RCU
User Manual

RCU-210N | RCU-2R5V | RCU-2Ra | RCU-C

RCU Series

M

rCU

Dinacell
electrónica

Mod. RCU

SENSORS

Dinacell
electrónica

Dinacell Electrónica S.L.

Dinacell Electronica S.L.

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Product notice

This manual describes the characteristics that serve the product in its most updated version.
The resources and functions included in this manual serve the RCU family of models (not all models incorporate all functions).
Not all resources are available in all editions or versions of the RCU.

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Introduction

1.1 Product description

RCU devices have been designed to limit the load on elevators. Our equipments have low power consumption. RCU are an excellent low-cost device to limit the weight in your elevator.

1.2 Features by model

⚠ This manual contains the resources for all RCU models.

Please check the following table to know models equipment functions.

Models		RCU-210N	RCU-2R5V	RCU-2Ra	RCU-C
Number of relays		2			-
Number of alams		2			3
Analog outputs	4-20 mA	-	-	✓	-
	0-20 mA	-	-	✓	-
	0-10 V	✓	-	✓	-
	0-5 V	-	✓	-	-
CANopen CIA 417		-	-	-	✓
NG technology (needs Gateway)		-	-	✓	✓
Mini USB for firmware upgrade		✓	-	✓	✓

Technical data for installation

2.1 Dimensions (mm) and components
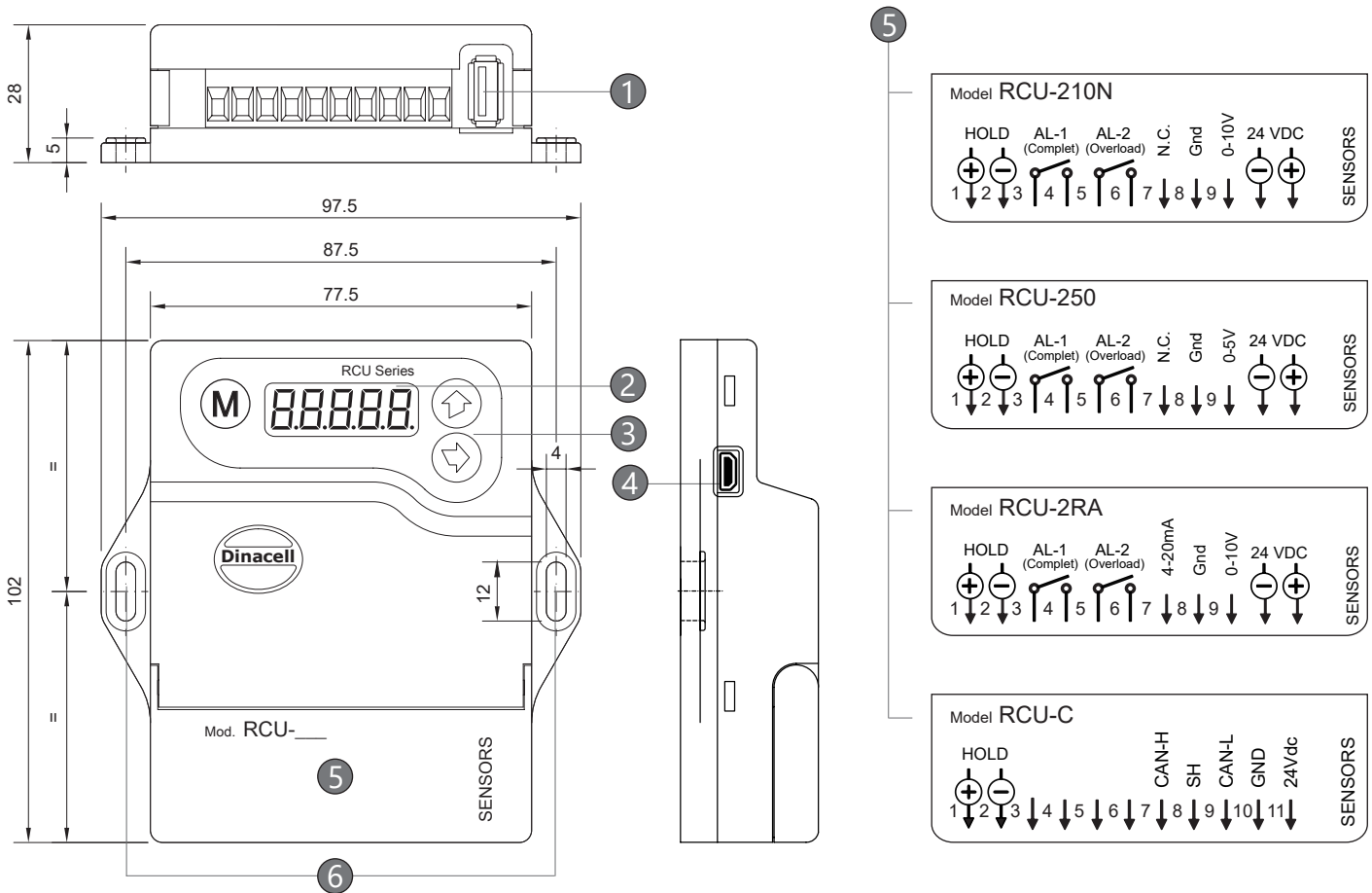
(1) Cell signal input. USB

(2) Display. 5 digits.

(3) Keyboard. 3 keys.

(4) Mini USB input.

(5) Wiring diagram. *Depending on the model.

(6) Fixing points. To install the control unit.

2.2 Electrical specifications

Power supply (Short circuital It is not necessary to replace any fuse.).		24 (18...40)VDC
Maximum current		65mA
Relays Contacts	Max. voltage	250VAC / 2A
Max. current		24 ... 125 VAC/DC
Box material		Fireproof plastic IP50

Internal structure & equipment management 3

3.1 Diagram of the general structure
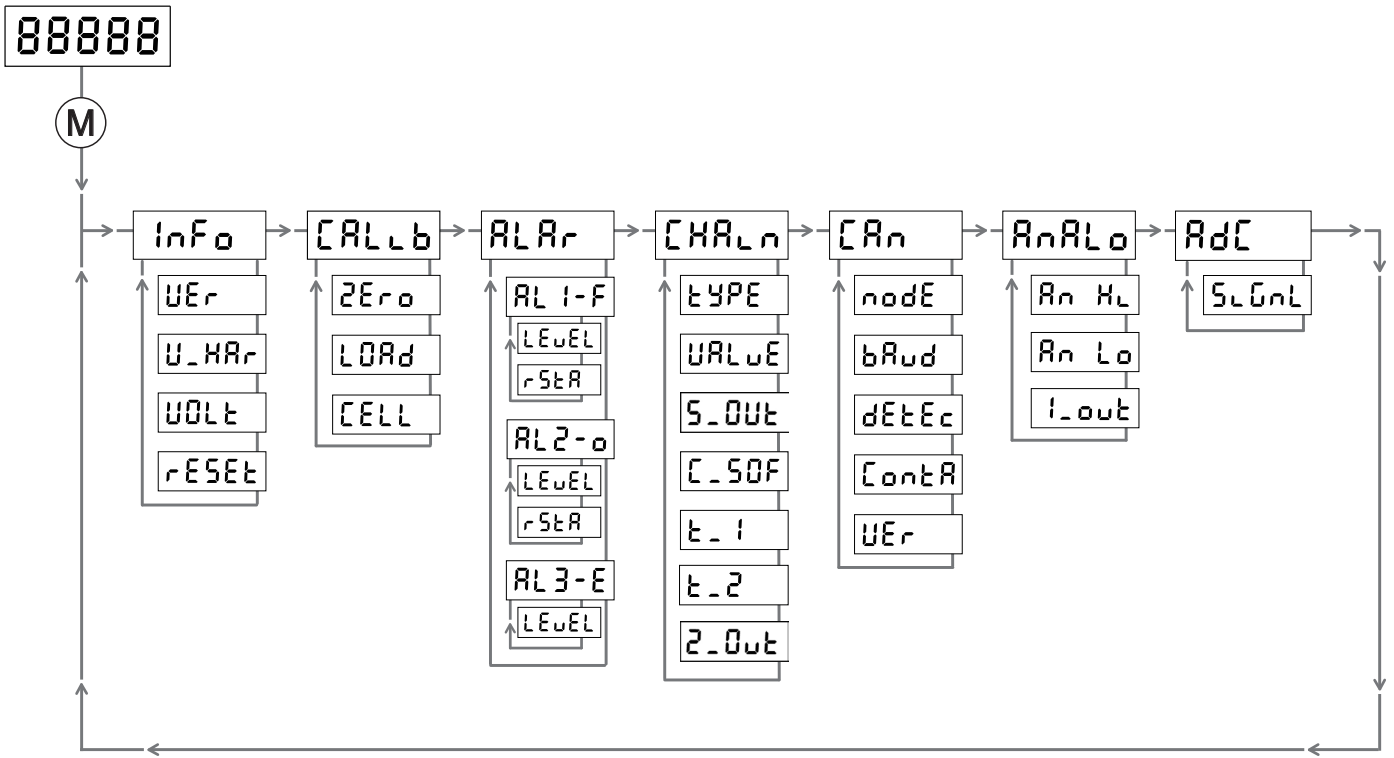
3.2 Button functions

Buttons	State	Functions
M	From Load indication	Keep pressed to enter or exit from the settings menu.
	Inside Menu	Press to navigate.
	Setting any parameter	Press twice to save and confirm the parameter value.
➡	Inside Menu	Press to enter inside a submenu or parameter.
	Setting any parameter	Press to select the digit to modify.
⬆	Inside Menu	Press to visualize the value of the parameter selected.
	Setting any parameter	Press to change the value of the blinking digit.

Settings Menu

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4.1 Settings Menu

The display of your equipment will show you, by default, the weight indicator $\boxed{88888}$. In order to enter or exit the settings menu you have to keep the button (M) pressed.

The menu has a cyclic structure composed of different submenus as shown in the diagram below.

⚠ Some models may not integrate all menus or funtions, see section 1.2.

Settings menu	Description
InFo	Device information submenu.
CALib	Equipment calibration submenu.
ALAr	Alarms submenu.
CHAln	Chain compensation submenu. ⚠ Only for models with CANopen-Lift CIA 417, see section 1.2.
CAn	CanOpen submenu.
AnALo	Submenu of analog output. ⚠ Only for models with analog output, see section 1.2.
AdC	Submenu for displaying the signal of the sensors in mV/V.

4.2 Information submenu

In this submenu you will find important equipment information and reset operation to restore the device to the factory state.

Options submenu	Description
InFo → UEr	**Firmware Version (Read-only).** The device will show the firmware version of the RCU unit. Valid values: 1.00 and higher.
U_HAr	**Hardware Version (Read-only).** The device will show you the hardware version of the RCU unit.
UOLt	**Unit voltage (Read-only).** Valid values around 24 VDC.
rESEt	**Reset operation.** Restoration of the equipment to the factory state, select: _NO To cancel the operation. _ALL To restore all values to the factory state. ⚠ All calibration information will be lost.

4.3 Calibration submenu

In this submenu you will find different parameters and operations that will help you adjust the equipment to obtain the highest possible measurement accuracy.

Options submenu	Description
CALib → 2Ero	**The Operation to indicate zero.** ⚠ This operation must be performed with the elevator cabin empty. Inside the display will show you a value in seconds, this value will allow you to start a countdown to be able to perform the operation without any weight inside the elevator.
LOAd	**Parameter to indicate a known weight.** ⓘ To display the weight it is recommended to place inside the elevators cabin a known weight of 60% of the maximum load capacity. Then indicate and confirm the value of that weight.
CELL	**Sensor sensitivity. (Option-B End Calibration)** If the load cells are plug & play (factory adjusted), it would be possible to perform a calibration without indicating a known weight in the "Load" parameter. This type of cells will have the value of Cell indicated on its label or in some type of attached document, which must be entered in this parameter. In case of connecting a set of cells to the equipment, you must add all the cells and enter the total. Only if the sensors are installed on the cables or on the elevator belts and the suspension is different from 1:1, you must multiply the sum by the type of suspension x2 (2:1), x3 (3:1) etc. Example: if we have connected 3 load cells with a value of Cell=500 installed in the elevator cables with a 2:1 suspension, the operation would be: (500+500+500)x2=3000 ⚠ In case of calibrating with a "Zero" and a "Load", this value is self-calculated and it is recommended not to modify it so as not to overwrite the calibration data.

4.4 Alarm submenu

In this submenu you can set alarms. If a value is applied to the alarm, when that value is exceeded the alarm will be activated and the state of the relay will change. The status of each relay can be configured individually as open or closed.

⚠ No alarm will be activated as long as voltage is supplied to the HOLD input (e.g. travel signal or door closing).

Options submenu	Description
`ALAr` → `AL1-F` → `LEuEL` `rStA`	**FULL CHARGE alarm.**
	Parameter to indicate the alarm level. If we apply a value to the alarm, we enable it. When the load value is exceeded, the alarm is activated, and the relay will change it´s state. When the alarm is active, the alarm LED indicates. If the value set is "00000", the alarm and the relay will be deactivated.
	Parameter to indicate the status of the relay. This parameter allows you to configure the relay status concerning the alarm when it is deactivated. `_OPEn` Normally open (set by default). `_CLOS` Normally closed.
`AL2-o` → `LEuEL` `rStA`	**OVERLOAD alarm.**
	Parameter to indicate the alarm level. This parameter is the same as that of the COMPLETE LOAD alarm but applied to the OVERLOAD alarm.
	Parameter to indicate the status of the relay. This parameter is the same as that of the COMPLETE LOAD alarm but applied to the OVERLOAD alarm.
`AL3-E` → `LEuEL`	**EMPTY CABIN alarm.**
	Parameter to indicate the level of the alarm. If we apply a value to the alarm, the alarm will be activated the measured weight is below this value.

4.5 Chain compensation submenu

In this submenu you can activate or deactivate the software chain compensation. This function allow to balance the weight gap produced by the elevator chain compensation on the cabin.
To use this compensation function the control unit must be connected to HOLD signal (chapter 2.1). Once the compensation is configured, after HOLD signal activation, that occurs when the doors are closed, the control unit calculate the weight after the elevator travels.

(i) When the elevator starts running and HOLD signal turns on, the display will not change, neither the analog output connected to the display until the run is over and HOLD signal deactivates.

Submenu Options	Description
`CHAin` → `tYPE`	**Parameter to select the type of chain compensation.** Within this parameter you can select: `_SoFt` Compensation via software. `_nonE` No chain compensation.
`VALuE`	**Maximum value of chain compensation. (For hardware and software).** Select a maximum value to compensate from 0 … 600.
`S_0ut`	**AUTO-ZERO seconds (Time).** Seconds programmed so the control unit make itself a ZERO when weigh don´t vary ± 20kg.
`C_S0F`	**Compensated value of the chain by software estimate. (Read-only)** Seconds to make an Auto Zero to the unit when the Hardware HOLD input is active, and the weight remains constant at least forthis period of time.
`t_1`	**Previous time to measure the weight before the activation of the HOLD signal.** This parameter is measured in tenths of a second and serves to be able to take a stable measure of the weight before closing doors.
`t_2`	**Delay time to update the weight when the HOLD signal is released.** This parameter is marked by tenths of a second and serves to be able to update a stable measure of weight after opening doors.
`2_0ut`	The RCU devices integrate a function called AUTO-ZERO-SHORT. When the device does not detect any weight changes of more than 20kg, for 2 minutes, it will eliminate any error that may appear below the value set as maximum compensation value. It also integrates the AUTO-ZERO-LONG function which after a 30 minutes pause, can make corrections of any weight.

	AUTO-ZERO-SHORT	AUTO-ZERO-LONG
`A_1`	ON	ON
`A_2`	ON	OFF
`A_3`	OFF	ON
`A_4`	OFF	OFF

(i) If the maximum compensation value is set to 00000, the AUTO-ZERO-SHORT function will be disabled.

(i) RCU devices integrate a function called AUTO-ZERO, which is activated after selecting a compensation type `type` and set a maximum compensation value `VALuE` .
This function is designed to automatically eliminate the small possible error that may appear below the marking as the maximum compensation value. The AUTO-ZERO function will be applied when the equipment does not detect any weight change of more than 20kg for a period of time.

⚠ If the maximum compensation value is set to "00000" it will deactivate the AUTO-ZERO function.

4.6 CanOpen submenu

Some of the RCU models integrate CanOpen. In this submenu you will find some important parameters that can be configured such as the transmission speed of the equipment.

Dinacell Electronica S.I: is CiA (Can In Automation) member.
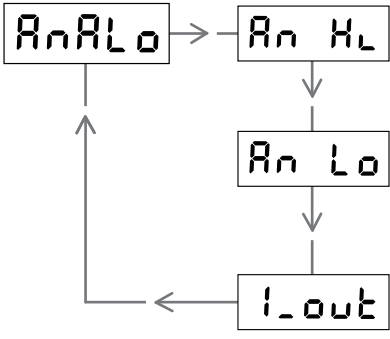Vendor-ID 00000361

Bus connection must be able to use with Cia-417 CAN high standard speed (ISO99-2)

⚠ If the Load Weighing unit is set at the end of the installation end, a 120Ohm resistor must be placed on the connector between Can High and Can Low lines.

Submenu Options	Description
`CAn` → `nodE`	**CanOpen device node identification. (Read-only)**
`bAud`	**Baud Rate of the device.** In this parameter we can select the transmission speed in our device. The transmission speeds of the device are 125 or 250kb supported by 417.
`dEtEc`	**Weight change detection.** Units needed to detect and send a change of weight in the cabin. When a weight change is exceeded, a PDO message is sent. Selectable units are 1,2,3,5,10,20,25,50,100,250.
`ContA`	**Contact control of elevator doors.** In case of not having a HOLD signal it is possible to detect the movement of the elevator doors through the information on the bus. `_No` If the installation integrates HOLD signal. `_NoUE` If the installation does not integrate a HOLD signal, select this option to read the controller's motion signal. (Recommended value) `_StAt` If the installation does not integrate a HOLD signal, select this option to read the status of the controller. `_Cont` If the installation does not integrate a HOLD signal, select this option to read the information of the elevator door controller.
`UEr`	**CanOpen version. (Read-only)** The current version is 2.0

4.7 Analog output submenu

This submenu allows you to select the type of analog output you need.

Submenu Options	Description
`AnALo` → `An HL`	**Maximum load for analog output.** In this parameter you must indicate the maximum load value in the selected units (chapter 4.3) for 5V, 10V or 20mA.
`An Lo`	**Minimum load for analog output.** In this parameter you must indicate the minimum load value in the selected units (chapter 4.3) for 0V, 0mA or 4mA.
`I_out`	**Type of current output.** With this parameter the output is set to 4-20 or 0-20mA.

● Example with Voltage (0-5V/0-10V): For a configuration with a minimum load of
0kg (empty elevator car) and a maximum capacity of 100kg (full elevator car).

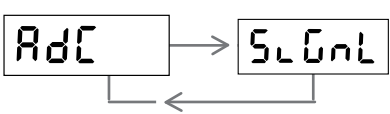| Configuration A	Configuration B
`An HL` =100kg ⟶ 100kg=5/10V `An Lo` =0kg ⟶ 0kg=0V	`An HL` =0kg ⟶ 0kg=5/10V `An Lo` =100kg ⟶ 100kg=0V

● Example with Power (0-20mA / 4-20mA): For a configuration with a minimum load of
0kg (empty elevator car) and a maximum capacity of 100kg (full elevator car).

Configuration A	Configuration B
`An HL` =100kg ⟶ 100kg=20mA `An Lo` =0kg ⟶ 0kg=0/4mA	`An HL` =0kg ⟶ 0kg=20mA `An Lo` =100kg ⟶ 100kg=0/4mA

4.8 ADC Submenu

In this submenú you can observe the mV/V signal of every sensor. This submenu is useful to compare the values between sensors and see if any cell is damage.

Submenu options	Description
`AdC` → `SiGnL`	**Sensor signal in mV/V. (Read-only).**

NG technology

5.1 What advantages does it have?

Dinacell equipment designed with NG technology is mainly characterized by its possible connectivity with phones, tablets or computers. Allowing through them to read all the parameters in real-time, test the installation and calibrate the unit without having to access its keyboard. In addition, it will allow you to obtain a report in PDF. These reports can be sent via email to keep good control of the facilities. On the other hand, you can record all the information of these reports on the mobile, tablet or computer of all the facilities you want.

Another feature to highlight is the possibility of a firmware update. In case of possible developments of Dinacell in its firmware to add or improve functionalities, it would be possible to update your NG equipment in an agile way.

5.2 Configuration from mobile, tablet or computer

The process of calibrating the equipment with NG technology through a mobile device, tablet or computer accelerates and reduces configuration times.

The steps and procedures when calibrating the equipment are the same (Chapter 7), but much more quickly and intuitively. To be able to enjoy these advantages you will need to connect and download the Dinacell application for your equipment with NG technology.

ⓘ For more information on the NG connection and its application, refer to the corresponding manual.

5.3 Firmware update

The firmware of any NG device can be updated using the NG connection and a USB memory containing the update.
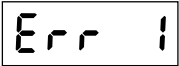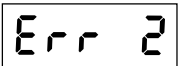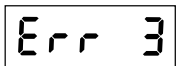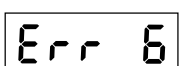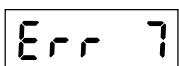
Follow the steps below to automatically load the firmware update:

(1) Copy the new firmware (file.CYP) to a USB memory.
(2) Plug the USB memory with the update into a USB to mini USB adapter hose.
(3) Turn off the power of the RCU equipment.
(4) Keeping the key Ⓜ pressed, reconnect the equipment power.
(5) Plug the mini USB hose into the NG connector.
(6) Wait for the unit to reset. The process can take up to a minute.
(7) When the update is finished, the device will start automatically.

Errors

6.1 Error Codes

The device can detect errors showing the error codes listed in the table:

Error	Description	Action
`Err 1`	Improperly connection. Sensor faulty or cable damaged.	Check the cable and the connections.
`Err 2`	Negative signal overflow. The sensor is working in the opposite direction or it is incorrectly connected.	Check the installation sensor.
`Err 3`	Positive overflow. The sensor is supported a load greater than the nominal value.	- The load cell may be damaged. - Replace The load cell with a higher nominal value.
`Err 6`	Memory data loss. ⚠ When this error appears, the relays change to OPEN state.	Reset the device. Restart the equipment with the values by defect. (Chapter 4.2)
`Err 7`	Load cell with very low sensibility. The unit was not properly adjusted or the load cell has a low nominal value.	- Adjust the zero and Load again. - Change the load cell by another with a lower nominal load.

⚠ Important: When an error appears, all alarms will be ACTIVATED and relay will change their status alarm. With ERROR 6 all the relay will be OPEN.

Quick guide for the installation of the RCU 7

⚠️ Some models may not integrate all the menus or functions, see section 1.2.

ℹ️ Before installing the sensors in your workplace it is advisable to read all the points in this guide.

ℹ️ The handling of the equipment buttons is indicated in chapter 3.2.

7.1 Equipment installation

ℹ️ The connections may vary depending on the RCU model (chapter 2.1).

7.1.1 Fix the equipment to the place of installation.

7.1.2 Connect the sensor to the equipment. In case of connecting several sensors, you can use an INTERFACE with USB output.

7.1.3 Connect the Hold signal taking into account its polarity.

7.1.4 For models with alarm relays, make the connections.

7.1.5 For models with "CAN" make the connections.

7.1.6 For models with "Analog Output" make the connections.

7.1.7 Connect power.

7.2 Equipment calibration `[RLLb]`

7.2.1 `[2Ero]` Do the operation to indicate zero, when you accept this operation it will start a countdown that will allow you to exit the elevator. (This operation must be carried out with the elevator empty).

7.2.2 `[LOAd]` Option-A

Parameter to indicate a known weight. To do this, you must introduce a known weight of at least 60% of its maximum capacity into the elevator car and indicate that weight on the equipment.

7.2.2 `[CELL]` Option-B

⚠️ This operation is only valid for Plug & Play sensors (factory adjusted) that have a cell value indicated on their label or in an attached document.

Enter the sum of the cell values of all the cells connected to the equipment.

ℹ️ Only for the sensors that are installed on the cables or on the elevator belts and the suspension is different from 1:1, you must multiply the sum by the type of suspension x2 (2:1), x3 (3:1) etc.

7.3 Equipment configuration

7.3.1 `[ALAr]` The next step is to configure the alarms by marking the status of the relay and setting a weight level for the full load, overload and empty or auxiliary alarms. If you need to know more about the types of alarms and how to configure them, it is indicated in (chapter 4.4).

7.3.2 `[CHALn]` By default the software chain compensation is activated. In case you need to modify the chain compensation or for more information (chapter 4.5).

7.3.3 `[CAn]` Only in case you need to configure the CanOpen parameters (chapter 4.6).

7.3.4 `[AnALo]` Only in case you need to configure the analog outputs (chapter 4.7).