



POWER CONTROL

CA-4

(Cod. 7 70 428)

INSTRUCTION MANUAL
(M98133401-03-06B)

(c) CIRCUTOR S.A.

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POWER CONTROL CA-4

1.- INTRODUCTION

CA-4 power controller has been created to control the maximum demand of energetic consumption of factories, industrial areas, offices flats, big surfaces and where ever we want to have a control above the loads to avoid to excel the maximum demand of contracted energy.

To allow it, the controller will use the modules to act on the loads. An analysis process of the energetic consumption will disconnect loads according to a priority order when the consumption is going to excel the maximum allowed level and the controller will connect again the loads according to a priority order when the consumption returns to a correct level.

The controller always tries to keep connected the maximum number of loads in all possible time. Then, the consumed prices will always approximate to allowed maximum level. Nevertheless, they never won't exceed it, and we will avoid to pay extra charges in the electrical company bill because of we have consumed more energy than we have contracted (in companies that apply this type of extra charge).

The system has been designed in a modular process, then, we can adapt it to each type of industrial plant. For example, we can use CA-4 controller with small companies, using some MR-3 modules, and we can use the same controller but more number of modules with bigger companies.

Modular design give us some advantages:

- Divided system

We don't need to have the whole power control system in only one place of the industrial plant. This control system will allow us to install each MR-3 modules near the loads we want to control. Then, we'll avoid to install too many long cables between the loads and

the controller. We'll just need a RS-485 bus that connects the MR-3 to the controller and short cables between MR-3 modules and the loads we want to connect.

However, if we want the controller works, we have to program several parameters with the controller software.

In the intructions manual, we can see how we can configure the controller and we'll see all the possibilities that this device give us, too.

- Easy to expand

If we need to expand the number of loads that we want to control in an industrial plant which has a CA-4 controller, we'll be able to do it quickly and easily. We'll just need to expand the number of MR-3 modules, and we'll connect them to RS-485 bus and we'll make necessary connections of new loads that we want to add.

1.1.- POWER CONTROL COMPONENTS

Power control system is compound of:

- A CA-4 controller

It supervises the installation and it decides if it's necessary to act over the loads.

- MR-3 modules

This modules (using their inputs and outputs) allow to know to CA-4 controller the load status (inputs) and they allow to the controller to act over the loads (outputs)

1.2.- PERFORMANCE

CA-4 controller can control up to three loads, so, it's perfect to little factories where it isn't necessary to control a lot of loads to maintain the maximum demanded power under contracted power. Elsewhere, we can use MR-3 modules to increase the number of loads we want to control. If we use a RS-485 communications bus, we can connect MR-3 modules to the CA-4 controller, then, the number of controlled loads can increase in an important way.

CA-4 controller, by means of MR-3 inputs, always knows if the loads are connected or disconnected, then, it knows if it can control a load or if it can't do any action with it, using other loads to do the control. So that CA-4 controller only will act over the loads that it can control and it won't lose time with the loads that it can't control.

However, CA-4 controller will be able to decide if it stops or connects load in MR-3 outputs. When CA-4 controller has to stop or connect again a load, it will send an order to corresponding MR-3 and then, the module will act over the load with corresponding output.

2.- BASIC INSTRUCTIONS

2.1.- DELIVERY SPOT CHECK

This manual is issued to help all the **CA-4** users to install and use it in order to get the best from it. After receiving the unit please check the following points:

- (a) Does this device corresponds to your order specifications?
- (b) Check if any damage was done during the shipment process.
- (c) Verify that it includes *One instruction manual.

2.2.- CONNECTION PROCEDURES



The manual you hold in your hands contains information and warnings that the user should respect in order to guarantee a proper operation of all the instrument functions and keep its safety conditions.

3.- INSTALLATION AND STARTUP



The manual you hold in your hands contains information and warnings that the user should respect in order to guarantee a proper operation of all the instrument functions and keep its safety conditions.

The instrument must not be powered and used until its definitive installed on the cabinet's door.


Whether the instrument is not used as manufacturer's specifications, the protection of the instrument can be damaged.

When any protection failure is suspected to exist (for example, it presents external visible damages), the instrument must be immediately powered off. In this case contact a qualified service representative.

3.1.- INSTALLATION

Before applying DC power to the, check following points:

- (a) Supply voltage: 24 V d.c. applied on **Power+** and **Power-** terminals
- (b) Consumption: 250 mA
- (c) Operation conditions:
 - Operating temperature: -10 to +60°C
 - Humidity: 25 to 75 % R.H.
- (d) Safety: Designed to meet protection class II as per EN 61010.

Mounting: 

Instrument is to be mounted on DIN rail mounting device with low dimensions.
All connections keep inside the cabinet.

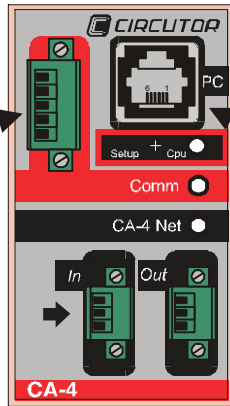
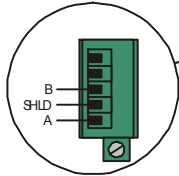
Note that with the instrument powered on, the terminals could be dangerous to touch and cover opening actions or elements removal may allow accessing dangerous parts. Therefore, the instrument must not be used until this is completely installed.

3.2.- CA-4 CONNECTION TERMINAL

Terminal N°	Concept
8	Voltage reference Power- / Inputs common
7	Input 1 --- Load 1
6	Input 2 --- Load 2
5	Input 3 --- Load 3 or pulse of synchrony
4	Input 4 --- KWh pulse
9	Voltage supply Power+
10	Relay output 1 --- Load 1
11	Relay output 2 --- Load 2
1	Relay output 3 --- Load 3
2	Relay output 4 --- Alarm relay
3	Relay common

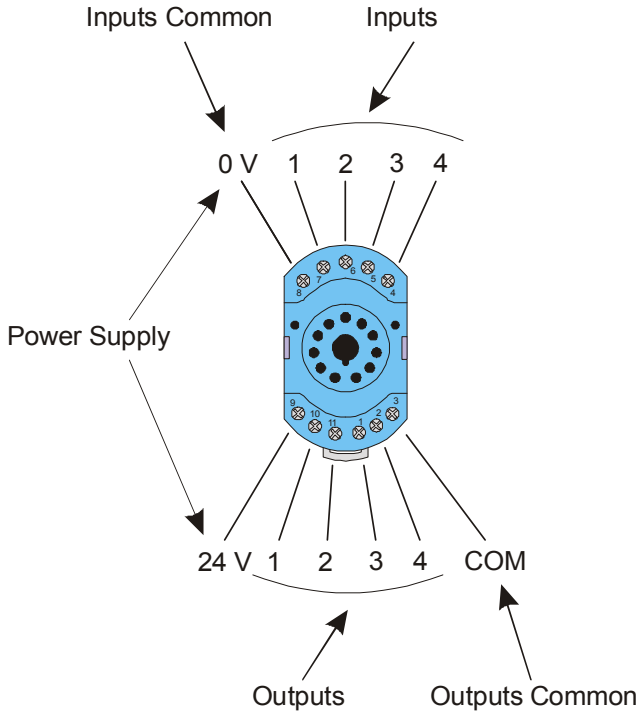
The connection with the MR-3 and the PC is done through the contacts on the device frontal.

Communications



PC
Connection

Detail of CA-4 frontal



Detail of Undecal base connectors

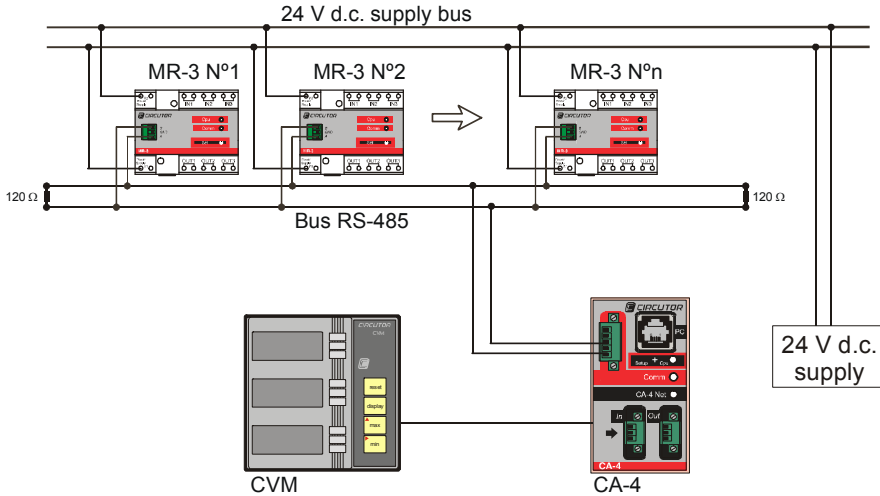
3.3.- CA-4 TO THE MR-3 CONNECTION

The connection between CA-4 and the MR-3 must be done with an RS-485 communication bus.

The RS-485 communication bus may be up to 1200m in length and the MR-3 can be placed anywhere along the bus.

In some cases, in each end of the communication bus must be terminated with a 120Ω resistor, so there must be 2 resistors per bus. This resistance will only be necessary if communications failures are detected in the communications between the controller and the proximity readers, due to the line impedance

See followind connections diagram for installation:



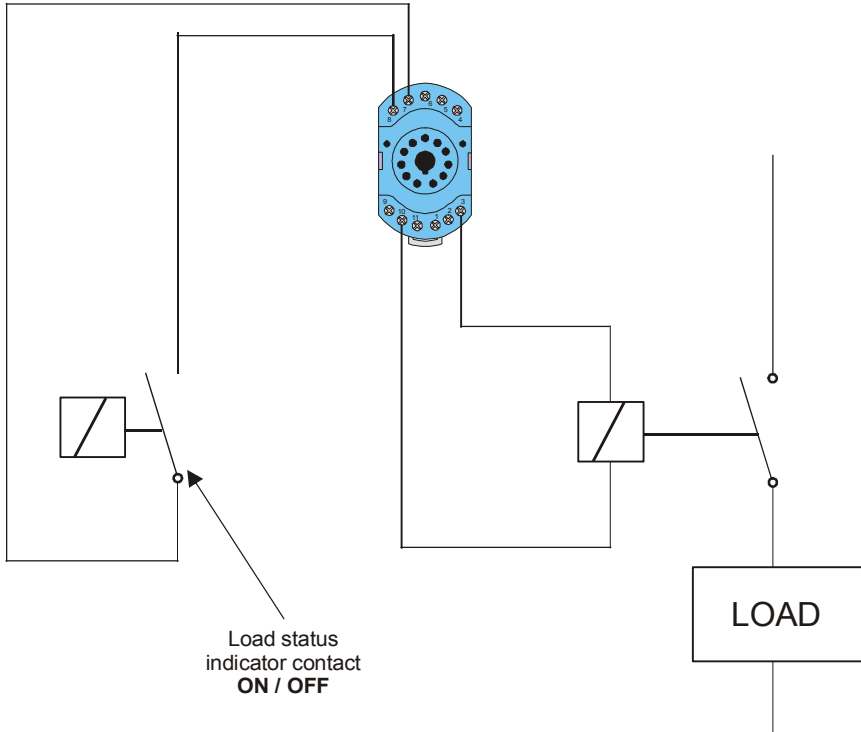
(*) Before installing the EOL 120 Ω resistance, refer to previous page information

Asignación de la dirección de los MR-3 :

- Remove power supply to the CA-4 controller
- Press **Setup** button places in the frontal side of the controller
- Without stop pressing **Setup** button attach power supply to the controller again
- Controller's **Comm** led will light on. Do not stop pressing **Setup** until it lights off
- At this moment, **Comm** and **Cpu** leds become intermittent
- Pulsar el botón **Set** de los MR-3 en el orden establecido. Al pulsarlo los leds **Comm** y **Cpu** se iluminarán intermitentemente y ya quedará asignada la dirección

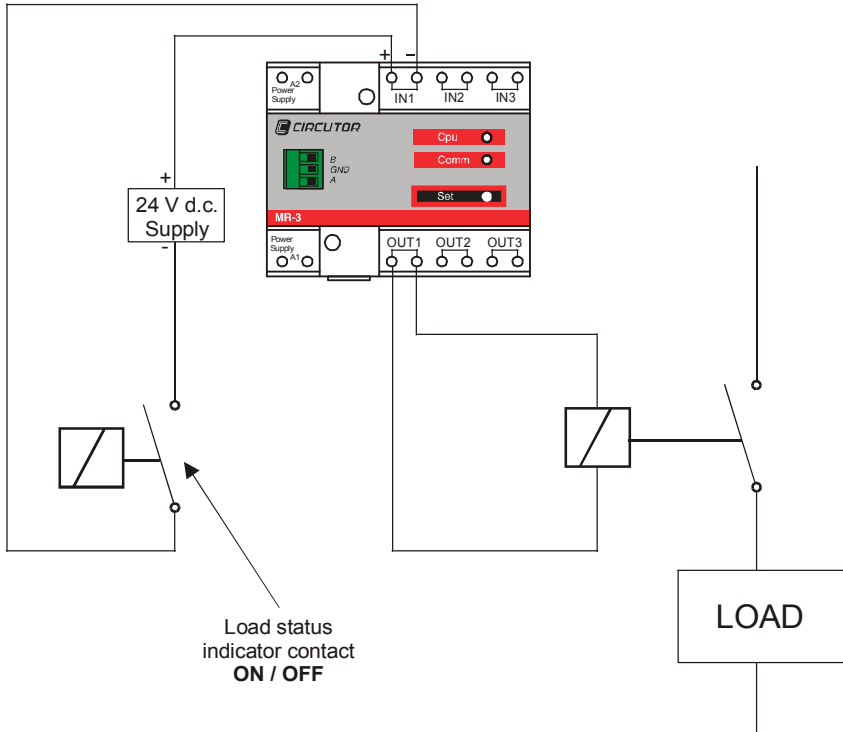
3.4.- LOAD CONNECTION WITH CA-4

See followind connections diagram for connections:

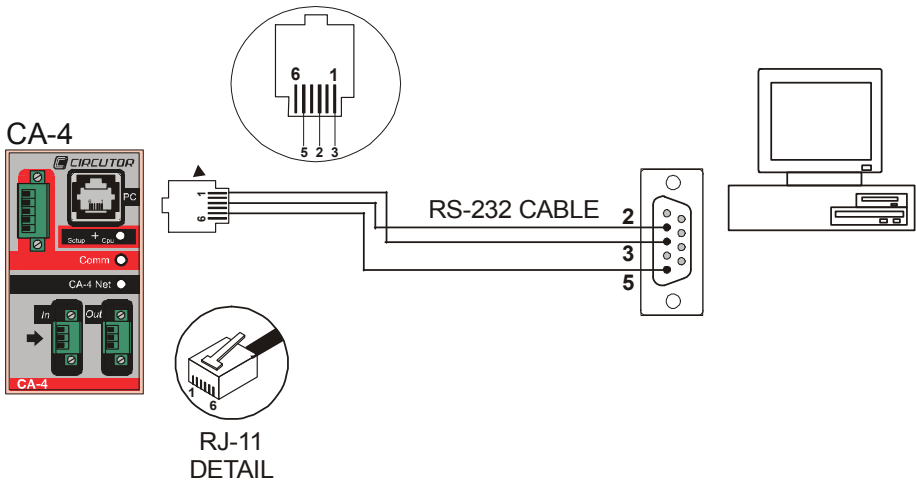


3.5.- LOAD CONNECTION WITH MR-3

See followind connections diagram for connections:



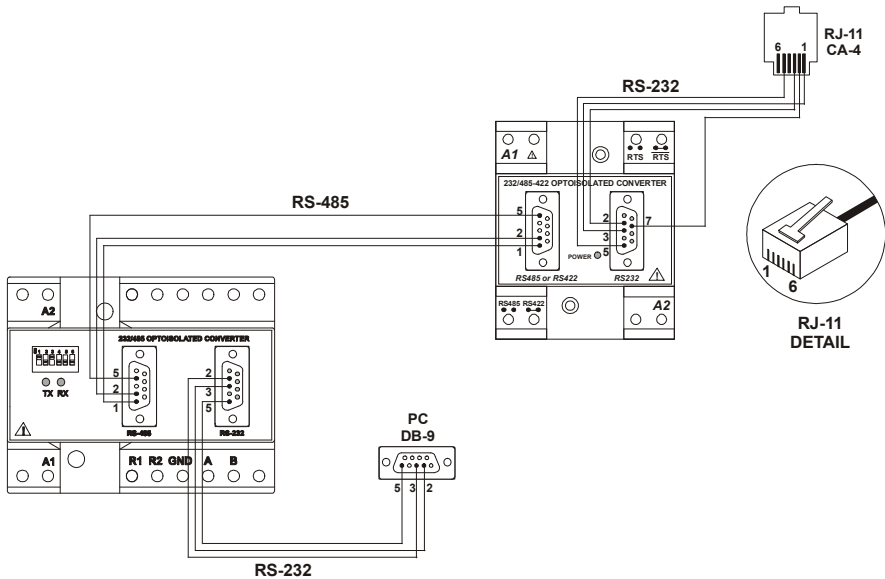
3.6.- CA-4 TO THE PC CONNECTION



If the distance between the CA-4 and the PC is longer to 12m, the RS-232 communication between the two devices is not recommended. An RS-485 communication bus must be used, so two more devices are required:

- RS-232 / RS-485 converter connected to the CA-4
- RS-232 / RS-485 intelligent converter connected to the PC

The next picture shows the connections of the RS-232 / RS-485 converters to the CA-4 and the PC.



4.- TECHNICAL CHARACTERISTICS

Power Supply :

Voltage.....	24 V d.c.
Voltage tolerance.....	+ / - 25 %
Consumtion.....	250 mA
Working temperature.....	-10 to +60 ° C

Output relay features : (4 relays)

Insulation voltage.....	1000 V contact-contact / 4000 V contact-coil
Thermal current Ith.....	3 A
Maximum operation power.....	1500 VA
Mechanical life.....	3 x 10 ⁷ operations
Electrical life.....	350 op. per hour (at maximum load)

Digital inputs..... 4 free voltage contacts (10 mA - 24 V d.c.)

Constructive characteristics :

Fixing..... Fitted onto symmetrical DIN 46277
(EN 50022)

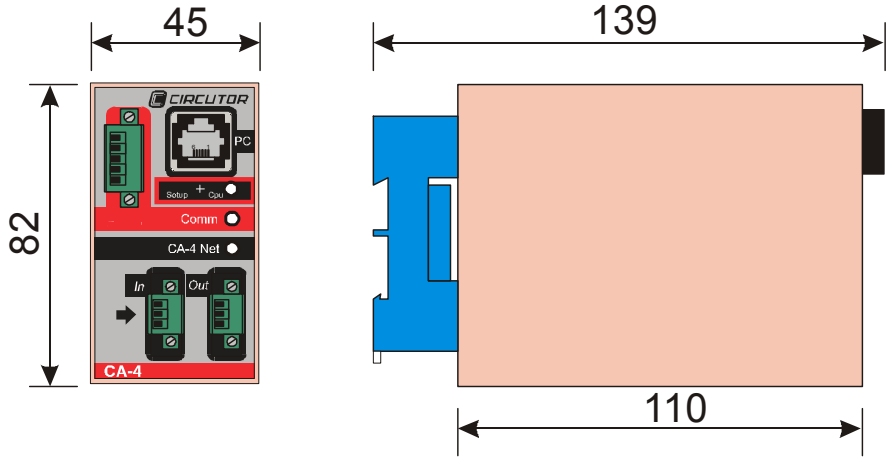
Frontal cover..... Lexan

Security..... Category I, EN 61010

Other characteristics : 1 "Test" key to configure the system.

Standards : EN 50082-1, EN50082-2, EN 61000-3-2,
EN 61000-3-3, EN 61010-1

CA-4 dimensions:



5.- SAFETY CONSIDERATIONS



All installation specification described at the previous chapters named INSTALLATION AND STARTUP, INSTALLATION MODES and SPECIFICATIONS.

Note that with the instrument powered on, the terminals could be dangerous to touch and cover opening actions or elements removal may allow accessing dangerous parts. This instrument is factory-shipped at proper operation condition.

6.- MAINTENANCE

CA-4 does not require any special maintenance. No adjustment, maintenance or repairing action should be done over the instrument open and powered and, should those actions are essential, high-qualified operators must perform them.

Before any adjustment, replacement, maintenance or repairing operation is carried out, the instrument must be disconnected from any power supply source.

When any protection failure is suspected to exist, the instrument must be immediately put out of service. The instrument's design allow a quick replacement in case of any failure.

7.- TECHNICAL SERVICE

For any inquiry about the instrument operation mode or in case of malfunction, you can contact CIRCUTOR S.A.'s technical service.

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