NATIONAL METER INDUSTRIES, INC.

DH96-CPP

INSTALLATION MANUAL (E61702)

INSTALLATION MANUAL DH96 – CPP

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INSTALLATION MANUAL FOR THE DH 96 CPP

OVERVIEW:

The DH 96 CPP is designed to limit the demand in the facility by using the relay module for alarms or load sheadding. There is a two (2) relay module and a four (4) relay module. Also available is a RS 485 module with software included for plotting and historical events. The CPP is to be operated by 2 wires N.O. of a KYZ pulse, form A relay or a switching transistor NPN. An external 120 vac supply is needed to energize the instrument. Energy values are written into RAM as not to loose these readings during power outages.

SPECIFICATIONS:

SUPPLY VOLTAGE: 12OVac 45 to 65 Hz.standard (optional 230, 24, 48 Vac)
(-15% to +20%)
4 VA (without modules)
7 VA (with modules)

DISPLAY: 4 digits made up of 7 red indicating leds.
Height 14 mm
8 operational red leds.
Programmable decimal point
Storage temp. –40 to +70 C
Operating temp. –10 to +65 C

RELAYS: 2 relay module or 4 relay module available
Current rating, 5amp.
Voltage rating 240 vac. Maximum
Maxiumum risistance load 750 VA
Isolating risistance 500V, >1000 M. Ohms
Mechanical endurance > 20,000,000 operations
Electrical endurance >30,000 operations at 5 amp. 250 vac.

RS 485 Module:
ModBus RTU communication protocol

- Checks relay state, and can overide program
- Read all measuring parameters, maxaminum and current demand, energy use and can reset.

- Communication speed selection 1200, 4800, 9600, 19200
- Parity selection, even, odd, or without
- Stop bits selection, 1 or 2

GENERAL CHARACTERISTICS

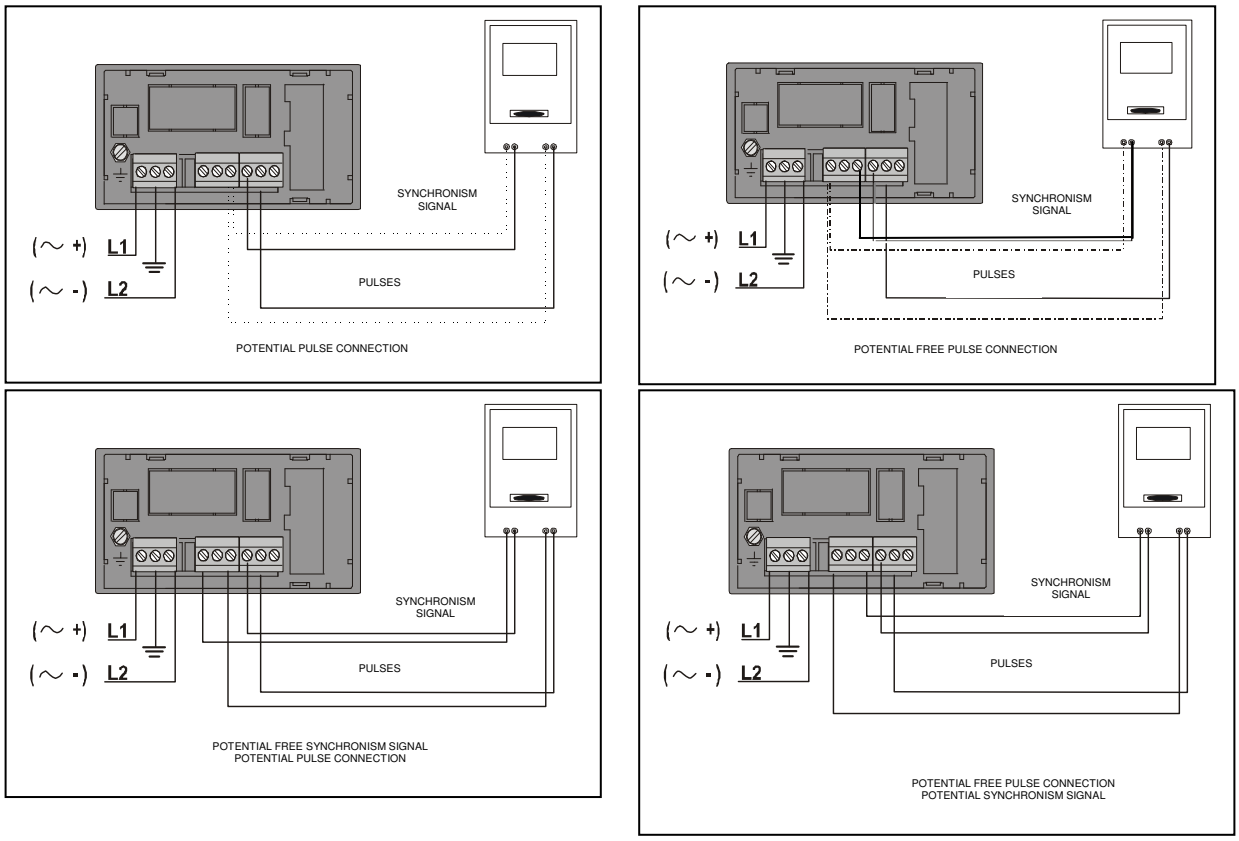
Dimensions: 3.78" X 1.89" X 5.43"
Weight: 1lb 2 oz.
Case material: ABS VO flame rated
Nema 1 case

STANDARDS:

IEC 1010, IEC 348, IEC 644
EN 50081-2, EN 50082-21
UL 508, VDE 0435

WIRING DIAGRAMS:

Examples:

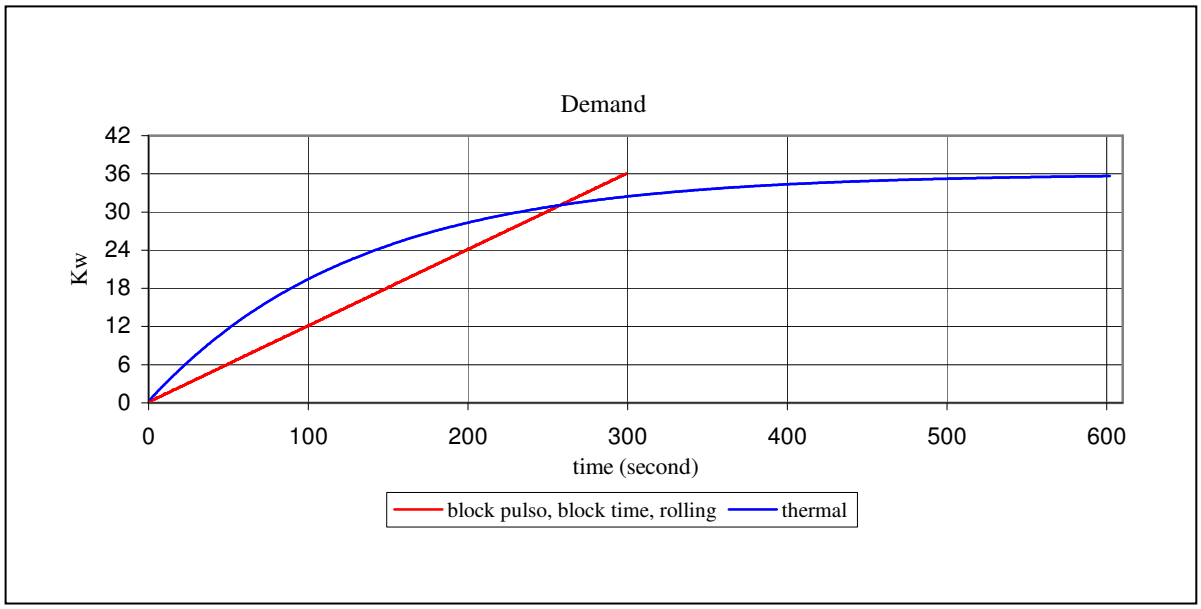


DEMAND METHOD

The DH96-CPP can be programmed in order to operate in 4 different demand methods.

1- SEGMENT OR BLOCK DEMAND with a Synchronised Pulse every interval from the utility meter. This method requires a pulse every time the interval starts or ends.
2- SEGMENT OR BLOCK DEMAND with a Synchronised Pulse daily. The CPP's internal clock starts and stops each interval. Every 24 hrs. the utility meter sends out a synchronised pulse to adjust the internal clock to the utility meter.
3- ROLLING OR SLIDING WINDOW DEMAND runs on a sliding sub-interval clock without the need of a synchronised pulse.
4- THERMAL DEMAND METHOD is immolated digitally to reflect the thermal demand method used in the mechanical meters. The sliding method is used in measuring the demand interval.

Example: The following graph shows the sampling method achieved for rolling and segment or thermal. The red line shows the reaction of a rolling and segment demand where as the blue line indicates a thermal demand measurement.
As indicated in the segment or rolling method the maximum value (36 KW) is reached at the end of the interval time (5-min.) in this case. In the case of the thermal demand reading, 90% of the value will be achieved in the first 5 minutes and than it will take another 5 minutes to achieve 99.9% of the true value.



PULSE INPUTS
Utility meters generate output pulses with type C contact, known as KYZ pulses, a form A relay or a switching transistor (NPN) depending upon the type of meter being used.
The CPP only needs 2 wires of any type of switch offered.

DEMAND CONTROL

Review the demand levels that have been allowed for your facility by the power provider (utility). Review your utility bills to see what have been your demand peaks for the past year and what it cost. Review the non-essential loads that can effect the demand of your facility, such as air conditioners, electric water heaters, electric heating equipment, non-essential lighting, manufacturing machinery etc. Any of these loads that could be turned off for a short period of time without effecting the facility operations, is considered a **predictive control.**

The CPP can be simply used as a demand alarm indicator with a two-relay module or a load controller with a four-relay module. (Other CPP units will allow up to 17 points).

In the **predictive control**, connecting and disconnecting the loads will be made by means of one algorithm that optimises the number of manoeuvres and guarantees that the contracted power cannot be exceeded. In order to achieve this, we must program the contracted demand from the utility and the individual value of each load that we will link to the DH96-CPP.

If only 3 of the relays are used than the 4th relay can act like an alarm relay that closes and activates a horn or light indicator when all the loads have been disconnected.

The DH96-CPP is based on a microprocessor that calculates from KYZ pulses the following parameters:

- **Energy demand**, Kilowatts in one of the 4 programmable choices.
  Peak demand, it is the maximum value of the demand it has been reached.
- **Average demand**, it is the average of demands reached in the last 32 integration periods. This value is displayed for the synchronised modes only. Example, 15-minute interval period will be the average reading of the last 8 hours.
- **Consumed Watt-hours** can be displayed in three windows, than can count up to 999,999,999 Whrs.

Peak and medium demand values as well as the watt-hour totals are saved in a non-volatile RAM memory that can be displayed whenever it is required. These registers can be reset whenever needed.

KEYBOARD FUNTIONS

Programming Set (IcnF)
By pressing this key, will open the program menus of several parameters that will be defined. Once inside this menu, its function will be validate your selections.

Displays
This key allows you to change from (min.) or current demand reading to totals displayed.

Totals displayed / maximum and average values
If you are displaying the demand, you will be able to see the peak and the average value by pressing this key.
When totals are displayed, you will be able to access the three totalizers: A totalizer (from 0 up to 999 MW), B totalizer (from 0 to 999 KW) and C totalizer (from 0 up to 999 W).
For instance: If the totalizer's values are, A:357, B:027, C:146 the total consumed Wh is: 375,027,146 Whrs or 375,027.1 KWhrs.

Totalizer's / peak and average values reset
If you are displaying the demand, you will be able to **reset** the peak and average value, by pressing this key for more than 5 seconds**. If you are displaying the totals, this key will *reset* their values.**

Default values
Pressing both keys at the same time, for more than 5 seconds, the CPP deletes all configuration parameters, restoring the default parameters.

Password Set
Pressing both keys at the same time, when we switch on the instrument, we will be able to introduce a 4-digit password. The function of this password is to **limit** the access to the configuration menus of the CPP. For deleting this effect, you must re-start the equipment, and you must press both keys at the same time. After introducing the previous password, you will have access to the menus again.

Remark: The introduction of the password, either for protection the access to the menus or deleting its protection must be done twice, the first time for its definition, and the second one to confirm it. If the second time does not coincide with the first, the devices consider it is a mistake, and it goes on with its starting routine.
Besides, in the DH96 CPP we have another security level against parameters' modification. At the end of each menu group appears the CE feature, with YES and NO options.

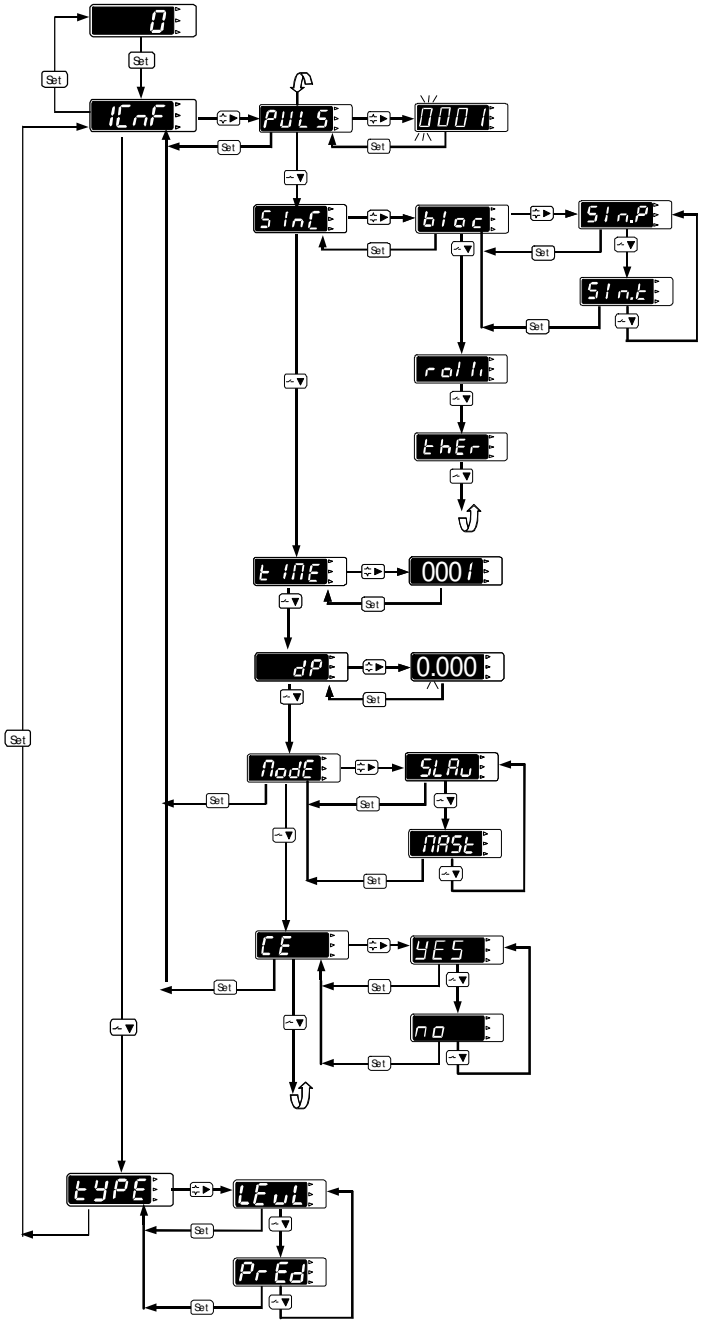
For instance, if we have programmed the equipment configuration and we choose NO; we will not be allowed to modify any parameter. It will be required that you enter into this option again and activate it with YES.

PROGRAMMING INSTRUCTIONS

The steps to follow are:

1) Firstly the user will program the device's configuration, where he will be able to settle: the energy that belongs to each pulse, operation type, interval period, decimal point position, and operation mode.
2) Following on, if there is a relay card and we have programmed the device in **SEGMENT DEMAND** mode, you will choose the control type of the relays: relays control by level or predictive control.
3) Finally, we will program the relays' configuration menu that appears depends on previous selection.

DEVICE PROGRAMMING



PULS **Energy pulses**

The energy value in Wh belonging to each pulse introduced.

SinC Demand type

The demand method of the CPP is entered in this section:

bloc Synchronised with the utility's meter,

SinP - Through synchronism pulses that are given in each start period. (Segment or block demand pulse)

SinT - By means of a synchronism pulse. (Segment or Block demand time +/- 24hrs.)

roll Without synchronism, using a Rolling or Sliding window.

thEr Without synchronization, using a sliding window and simulating the response of the thermal demand.

tIME **Integration period**

Here you introduce the demand interval period in minutes (from 1 to 60). In the thermal mode, it is the period in which we want to have the 90% of the final value.

dP **Decimal point**

You select the position of the decimal point to display the instantaneous demand.. Pressing the ▷ key varies the position of the decimal point.

Mode **Working mode**

You select the working mode of the DH96 CPP, in **master** mode the unit is controlling the relays, in **slave** mode the user controls the relays via software.

CE **Configuration enabled**

If the user programs the device as (No) it disables the modification of the previous parameters and as (Yes) it enables the modification.

tYPE **Relay control**

This option appears only if we have programmed the synchronization mode (***block demand pulse*** or ***block demand time***).

The device has two working modes to control the relays:

LEvL control by level,

PrEd control by forecast.

The menu to configure the relays depends on this selection.

Programming values:

To step from one value (4 digits) to another, press the following key ▷

To modify the value of the selected digit press repeatedly the key ▽

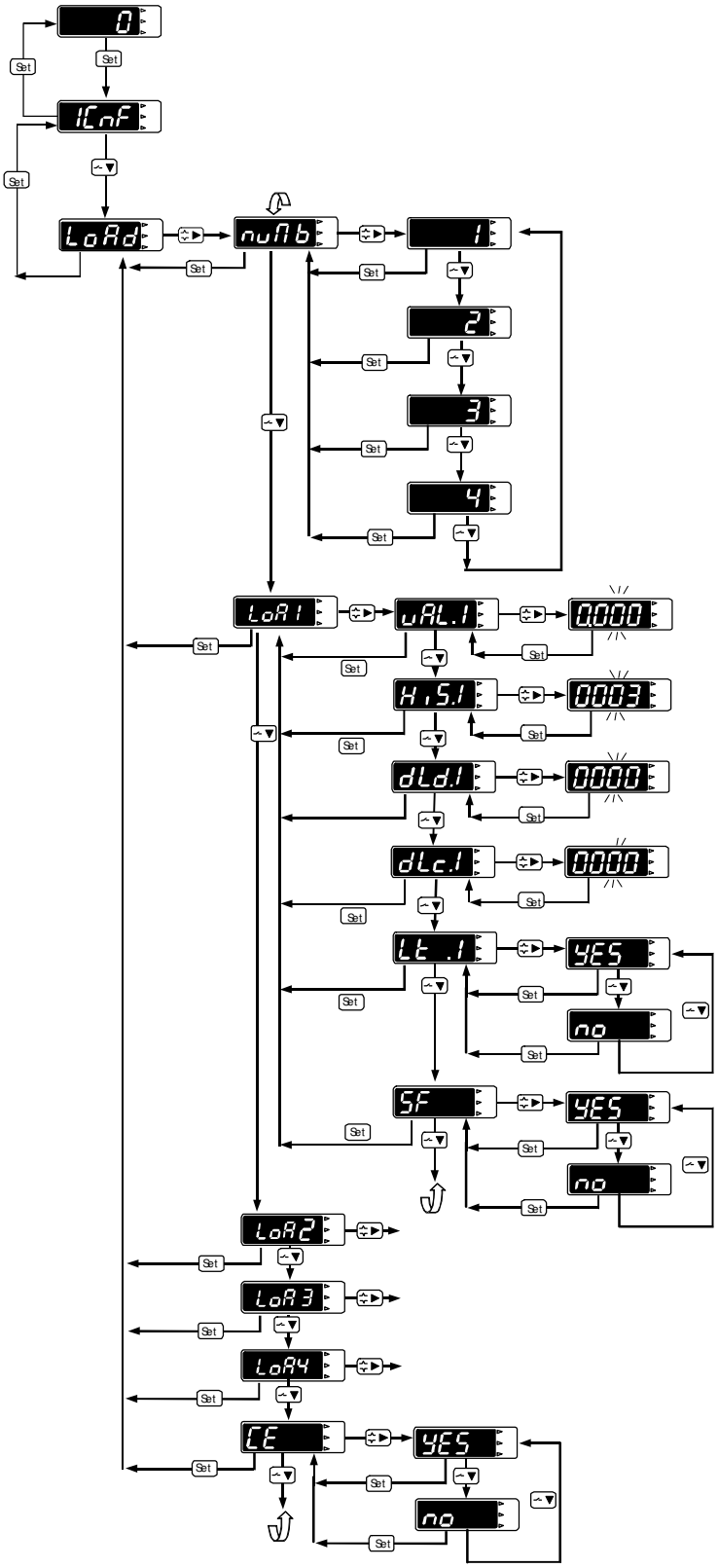
By using the two keys you will define the 4 digit value.

NOTE:

If you see that it is impossible to change these values, go to the CE option and check that it has been programmed with (YES).

To validate the values, remember that the key Set should be pressed repeatedly, until you arrive to the measured value.

RELAYS CONTROLLED BY REAL VALUES



 **Number of relays**
We select the number of relays that will use.
We will program each relay with the following parameters:

 **Value of the alarm**
We introduce the value of the instantaneous demand which will trip the corresponding alarm.
The value of the <alarm **1.** should be the smallest, and therefore the following will >alarm **2** >alarm **3** >alarm **4**.

 **Hysteresis**
Introduce the desired difference between the connection point and the disconnecting point of the load in %. (Minimum 4%, maximum 50%)

 **Delay on the disconnection**
Introduce the delay that there will be between the time in which the alarm level has been reached and the time the relay is disconnected. (in seconds).

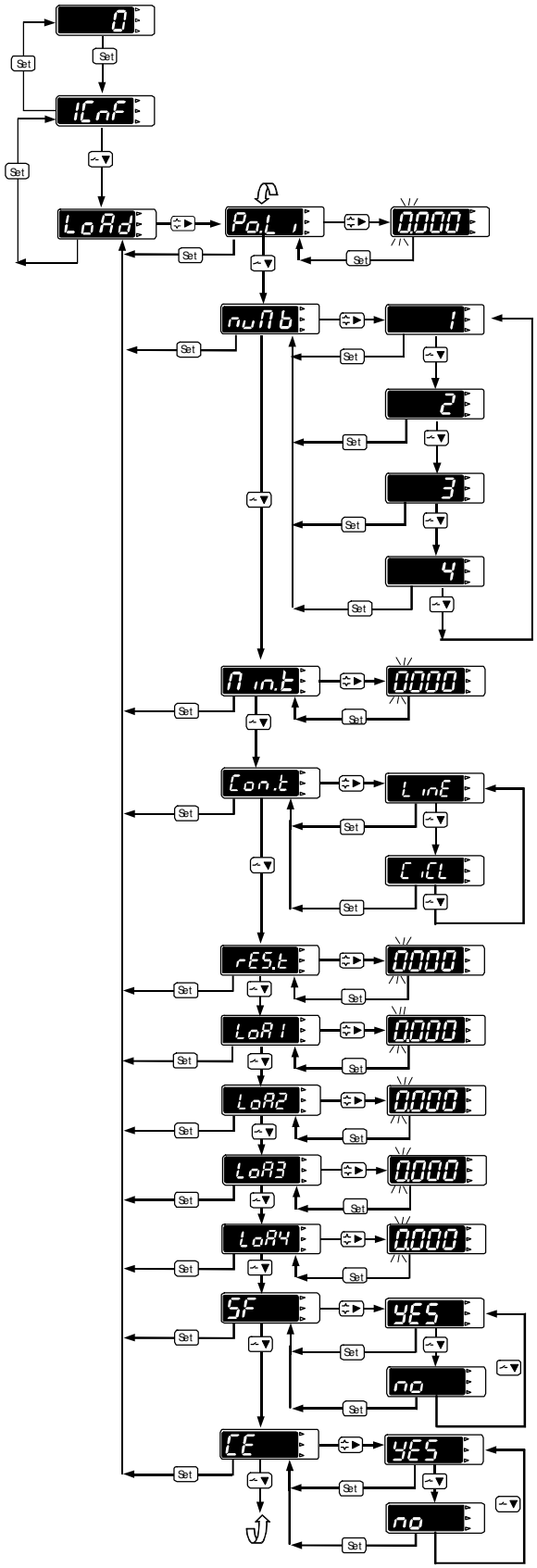
 **Delay on the connection**
Specify the delay time that will be between the time in which the alarm contacts turn off and the time in which the relay is connected again (in seconds).

 **Security failure**
We can choose over here between a normally open relay (Yes) or normally close (No).

 **– Latch -**
You specify in this option if you wish to latch the relay once the relay has tripped even though the alarm condition might disappear.

 **Configuration enabled**
Program in (No), disables the modification of the previous parameters, and (Yes) it enables the modification of them.

PROGRAM PREDECTIVE RELAY CONTROLS



 **Contracted power**

We introduce the value of the contracted maximum demand with the utility. (KW)or (KVA), depending upon the given rate and pulse.

 **Number of relays**

We select the number of relays that we will use.

 **The delay in the connection**

Specify the delay that there will be between the time in which the alarm disappears and the time in which the relay is connected again (in seconds).

 **Type of connection / disconnection of the relays)**

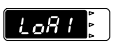
We can select among the two different types of relay operations.

 cyclical, where we disconnect first the relays that have been connected for a longer time

 linear, where the connection and disconnecting is made by priorities. (Relay **1**. is the first one to be disconnected).

 **Transient time**

Depending on the load in the facility, we can have fast peak variations of the power (for example installations with a lot of inductive loads), but should not cause an inmediate action by the CPP. By means of the transient time, we can adjust the response time of the relays in the CPP to the characteristics of the installation.(in seconds).

 **Power**

You introduce the KW power that each relay controls.

 **Security failure**

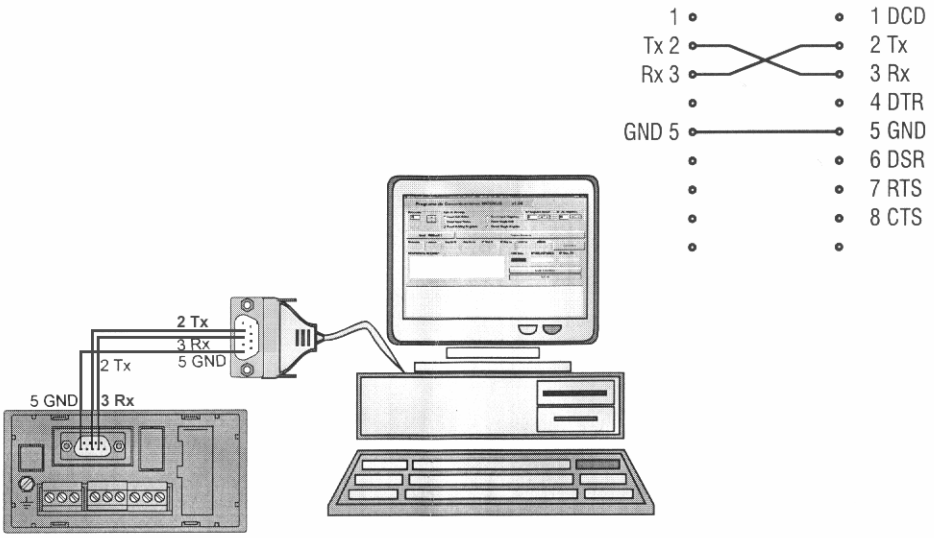
We can choose a normally open relay (Yes) or normally close relay (No).

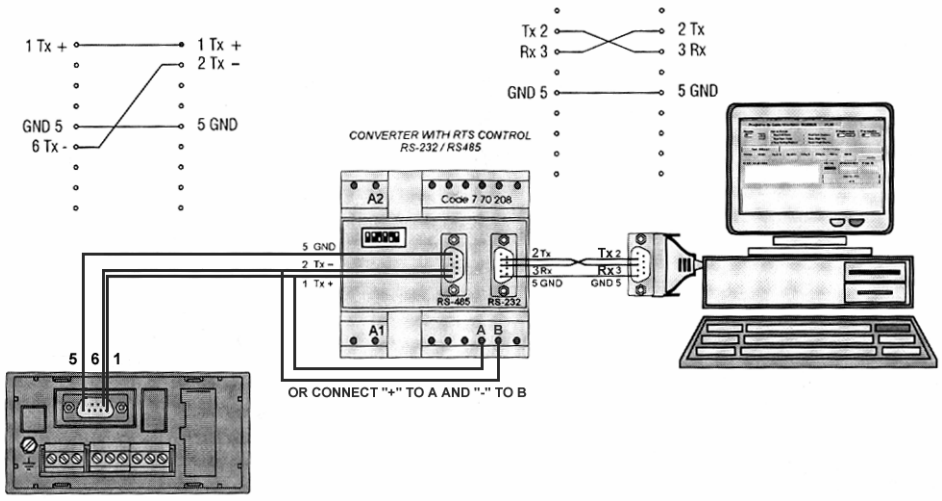
 **Configuration enables**

Programmed in (No) it disables the modification of the previous parameters, and in (Yes) it enables the modification of them.

COMMUNICATIONS: WIRING AND PROGRAMMING

RS-232 CONNECTION COMMUNICATION WIRING RS-485 CONNECTION

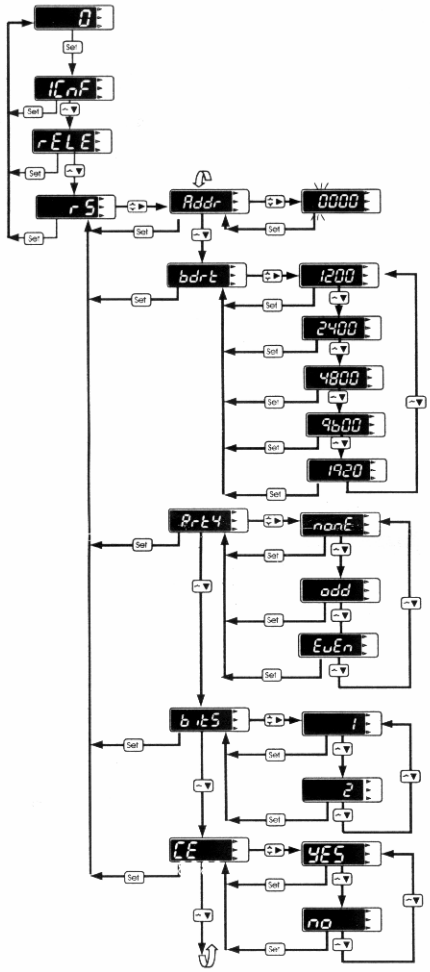




RS485 COMMUNICATION FROM DH96-CPP

MAY EITHER BE CONNECTED TO THE DB9 TERMINAL ON THE CONVERTER
OR HARD WIRED TO TERMINALS "A" AND "B" ON THE CONVERTER

DH96-CPP COMMUNICATIONS PROGRAMMING



Addr **Address**

Set here the address of the instrument. This address must be range between 1 and 247.

bdrt **Baud rate**

Select here baud rate transmission: 1200, 2400, 4800, 9600 or 19200 bauds.

PrtY **Parity**

Select here if you desire even parity, odd parity or none parity.

bitS **Bit stop**

Select here if you desire one or two bits stop.

CE **Configuration enabled**

If the user programs the device as (No) it disables the modification of the previous parameters and as (Yes) it enables the modification.

Default Comunications Parameters

Slave Address : 1
Speed Comunications : 9600 bauds
Parity: None
Stop Bits: **1**