

# IBC CL

Interface Block Communication Current Loop

## NNI 16

New Network Interface 16 current loop devices

### TECHNICAL MANUAL



**grifo**<sup>®</sup>  
ITALIAN TECHNOLOGY

Via dell' Artigiano, 8/6  
40016 San Giorgio di Piano  
(Bologna) ITALY  
E-mail: [grifo@grifo.it](mailto:grifo@grifo.it)




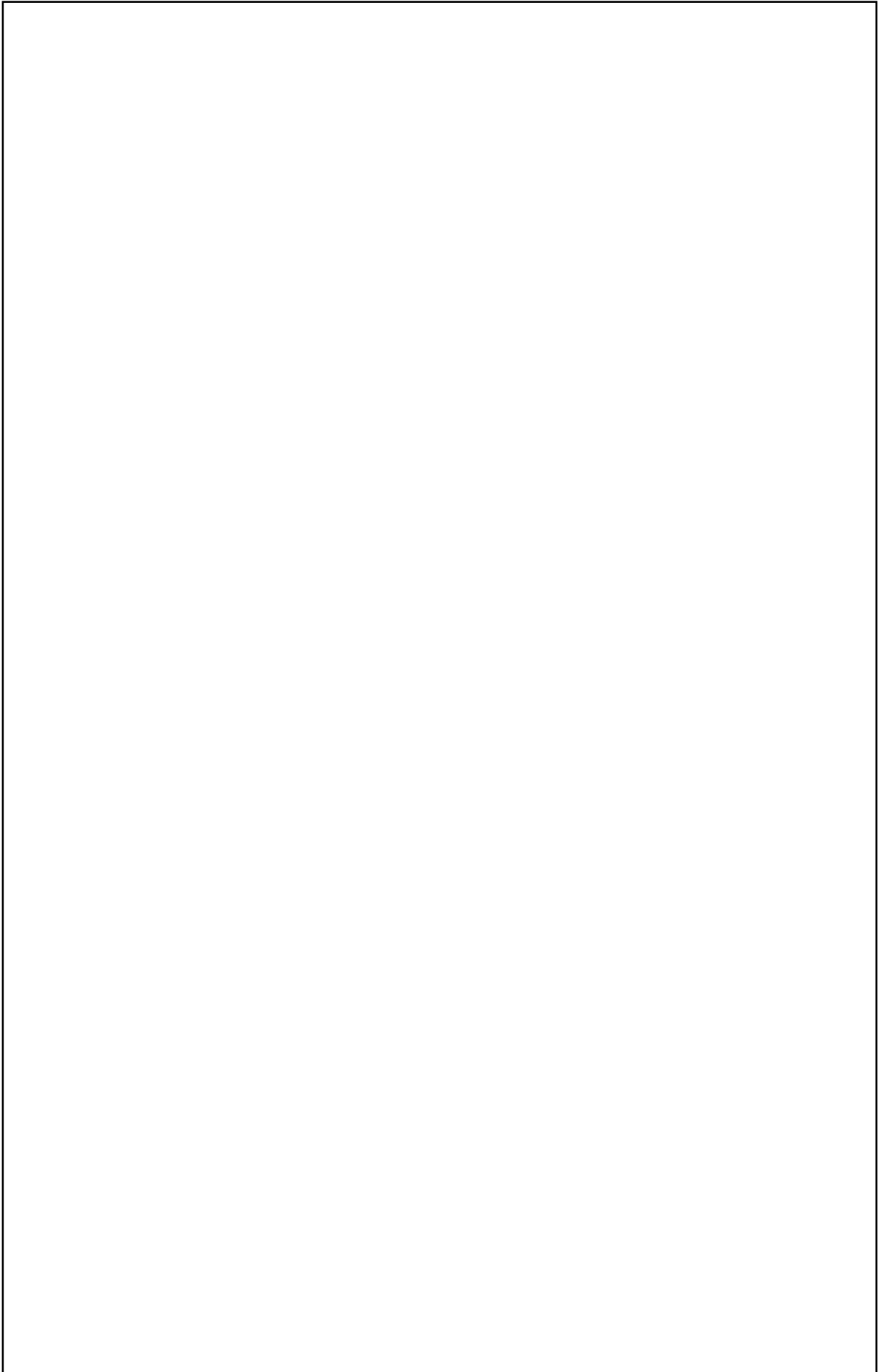
<http://www.grifo.it> <http://www.grifo.com>  
Tel. +39 051 892.052 (a. r.) FAX: +39 051 893.661

IBC CL, NNI 16

Rel. 5.10

Rel. 28 April 2003

<sup>®</sup>, GPC<sup>®</sup>, grifo<sup>®</sup>, are trade marks of grifo<sup>®</sup>



# IBC CL

**Interface Block Communication Current Loop**

# NNI 16

**New Network Interface 16 current loop devices**

## TECHNICAL MANUAL

The most important function of **IBC CL** is the conversion of one RS 232 serial line in active current loop serial line. Thanks to this module the numerous systems that have RS 232 standard can be connected to the industrial devices that use current loop standard.

The most important function of **NNI 16** is the capability to concentrate up to four active current loop lines in one passive current loop line. Thanks to this module the numerous industrial systems that use current loop standard can be connected together without any problems for communication lines power supply.

**grifo**<sup>®</sup>

ITALIAN TECHNOLOGY

Via dell' Artigiano, 8/6  
40016 San Giorgio di Piano  
(Bologna) ITALY

E-mail: [grifo@grifo.it](mailto:grifo@grifo.it)

<http://www.grifo.it>

<http://www.grifo.com>

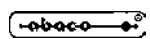
Tel. +39 051 892.052 (a. r.) FAX: +39 051 893.661



**IBC CL, NNI 16**

Rel. 5.10

Rel. 28 April 2003

 <sup>®</sup>, GPC<sup>®</sup>, grifo<sup>®</sup>, are trade marks of grifo<sup>®</sup>

## DOCUMENTATION COPYRIGHT BY grifo®, ALL RIGHTS RESERVED

No part of this document may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, either electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without the prior written consent of **grifo®**.

### IMPORTANT

Although all the information contained herein have been carefully verified, **grifo®** assumes no responsibility for errors that might appear in this document, or for damage to things or persons resulting from technical errors, omission and improper use of this manual and of the related software and hardware.

**grifo®** reserves the right to change the contents and form of this document, as well as the features and specification of its products at any time, without prior notice, to obtain always the best product.

For specific informations on the components mounted on the card, please refer to the Data Book of the builder or second sources.

### SYMBOLS DESCRIPTION

In the manual could appear the following symbols:

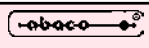


Attention: Generic danger



Attention: High voltage

### Trade Marks

, **GPC®**, **grifo®** : are trade marks of **grifo®**.

Other Product and Company names listed, are trade marks of their respective companies.

The use of these devices has turned - IN EXCLUSIVE WAY - to specialized personnel.

The purpose of this handbook is to give the necessary information to the cognizant and sure use of the products. They are the result of a continual and systematic elaboration of data and technical tests saved and validated from the manufacturer, related to the inside modes of certainty and quality of the information.

The reported data are destined- IN EXCLUSIVE WAY- to specialized users, that can interact with the devices in safety conditions for the persons, for the machine and for the environment, impersonating an elementary diagnostic of breakdowns and of malfunction conditions by performing simple functional verify operations , in the height respect of the actual safety and health norms.

The informations for the installation, the assemblage, the dismantlement, the handling, the adjustment, the repair and the contingent accessories, devices etc. installation are destined - and then executable - always and in exclusive way from specialized warned and educated personnel, or directly from the TECHNICAL AUTHORIZED ASSISTANCE, in the height respect of the manufacturer recommendations and the actual safety and health norms.

The devices can't be used outside a box. The user must always insert the cards in a container that respect the actual safety normative. The protection of this container is not threshold to the only atmospheric agents, but specially to mechanic, electric, magnetic, etc. ones.

To be on good terms with the products, is necessary guarantee legibility and conservation of the manual, also for future references. In case of deterioration or more easily for technical updates, consult the AUTHORIZED TECHNICAL ASSISTANCE directly.

To prevent problems during card utilization, it is a good practice to read carefully all the informations of this manual. After this reading, the user can use the general index and the alphabetical index, respectly at the begining and at the end of the manual, to find information in a faster and more easy way.

## GENERAL FEATURES OF IBC CL

The most important function of **IBC CL** is the conversion of one RS 232 serial line in active current loop serial line. Thanks to this module the numerous systems that have RS 232 standard can be connected to the industrial devices that use current loop standard.

The main features of **IBC CL** module are:

- conversion of **RS 232** standard in **current loop active** standard;
- active current loop line that can be connected up to **4 devices** provided of passive current loop;
- management of communication in **full duplex** modality;
- maximum baud rate supported by current loop line: **19200 Baud**;
- single power supply from mains at **220 Vac** or **110 Vac**;
- internal **power supply section** that ensures the nominal current value by changing the **power supply voltage** of current loop line;
- current maintained on current loop line: **20 mA**;
- one **quick release, screw terminal** connector for **power supply**;
- one **9 pins D male connector** with standard pin out for **RS 232** serial line;
- one **quick release, screw terminal** connector for **active current loop** serial line;
- two status **LEDs** that show the activity on current loop serial line;
- handy **plastic container** for a direct mounting on table or electric panel;
- small dimension: **135 x 90 x 70 mm**;
- weight: **450 g**.

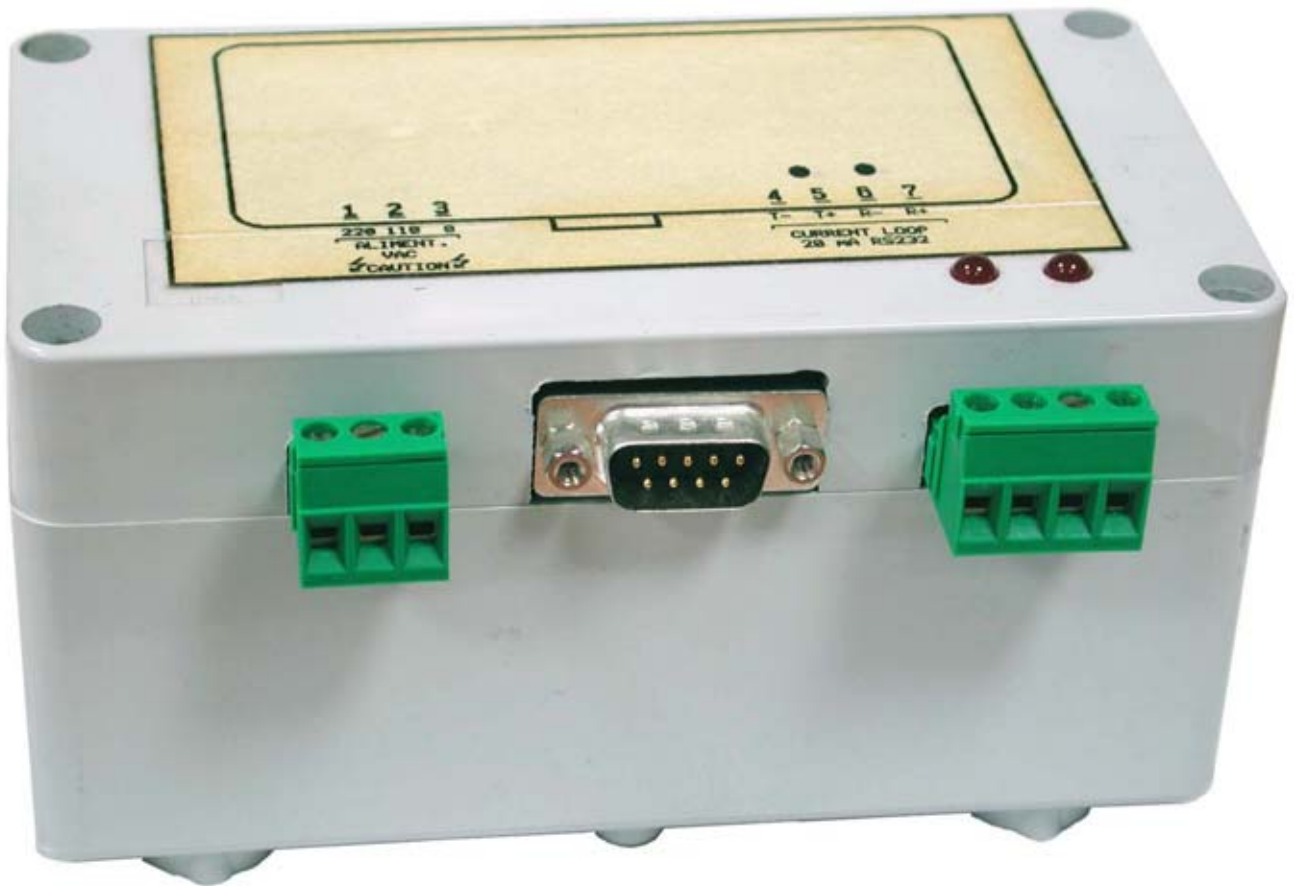


FIGURE 1: PHOTO OF IBC CL

## GENERAL FEATURES OF NNI 16

The most important function of **NNI 16** is the capability to concentrate up to four active current loop lines in one passive current loop line. Thanks to this module the numerous industrial systems that use current loop standard can be connected together without any problems for communication lines power supply.

The main features of **NNI 16** module are:

- concentrates **4 active current loop** lines in **1 passive current loop** line;
- active current loop lines that can be connected up to **4 devices** provided of passive current loop;
- management of communication in **full duplex** modality;
- maximum baud rate supported by current loop line: **19200 Baud**;
- single power supply from mains at **220 Vac** or **110 Vac**;
- internal **power supply section** that ensures the nominal current value by changing the **power supply voltage** of current loop line;
- current maintained on current loop line: **20 mA**;
- one **quick release, screw terminal** connector for **power supply**;
- one **quick release, screw terminal** connector for **passive current loop** serial line;
- two **quick release, screw terminal** connector for **active current loop** serial lines;
- eight status **LEDs** that show the activity on active current loop serial lines;
- handy **plastic container** for a direct mounting on table or electric panel;
- small dimension: **165 x 90 x 70 mm**;
- weight: **580 g**.



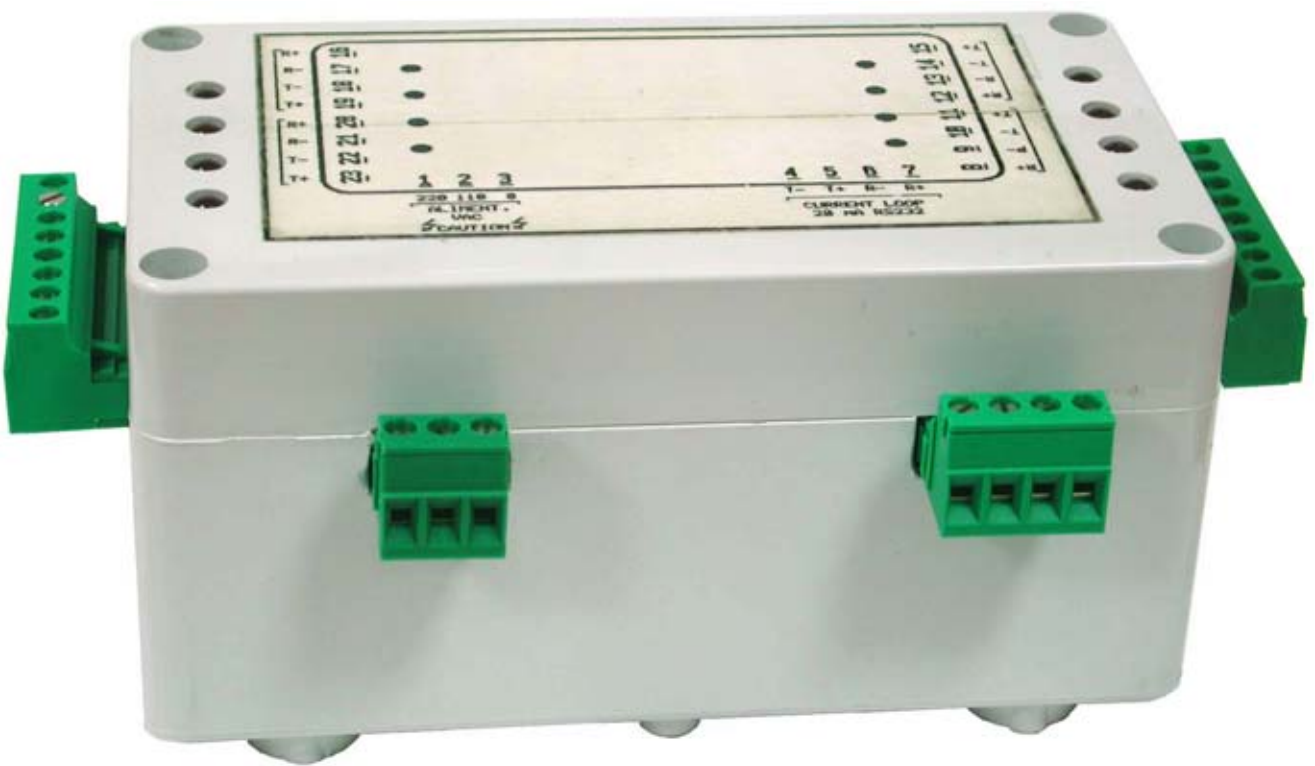


FIGURE 2: PHOTO OF NNI 16

## INSTALLATION

In this chapter there are the information for a right installation and correct use of the card. The user can find the location and functions of each connectors and LEDs and some explanatory diagrams.

### CONNECTIONS

**IBC CL** and **NNI 16** modules are provided respectively with with 3 and 4 connectors that can be linkeded to control system cards or directly to the field, according to system requirements. In this paragraph there are connectors pin out, a short signals description (including the signals direction) and connectors location (please refer to the label on top of the module).

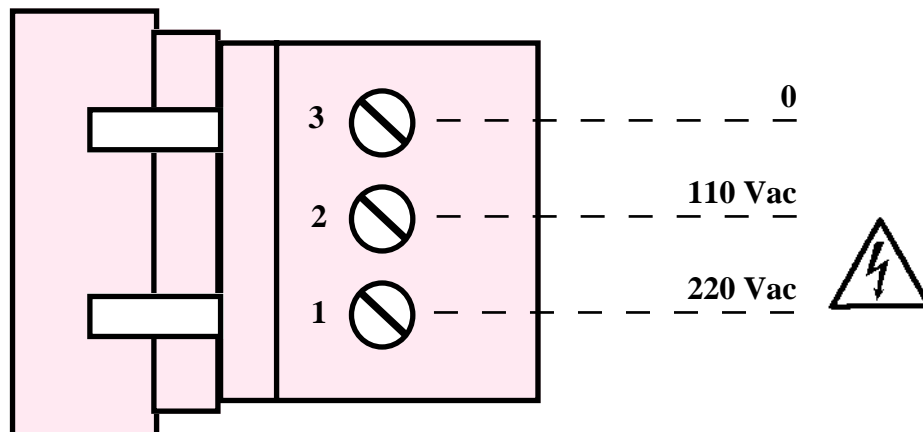
Following figures show the frontal view of connectors; they can be easily recognized because they reproduce exactly the shape of the connectors and also thanks to the serigraph on the board.

#### **CN3 - CONNECTOR FOR IBC CL AND NNI 16 POWER SUPPLY**

CN3 is a 3 pins quick release screw terminal connector that allows to provide power supply to modules.

Each module is designed to accept mains power supply, both 110 Vac and 220 Vac, at 50 Hz.

Please be sure to isolate properly the cables of this connector.



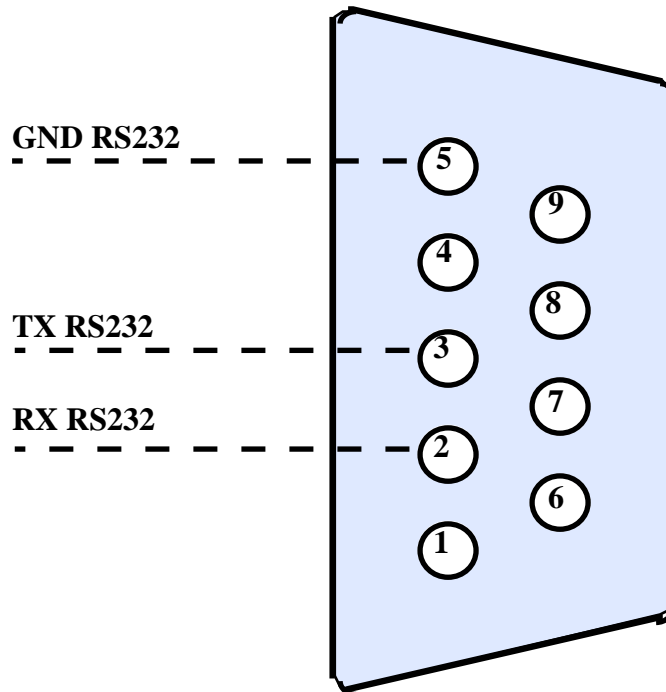
**FIGURE 3: CN3 - POWER SUPPLY CONNECTOR FOR IBC CL AND NNI 16**

Signals description:

- 0** = I - Common of power supply 110 Vac or 220 Vac
- 110 Vac** = I - Power supply 110 Vac
- 220 Vac** = I - Power supply 220 Vac

**CN2 - CONNECTOR FOR RS 232 SERIAL LINE ON IBC CL**

CN2 is a 9 pins D type male connector that allows to connect RS 232 serial line to module IBC CL. Signals location has been designed to reduce interferences while RS 232 signals are compliant to CCITT specifications.



**FIGURE 4: CN2 - CONNECTOR FOR RS 232 SERIAL LINE ON IBC CL**

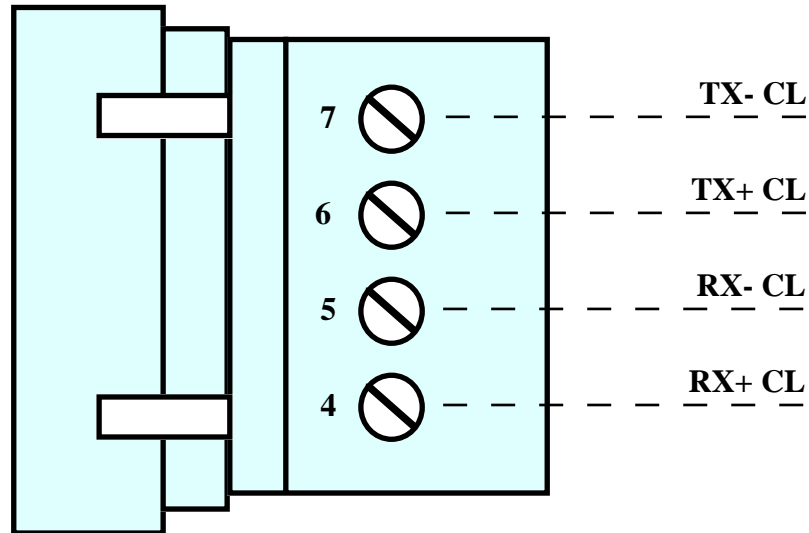
Signals description:

**RX RS232** = I - RS 232 Receive Data  
**TX RS232** = O - RS 232 Trasmit Data  
**GND RS232** = - RS 232 digital ground

**CN1 - CONNECTOR FOR CURRENT LOOP SERIAL LINE ON IBC CL**

CN1 is a 4 pins quick release screw terminal connector that allows to connect active current loop serial line on module **IBC CL**.

Signals location has been designed to reduce the interferences and to easy connections to the field, while signals are compliant to CCITT directives regarding 20 mA current loop standard.



**FIGURE 5: CN1 - CONNECTOR FOR CURRENT LOOP SERIAL LINE ON IBC CL**

Signals description:

- RX- CL** = I - Current Loop Receive Data Negative
- RX+ CL** = I - Current Loop Receive Data Positive
- TX- CL** = O - Current Loop Transmit Data Negative
- TX+ CL** = O - Current Loop Transmit Data Positive

## CN1 - CONNECTOR FOR CURRENT LOOP SERIAL LINE ON NNI 16

CN1 is a 4 pins quick release screw terminal connector that allows to connect active current loop serial line on module **NNI 16**.

Signals location has been designed to reduce the interferences and to easy connections to the field, while signals are compliant to CCITT directives regarding 20 mA current loop standard.

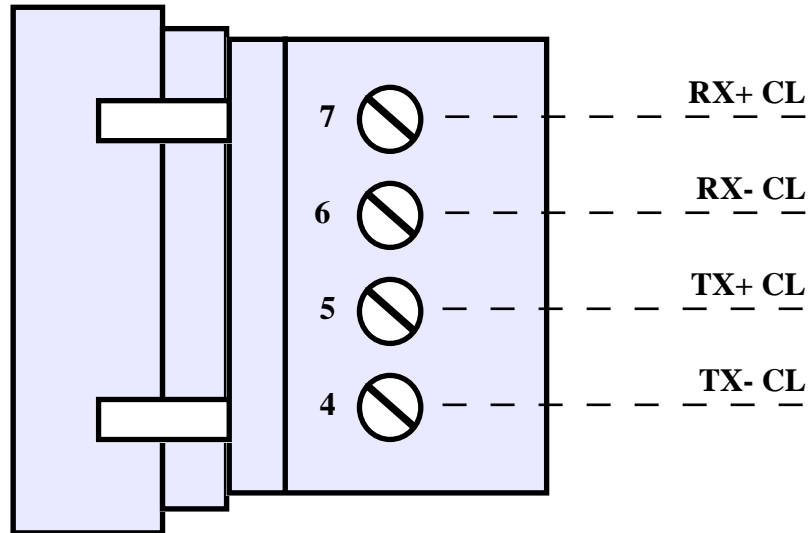


FIGURE 6: CN1 - CONNECTOR FOR CURRENT LOOP SERIAL LINE ON NNI 16

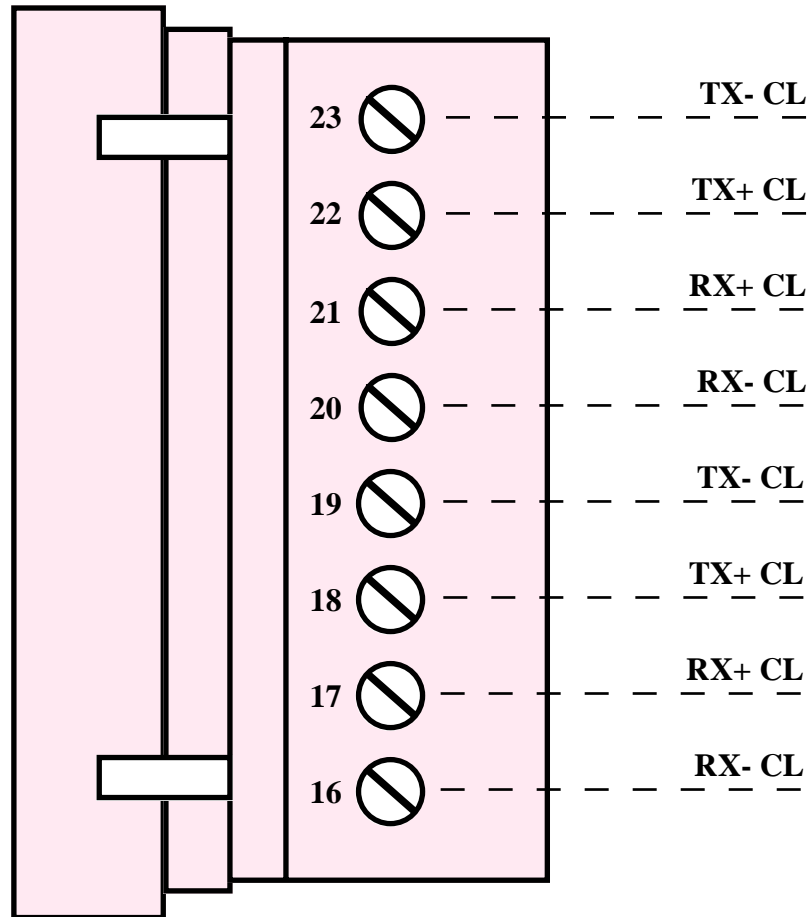
Signals description:

- RX- CL** = I - Current Loop Receive Data Negative
- RX+ CL** = I - Current Loop Receive Data Positive
- TX- CL** = O - Current Loop Transmit Data Negative
- TX+ CL** = O - Current Loop Transmit Data Positive

**CN4 - CONNECTOR FOR TWO CURRENT LOOP SERIAL LINES ON NNI 16**

CN4 is a 8 pins quick release screw terminal connector that allows to connect two out of four current loop serial lines on module **NNI 16**.

Signals location has been designed to reduce the interferences and to easy connections to the field, while signals are compliant to CCITT directives regarding 20 mA current loop standard.



**FIGURE 7: CN4 - CONNECTOR FOR TWO OUT OF FOUR CURRENT LOOP SERIAL LINE ON NNI 16**

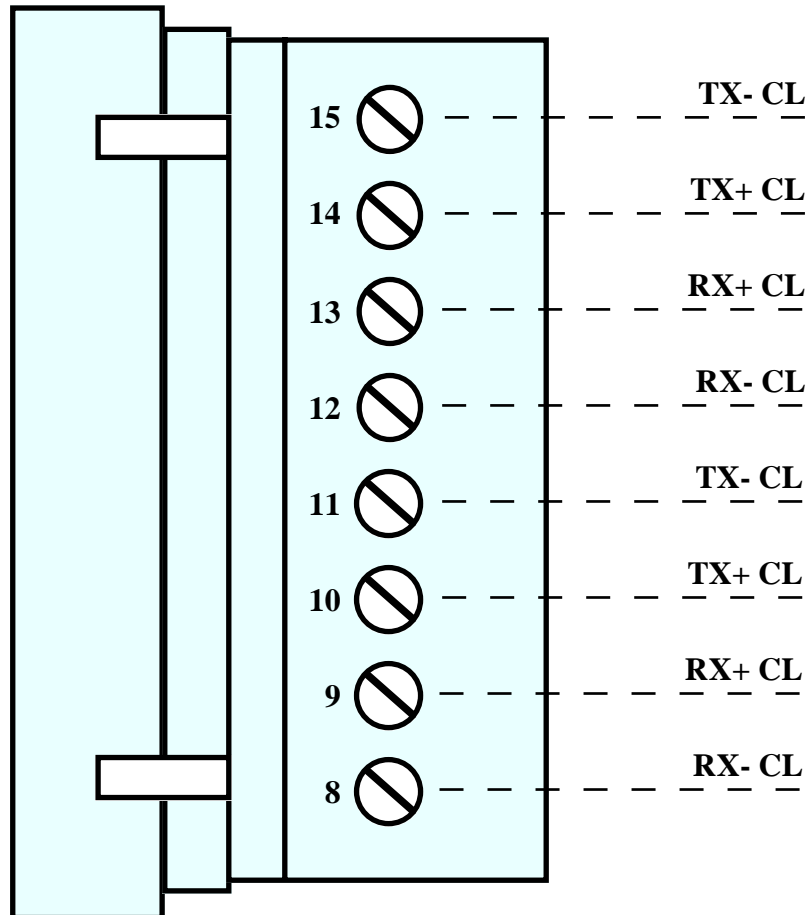
Signals description:

- RX- CL** = I - Current Loop Receive Data Negative
- RX+ CL** = I - Current Loop Receive Data Positive
- TX- CL** = O - Current Loop Transmit Data Negative
- TX+ CL** = O - Current Loop Transmit Data Positive

**CN5 - CONNECTOR FOR TWO CURRENT LOOP SERIAL LINES ON NNI 16**

CN5 is a 8 pins quick release screw terminal connector that allows to connect two out of four current loop serial lines on module **NNI 16**.

Signals location has been designed to reduce the interferences and to easy connections to the field, while signals are compliant to CCITT directives regarding 20 mA current loop standard.



**FIGURE 8: CN5 - CONNECTOR FOR TWO OUT OF FOUR CURRENT LOOP SERIAL LINE ON NNI 16**

Signals description:

- RX- CL** = I - Current Loop Receive Data Negative
- RX+ CL** = I - Current Loop Receive Data Positive
- TX- CL** = O - Current Loop Transmit Data Negative
- TX+ CL** = O - Current Loop Transmit Data Positive

## SERIAL LINES CONNECTIONS

Here follow a set of figures showing how to make connections with serial lines of modules **IBC CL** and **NNI 16** and generic "External Systems".

In advance, it is opportune to provide some notes about connections, to explain the figures and help to make the correct connections also in different situations:

- 1) The indication "External Systems" is referred to any device provided with an asynchronous current loop communication line both made by **grifo®** and third parties. Amongst **grifo®** products are remarkable several **GPC®** control cards; **QTP** operator interfaces; communication cards **UCC A2**, **UBC B2**, **MSI 01.CL**; etc.
- 2) Every connection (both RS 232 and current loop) must be performed connecting transmitter (TX...) to receiver (RX...) and viceversa.
- 3) All current loop connections must be performed to warrant current circulation, that is a positive signal (+) must be always connected to a negative signal (-) and viceversa.
- 4) There must be only one active system that supplies the whole network.
- 5) Up to 4 passive systems can be connected to an active line of IBC CL or NNI 16, by means to warrant the above mentioned electric specification.
- 6) Current loop cables must have diameter, conductivity (AVG), isolation, etc. compliant with below reported specifications.
- 7) Current loop interfaces connectable to networks where modules **IBC CL** or **NNI 16** are present must respect following electric specifications:
  - circulation of a **20 mA** current must be guaranteed;
  - potential drop on each transmitter is about **2.35 V** with a 20 mA current;
  - potential drop on each receiver is about **2.52 V** with a 20 mA current;
  - in case of shortcircuit each transmitter must dissipate at most **125 mW**;
  - in case of shortcircuit each receiver must dissipate at most **90 mW**.For further info please refer to HEWLETT-PACKARD Data Book, (**HCPL 4100** and **4200** devices).
- 8) Electrically, expandibility of a current loop network is unlimited: anyway the potentialities of logic protocol used must be checked (Master-Slave, **ABACO®** Link BUS, GNET, Modbus, etc.).
- 9) Should a current loop connection break, communication stops on that arm and on all eventual arms connected to it; communications on other arms continues to work correctly.
- 10) Should a passive system disconnect from a current loop arm (e.g. for maintenance, updates, connections change, etc.), to keep working the communication on that arm the signals must be short circuited as follows:

RX +      short circuited to RX -  
TX +      short circuited to TX -



Example: PC female connector  
DB9 DB25

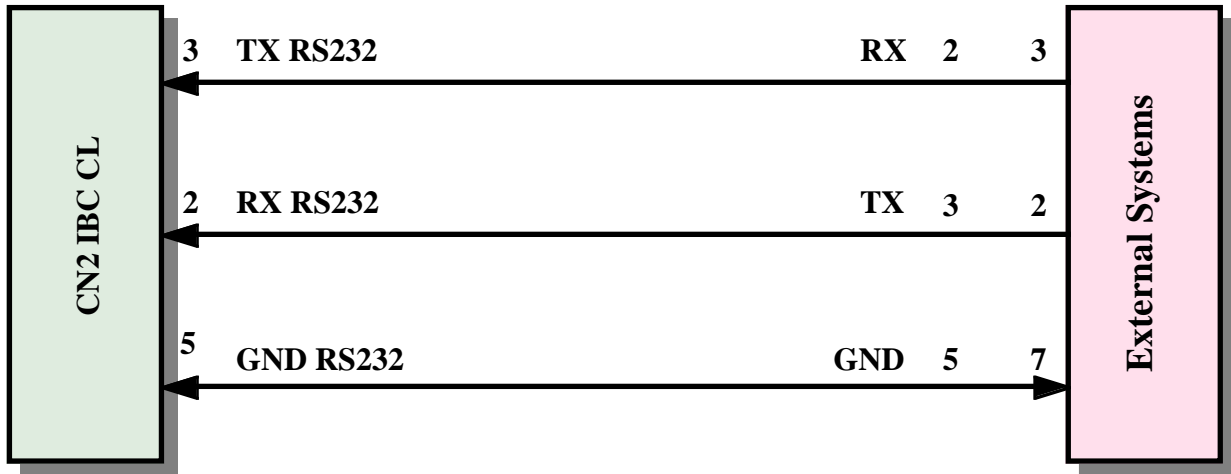


FIGURE 9: RS 232 SERIAL CONNECTION

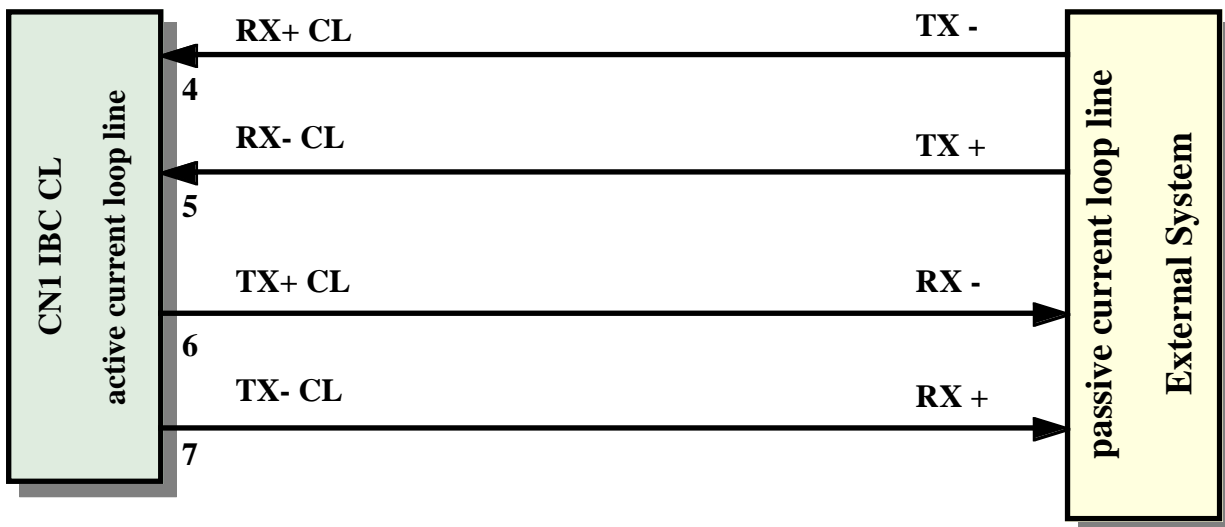


FIGURE 10: POINT TO POINT CURRENT LOOP SERIAL CONNECTION

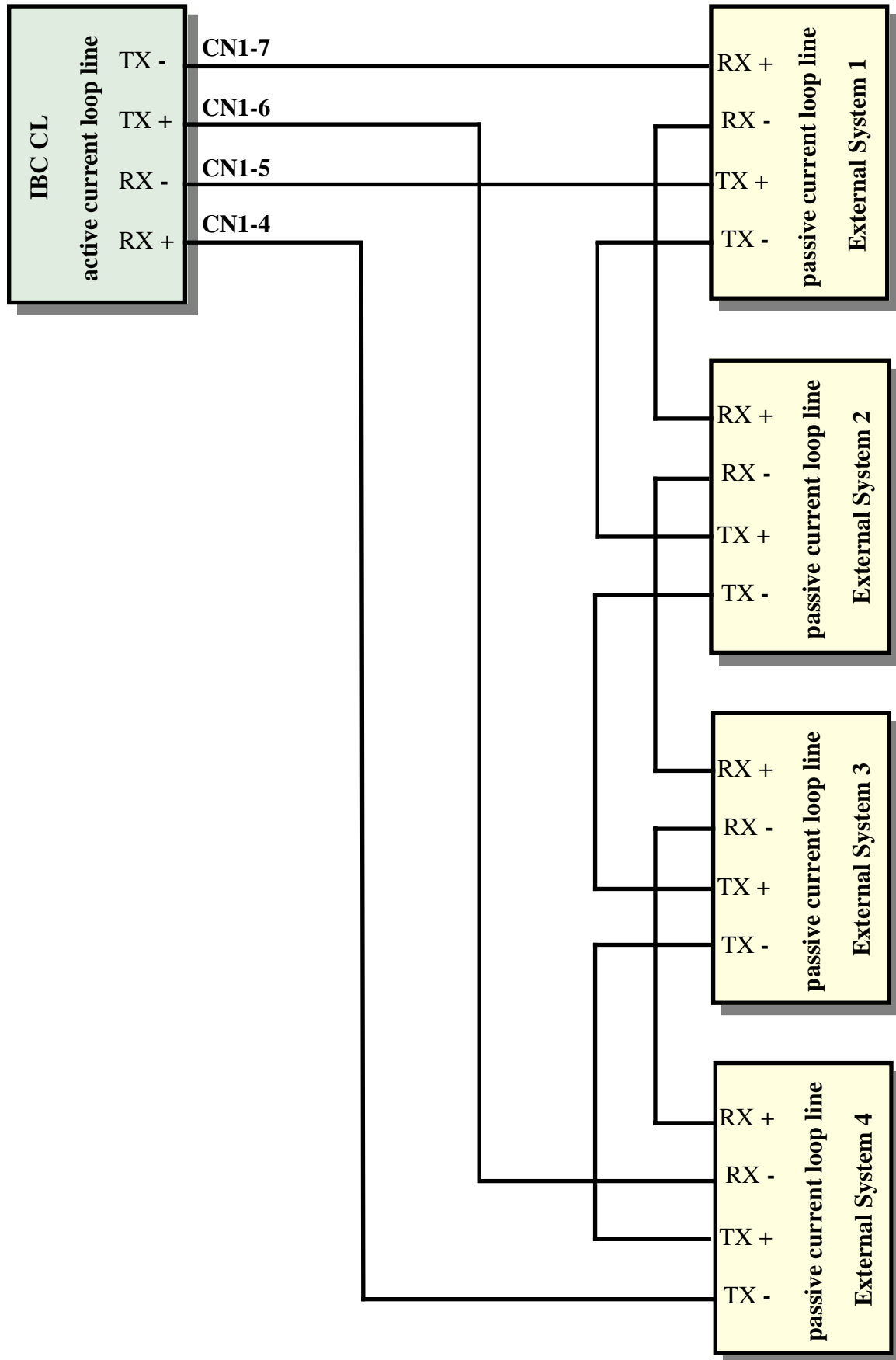


FIGURE 11: CURRENT LOOP IBC CL NETWORK SERIAL CONNECTION

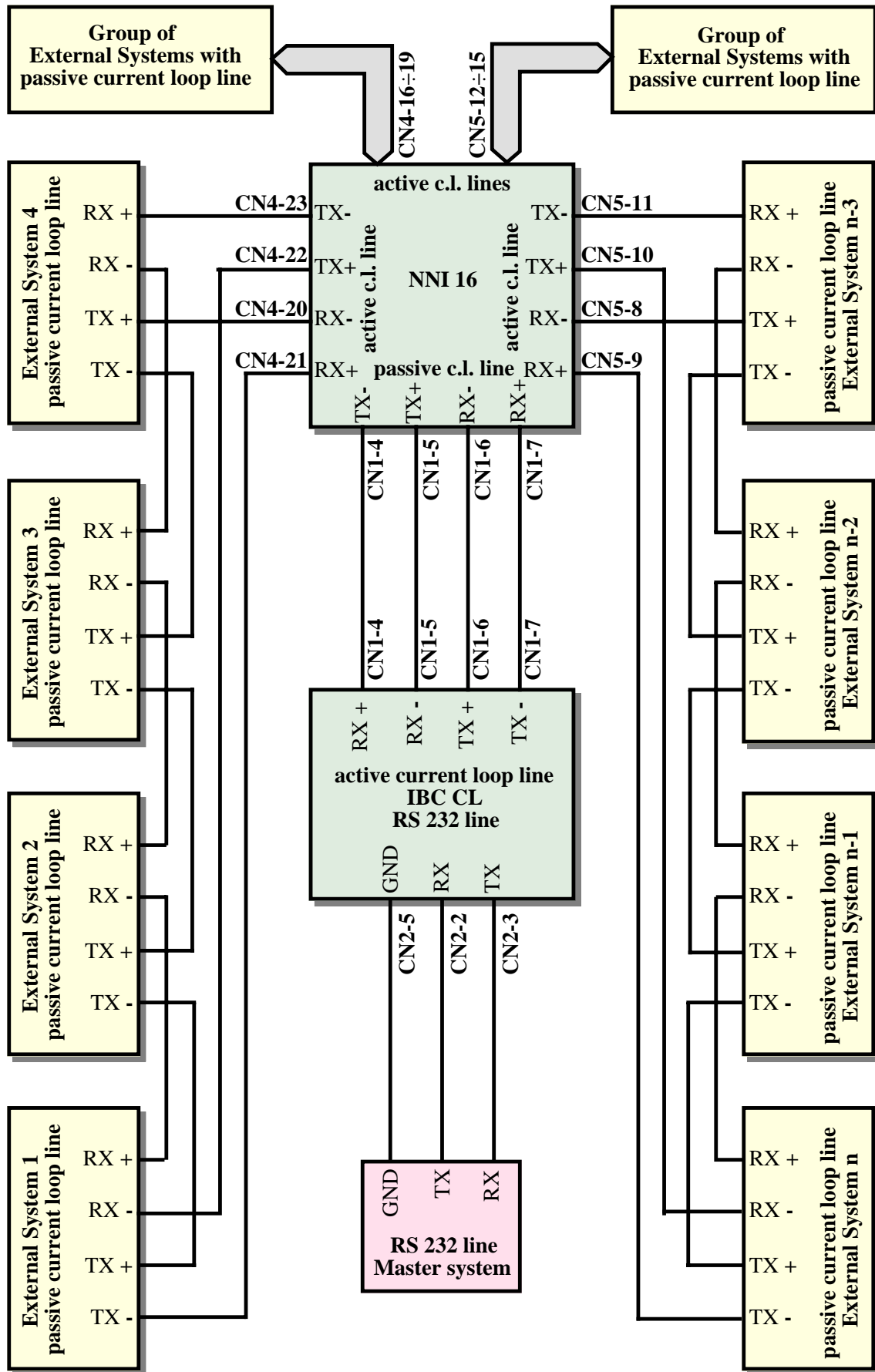


FIGURE 12: CURRENT LOOP IBC CL AND NNI 16 NETWORK SERIAL CONNECTION

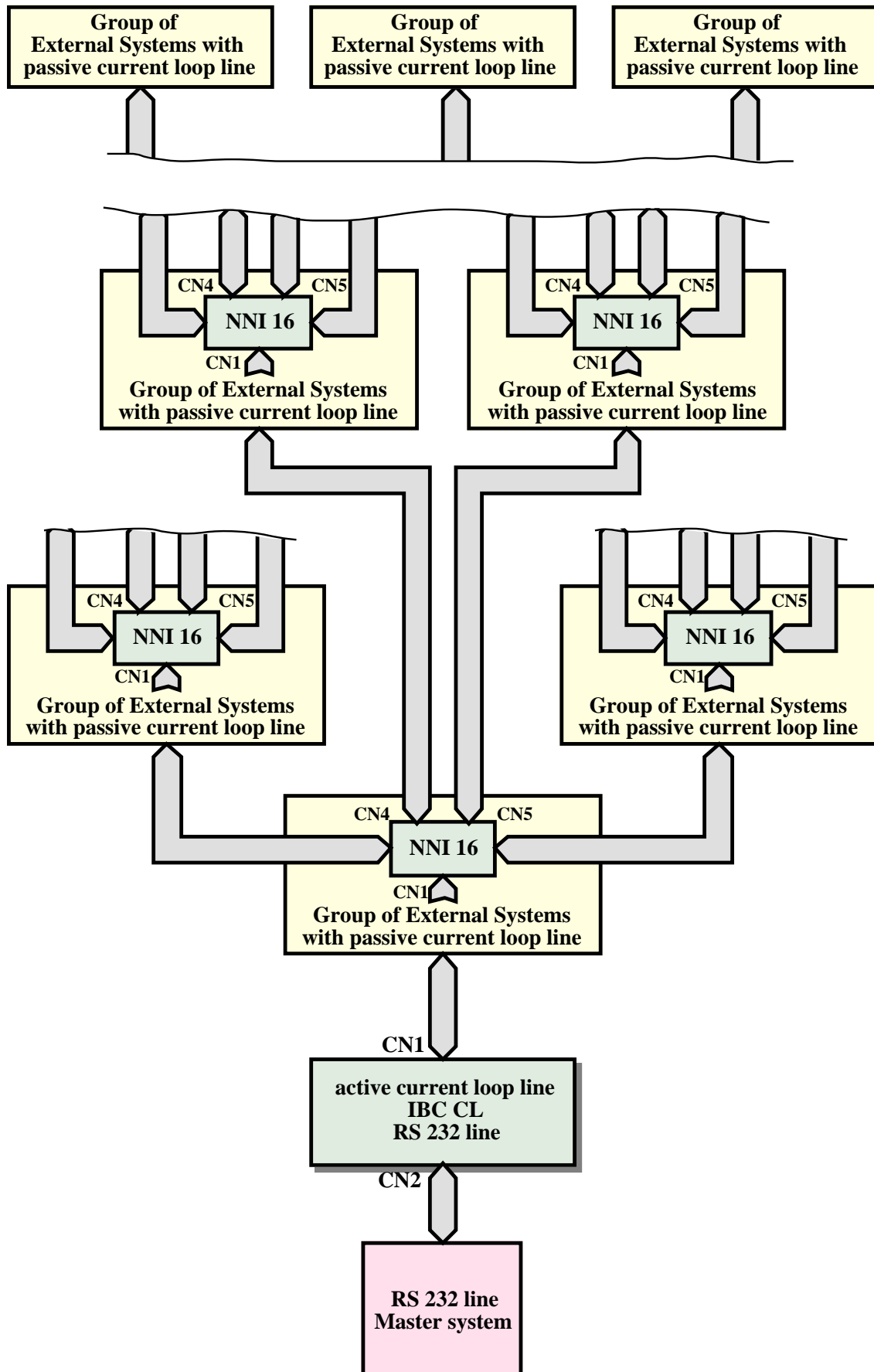


FIGURE 13: CURRENT LOOP IBC CL AND NNI 16 NETWORK SERIAL CONNECTION EXPANSION



## VISUAL SIGNALATIONS

Modules **IBC CL** and **NNI 16** feature respectively 2 and 8 red LEDs with the purpose to visualize the status of current loop communication lines. In detail:

LED	COLOUR	PURPOSE
LD1	Red	Visualizes status of current loop reception line on pins 4, 5 of CN1
LD2	Red	Visualizes status of current loop transmission line on pins 6, 7 of CN1

**FIGURE 14: IBC CL STATUS LEDs**

LED	COLOUR	PURPOSE
LD3	Red	Visualizes status of current loop reception line on pins 16, 17 of CN4
LD4	Red	Visualizes status of current loop transmission line on pins 18, 19 of CN4
LD5	Red	Visualizes status of current loop reception line on pins 20, 21 of CN4
LD6	Red	Visualizes status of current loop transmission line on pins 22, 23 of CN4
LD7	Red	Visualizes status of current loop reception line on pins 8, 9 of CN5
LD8	Red	Visualizes status of current loop transmission line on pins 10, 11 of CN5
LD9	Red	Visualizes status of current loop reception line on pins 12, 13 of CN5
LD10	Red	Visualizes status of current loop transmission line on pins 14, 15 of CN5

**FIGURE 15: NNI 16 STATUS LEDs**

The main purpose of LEDs is to allow a quick verification about correct connection and working of current loop serial line.

In fact, when a LED is lit, it indicates presence of current on communication loop, such presence happens only in case of correct connection.

Immediatly after connecting the module, all LEDs of connected arms must be ON and turn OFF only in correspondance with line activity.

Turning OFF may not be visible, in fact it depends on baud rate and amount of data on the network. To locate LEDs on the modules, please refer to the label on top of the container.

