Exponential Mode: $trec_{n+1} = trec \cdot 2^n$,

Reset time: double the time between reclosures

Accuracy Class:

Current 5 %

Accuracy under measuring conditions:

- Current transformers not included.

- Temperature from + 5 °C to + 45 °C

Mechanical features:

- Type of casing: Modular self extinguishing plastic.
- Connection: Metal terminals with "Pozidrive" screws
- Mounting: Symmetrical profile DIN 46277 (EN 50022) coupling.
Screw mounted option (Mounting hole \varnothing 4.2 mm).
- Facing: Lexan front
- Protection Built in relay : IP 41
 Terminals : IP 20
- Sizes: 140 x 70 x 110 mm (Relay 8 modules according to DIN 43 880)
- Weight: 0.560 kg

Output relay features :

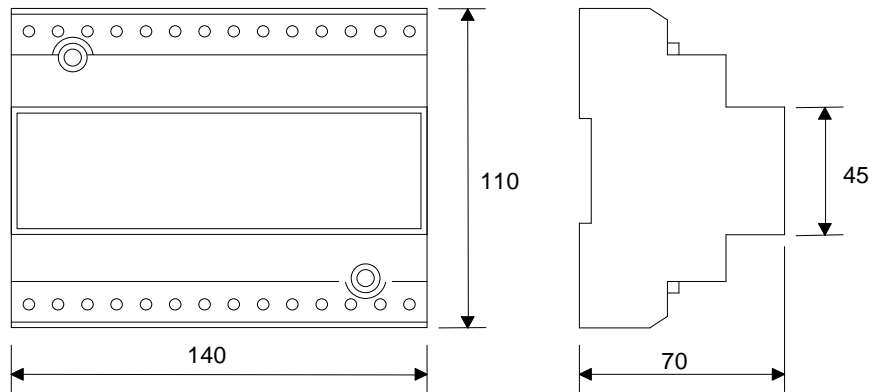
- Maximum operating voltage : 250 V AC.
- Maximum operating current : 5 A

Safety Category III - 300 V AC., EN-61010

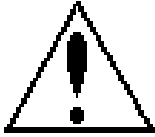
Electric shock protection by double isolation class II

Standards: IEC 1008, IEC 1010, IEC 255-5, UNE 801-2, UNE 801-3, UNE 801-4, UNE 60730-1, UNE 61010

Sizes:



7.- SAFETY ADVICE



Installation guidelines given in the previous sections INSTALLATION AND START UP, TYPES OF INSTALLATION and TECHNICAL FEATURES must be followed.

When the equipment is connected the terminals are dangerous when touched and opening covers or removing parts may give access to parts that are dangerous when touched. This equipment is supplied in good working order.

8.- MAINTENANCE

The **CDR-8** does not require any special maintenance. Any adjustment, maintenance or repair on open equipment must be avoided as far as possible. If this is unavoidable it must be undertaken by someone qualified and informed of the necessary procedure.

Before any change to the connections, replacement, maintenance or repair the equipment must be disconnected from the power supply. If any operating or protection fault with the equipment is suspected, it must be taken out of service, ensuring against any accidental connection. The equipment is designed to allow parts to be quickly replaced in the event of any breakdown.

9.- TECHNICAL SERVICE

In the event of any operating queries or equipment breakdown please contact our Technical Service:

CIRCUTOR S.A. – After sales service

Vial Sant Jordi, s/n

08232 - Viladecavalls

Tel. – (+34) 93 745 29 00 & fax – (+34) 93 745 29 14

E-mail: central @ circutor.es

10.- CDR-8 COMMUNICATIONS...



One or several **CDR-8** instruments may be connected to a computer. As well as the usual operation of each instrument this system can centralise data at one single point. The **CDR-8** has a 485 series communication output. If more than one instrument is connected on one line each one has to be assigned a number or address (from 01 to 255) so that the central computer sends data requests to those addresses.

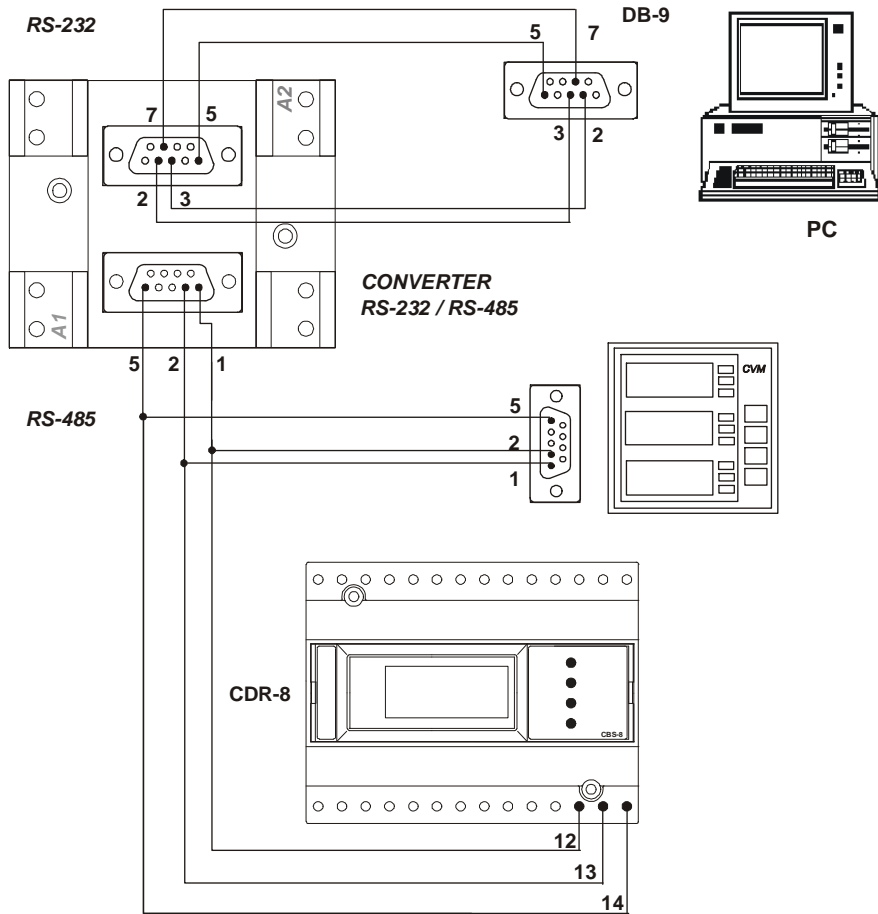
10.2.- Please Note:

- **PROTOCOL:** MODBUS © (Question/Answer)
- **CDR-8 DEFAULT CONFIGURATION:** 001/9.600 / **8 bits** / N / 1 bit
- Possible speeds : 4.800 - 9.600 - 19.200 bauds
- **RS-485 output:** Terminal No. *Signal*

12	-----	TX +
13	-----	TX --
14	-----	GND

- The RS-485 is connected by a **plaited insulated** communications cable, three wire minimum, with a maximum distance between PC and final peripheral of 1,200 metres. The **CDR-8** uses an RS-485 communication line that can be connected to a **maximum of 32 instruments in parallel (multi-point Bus) for each used COM of the computer.**

10.2.- RS-485 connection system to a PC (RS-232)



***If the RS485/232 converter with RTS control is used (code 770208), it is not necessary to use the 7 pin connection on the RS-232.**

10.3.- MODBUS[®] Protocol

The **CDR-8** system analyzer can communicate via **MODBUS[®]** protocol, as described below.

The MODBUS[®] protocol uses **RTU mode** (Remote terminal Unit). Each 8-bit byte in a message contains two hexadecimal 4 bit characters.

The format for each byte in RTU mode is:

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

MODBUS FUNCTIONS USED IN THE CDR-8:

- FUNCTION 03h and 04h** Reading n Words (16 bits - 2 bytes). The reading function used by all of the **CDR-8** parameters.
- FUNCTION 06h** Writing one WORD (16 bits - 2 bytes) in one position in the memory.
- FUNCTION 10h** Writing n WORDS (16 bits - 2 bytes) in consecutive positions in the memory.

10.3.1.- Readout logs

To read these logs the Modbus 03H or 04H function is used.

Two types of data can be distinguished in the equipment’s memory:

- **Variables:** Corresponding to all information supplied by the **CDR-8** on the measurements made and the status of the relays.
- **Logs (Histories):** These logs store the last 100 operations done by the station.

Variables

Description	Units	<i>MODBUS LOGS HEXA-DECIMAL (longs)</i>							
		Channel							
		1	2	3	4	5	6	7	8
Date*		0000-0001							
Earth leakage current	(mA)	0002	0003	004	0005	0006	0007	0008	0009
Output status	0=Not tripped 1=Exceeded. 2=Tripped. 3=Blocked.	000A	000B	000C	000D	000E	000F	0010	0011
Alarm relay status	0=Not activated 1=Activated	0012							
Trip current	(mA)	0013	0014	0015	0016	0017	0018	0019	001A
Last recorded trip		001B							
Operating mode		001C							
“PROG” switch	0 = Up 1 = Down	001D							
Software Version		001E							
Pre-alarm activated	0=Not activated 1=Activated	001F	0020	0021	0022	0023	0024	0025	0026

Date Format:

b0 - b5	Seconds	b17 - b21	Day of the month
b6 - b11	Minutes	b22 - b25	Month
b12 - b16	Hour	b26 - b31	Year + 2000

Memory log (History)

Trips are recorded in the equipment's memory. The structure of this data in the memory is in 4 recording blocks.

The table shows the starting log and the final reading

Event	0	1	2	3	4	5	6	7	8	9
00	0400	0404	0408	040C	0410	0414	0418	041C	0420	0424
10	0428	042C	0430	0434	0438	043C	0440	0444	0448	044C
20	0450	0454	0458	045C	0460	0464	0468	046C	0470	0474
30	0478	047C	0480	0484	0488	048C	0490	0494	0498	049C
40	04A0	04A4	04A8	04AC	04B0	04B4	04B8	04BC	04C0	04C4
50	04C8	04CC	04D0	04D4	04D8	04DC	04E0	04E4	04E8	04EC
60	04F0	04F4	04F8	04FC	0500	0504	0508	050C	0510	0514
70	0518	051C	0520	0524	0528	052C	0530	0534	0538	053C
80	0540	0544	0548	054C	0550	0554	0558	055C	0560	0564
90	0568	056C	0570	0574	0578	057C	0580	0584	0588	058C

The recorded event format (8 bytes) will be:

1 byte	Operation date
2 byte	
3 byte	
4 byte	
5 byte	Trip current
6 byte	
7 byte	Trip channel
8 byte	Not used

10.3.2.- Operating logs

There are a series of configuration operations that can only be done through communications:

These variables are used with the log writing function.

Channel RESET

Writing	
NP06030XFFFFCRC	
Response	
NP06030XFFFFCRC	

Where x is the channel number (1-8) to Reset (0-All channels)

Deleting the operation file

Writing	
NP06030EFFFFCRC	
Response	
NP06030EFFFFCRC	

10.3.3.- Automatic reclosure

The CDR-8 has an automatic reclosure feature.

To make this option available it must be activated via the "EasyComm CDR-8" software on the CD supplied with the equipment.

The instruction manual for the software can also be found on this CD.