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# DLC 0408R



## USER MANUAL

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# 1 HARDWARE CHARACTERISTICS

This chapter describes the hardware characteristics of “DLC\_0408R” :

## 1.1 Electric Characteristics

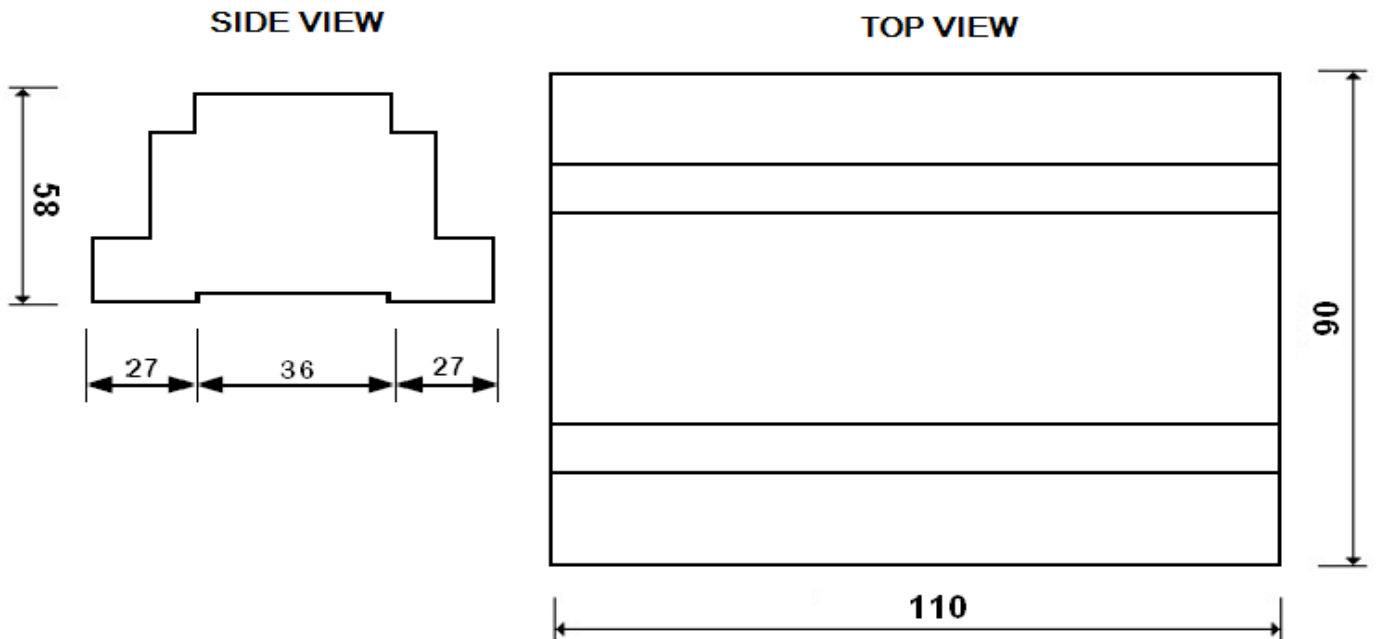
ELECTRIC CHARACTERISTICS	
Power supply voltage	24 Vdc +/- 10 %
Maximum Permitted Power Supply	27 Vdc
Current Consumption	Under 50 mA without loads [Power Supply = 24 Vdc]
Microprocessor	Hitachi H8
Digital Inputs	4 digital inputs PNP 12 V or 24 V
Analog Inputs	x
Digital Outputs	8 relè outputs
Analog Outputs	x
Serial Lines	1 Serial Line : RS 485 Supports the communication protocols : KERNEL / KNP / EXPA and MODBUS RTU
Leds	2 yellow leds, for signalling the transmission and reception of data from serial
Addressing	8 Dip-switches (of which only 5 for the addressing from 1 to 31)

## 1.2 Mechanics Characteristics

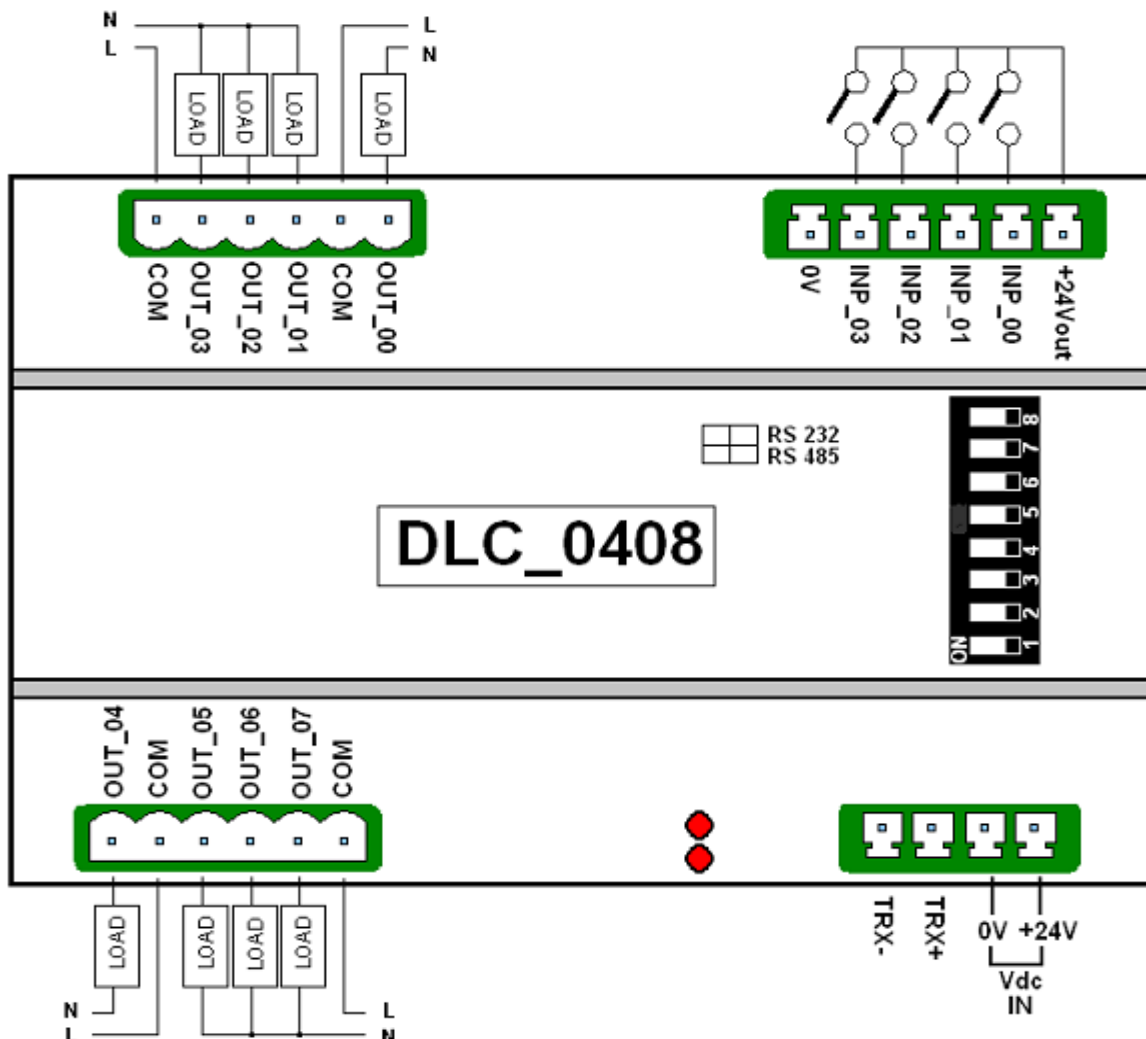
MECHANICS CHARACTERISTICS	
Temperature Range	From -10 ^C to +70^C
Humidity Range	From 10 % to 90 % (non-condensing)
Operating Atmosphere	Without corrosive gas
Noise Immunity	According to rules in force
Fixing System	On din rail
Weight	200 g
Keyboard	No Keyboard
Display	No Display

### 1.3 Dimensions

Front View 110x90 ; Depth 58 mm



### 1.4 I/O Connections

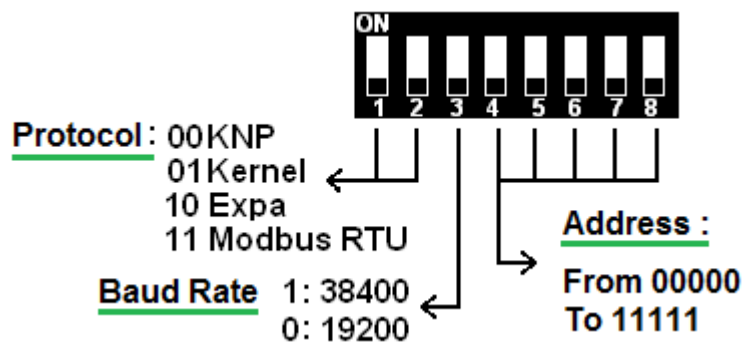


## 2 GENERAL NOTES

In order to have a correct and complete picture on the use of DLC\_0408R and how to work with this object, it's appropriate to give some general information. The DLC\_0408R is a digital expansion module can be connected to Kernel devices, used mainly in building automation systems. Each individual module mounts 4 digital inputs (24 V) and 8 relay outputs; correctly configuring the application on the PLC and the addresses of the modules, it's possible to connect up to thirty! This allows a maximum of 120 digital inputs and 240 relay outputs in more than those which the PLC Kernel systems used, mounts already on board. Once established by software the number of modules DLC\_0408R that you want to connect, the I/O of those modules will be processed by the PLC Kernel exactly as normal I/O onboard PLC.

### 2.1 DIP-SWITCHES

You can configure for each DLC\_0408R its own node address, baud rate and protocol, through the 8 suitable dip-switches (see hardware characteristics and the following figure).



Here are some examples that help to understand :

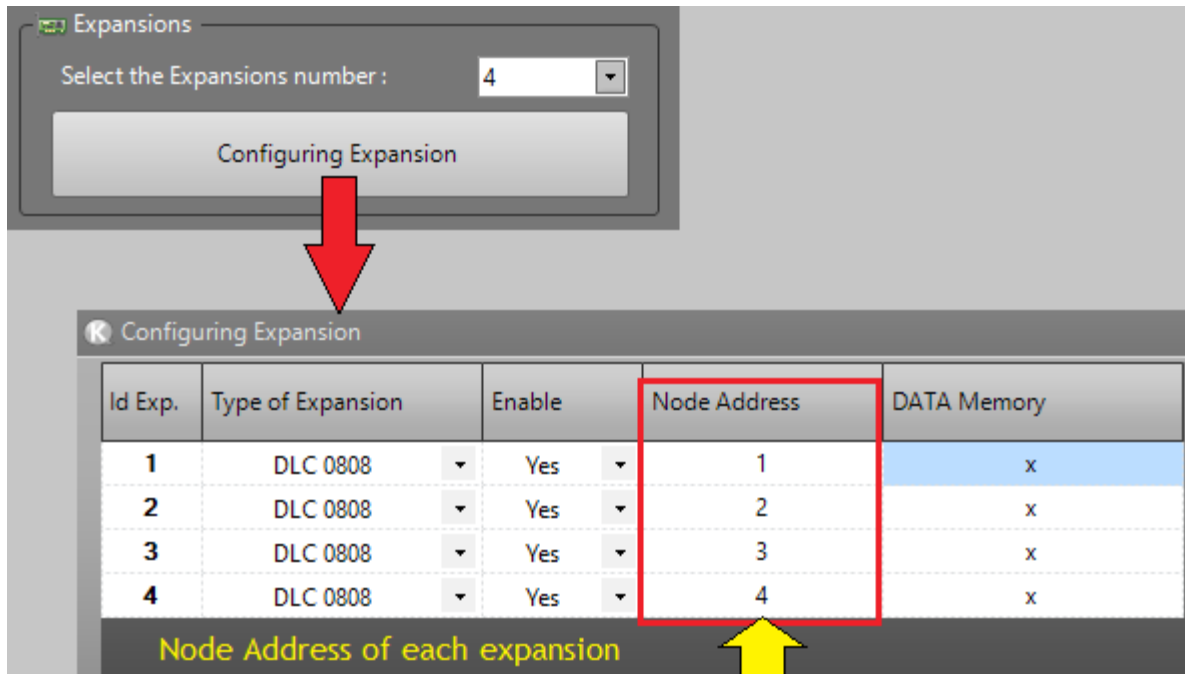


### ATTENTION

The "Expa" protocol (switch code "10") serves for the connection of the expansion with the STANDARD PLC!  
For more clarification on this particular protocol, directly consult the technical office of the KERNEL Sistemi s.r.l.

In the application program of the PLC of the Kernel Sistemi you need to set the NUMBER and the TYPE of EXPANSIONS that are connected. To do this it's necessary to open the project and go into the menu "Project Options" >> table "Serial" to set the number of expansions; click on the button "Configuring Expansion" to choose the type of expansions connected.

**IMPORTANT : the node address of each expansion set with the dip-switch must MATCH the one assigned automatically by the application program of the PLC of the Kernel Sistemi [see figure below] :**



## 2.2 Communication

**The serial communication occurs only via RS 485. It will be necessary to set the protocol KNP MASTER 19200, N, 8, 1, on the PLC Kernel Sistemi.**

With the dip-switches 1 and 2 you select the COMMUNICATION PROTOCOL and with the dip-switch 3 you choose the BAUD RATE; according to the protocol set with the dip-switches, you need to select the corresponding protocol (within the PLC project) in the COM used between PLC and expansions. Also in this case it's necessary to open the PLC project and go to the menu "Project Options" >> table "Serial" to select the correct protocol :

**DIP-SWITCH 1 e 2 - Project Options >> "Serials" of the PLC project**

00 = KNP (Kernel Network Protocol) - KNP MASTER  
 01 = KERNEL Protocol - KERNEL  
 10 = EXPA Protocol - x  
 11 = MODBUS RTU Protocol - RTU MASTER

Also the Baud Rate set with the dip-switch must obviously coincide with the one selected in the "Project Options" >> table "Serial" in the COM used between PLC and expansions.

## 2.3 Time Active Communication

The expansion has a time called "Time Active Communication", i.e. a waiting time within which, if an output of the expansion is high and within the fixed time isn't received by the module another command that puts high that output, it's brought to zero. This system mainly represents a security, because in the case in which the expansion was connected to a PLC Kernel and for some reason the communication between the two devices is interrupted, the outputs of the expansion after a time "X" would be placed at 0. The PLC Kernel, therefore, sends in continuation a command strings to the outputs expansions.

In the case you want to send only once the string of ignition of the outputs, it will be necessary to go to exclude this time; to do this it's possible to manipulate this value within the DATA memory 16 of the expansion. The DATA.16 has default value equal to 10, i.e. 1 second; it's possible to vary as desired, and placing this value to 0 will exclude the "Time Active Communication".

## 2.4 I/O Management

Once you have entered the correct number of expansions in the menu "Project Options" of the application program for the PLC Kernel which will be linked (see figure above), will be available the inputs and the outputs in blocks of 8 elements (8 I/O), clearly in the case of expansion 0408R since it has only 4 inputs will use only the first 4 inputs of each block of 8 elements [starting from the I/O 32, will be 4 used and 4 unused].

See example :

Expa. 0408R Addr. 1 : Inputs from INP\_32 to INP\_35 + Outputs from OUT\_32 to OUT\_39  
 Expa. 0408R Addr. 2 : Inputs from INP\_40 to INP\_43 + Outputs from OUT\_40 to OUT\_47  
 Expa. 0408R Addr. 3 : Inputs from INP\_48 to INP\_51 + Outputs from OUT\_48 to OUT\_55  
 Expa. 0408R Addr. 4 : Inputs from INP\_56 to INP\_59 + Outputs from OUT\_56 to OUT\_63  
 ecc...

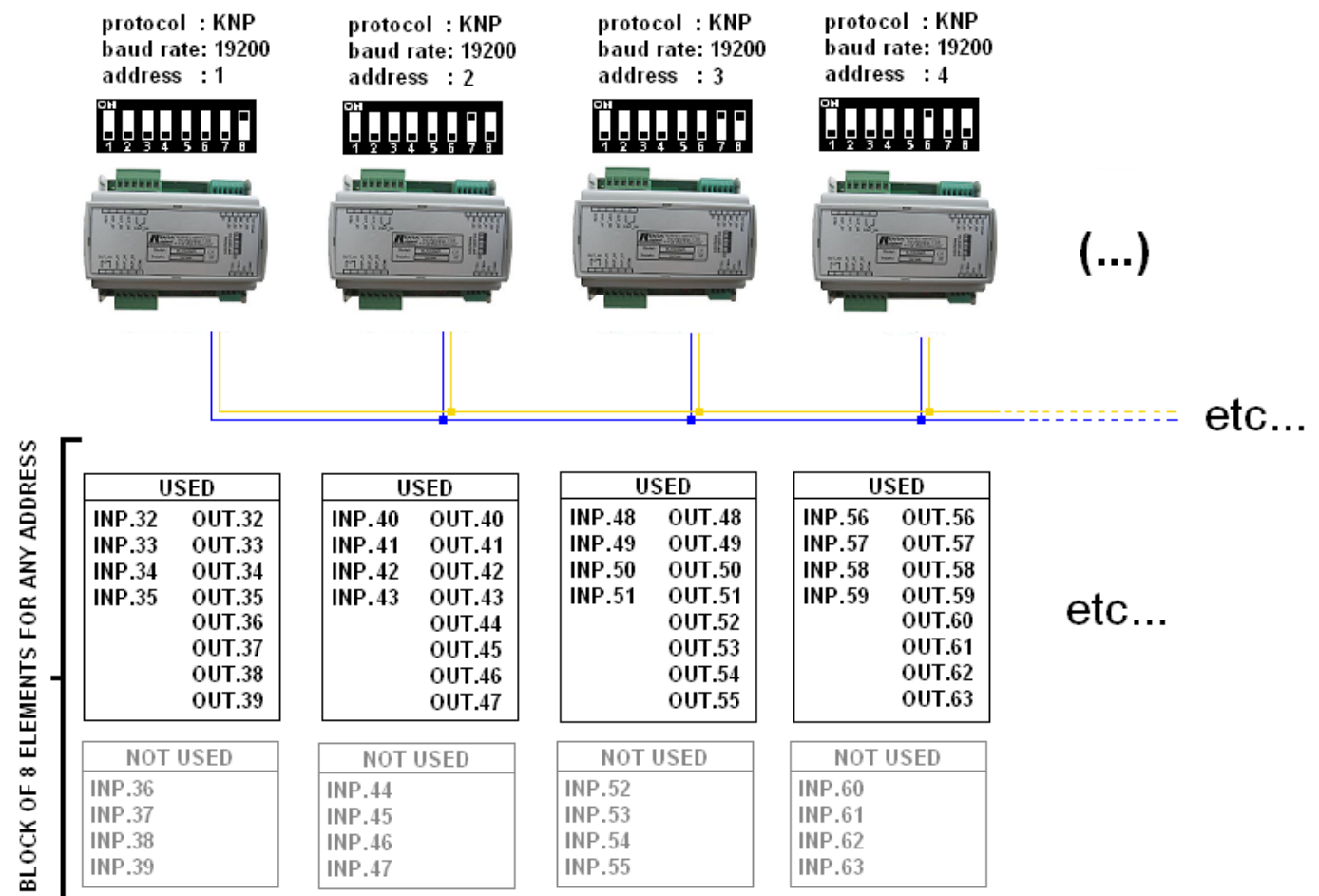
In the case in which the expansions aren't controlled by a PLC Kernel, but from any other device with the different protocol from KNP, to manage I/O, you will not be able to act on the INP / OUT from 32 forward; it will be necessary to act on the 16 bit DATA Memory 00 for inputs and 01 for the outputs. These are 2 WORD\_WIDE DATA (16 Bit) and each bit corresponds an input or an output :

INPUTS :

DATA.00 = Will contain the status of INPUTS from 00 to 03

OUTPUTS :

DATA.01 = Will contain the status of OUTPUTS from 00 to 07



### 3 CONTACTS

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