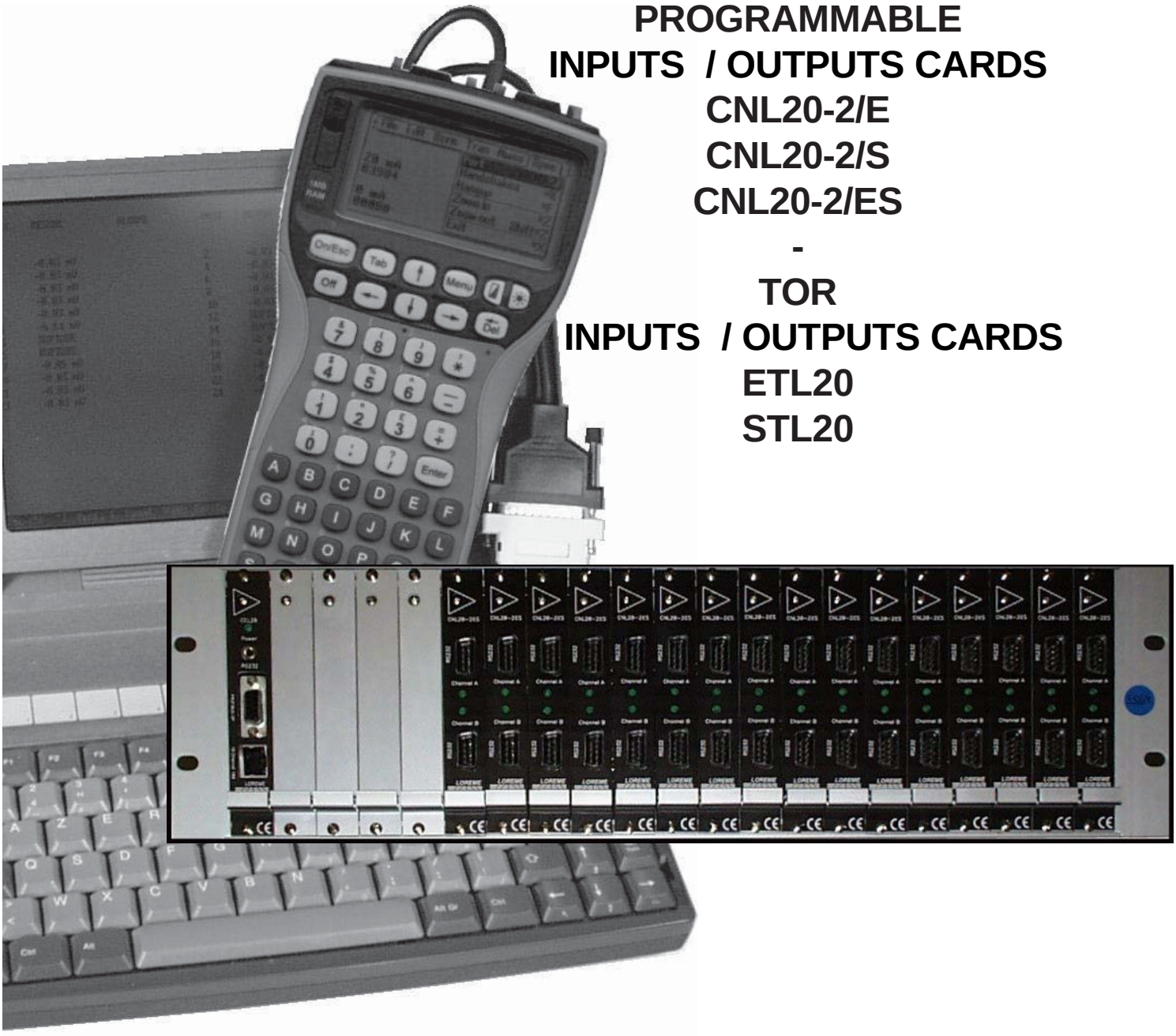
COMMUNICATING DEPORTED ANALOG INPUTS OUTPUTS RACK

CONFIGURATION AND USE

COMMUNICATION CONCENTRATOR
CCL20
-
PROGRAMMABLE
INPUTS / OUTPUTS CARDS
CNL20-2/E
CNL20-2/S
CNL20-2/ES
-
TOR
INPUTS / OUTPUTS CARDS
ETL20
STL20



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REV1.7/1a.2h/0.0 - **11/08/06**

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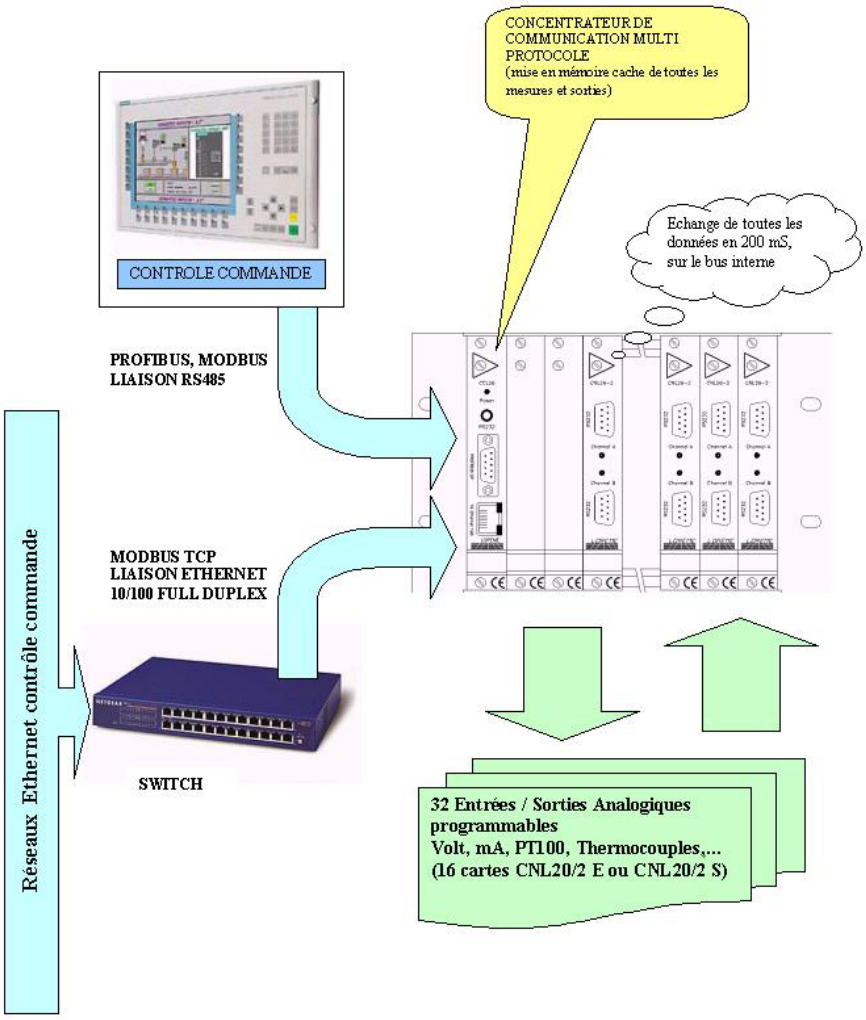
Presentation

Communicating and deported inputs/outputs rack with industrial protocol, the modular device is composed of a communication concentrator and according to needs, of analog input card (programmable), of analog output card (programmable), of digital inputs card or of digital outputs card .
* Analog input channels, 2 channels (ref : CNL20-2/E) are configurable in mV, Volt, mA, Thermocouple or RTD ...
* Analog output channels, 2 channels (ref : CNL20-2/S) are configurable in mA or Volt .
A universal version of analog inputs / outputs cards is available (CNL20-2/ES) allowing 3 differents operating modes: in standard measure converter without communication, in deported input, in deported output.
* The digital cards consist of 16 inputs channels or 16 outputs channels.

The communication concentrator is in charge of the exchange and the buffering of the whole inputs / outputs variables thus improving transfer speed with the outside. This solution allows to reduce communication tasks realized by the control host (supervisors, P.L.Cs...), the rack appearing on the network like a single slave. Request number and refresh time are thus considerably reduced. Thus decreasing the network congestion and the automat load. The communication concentrator interchangeability allows a fast and simple evolution of the rack to a new protocol.

Realization :
rack 19 '' height 3U equipped of screw connector (maximum section of wiring 2.5 mm²)
a wired internal power supply and communication bus
Inputs / outputs card 3U width 4TE, (16 slots)
(option small size rack realization having less slots)
Communication concentrator card of 3U width 4TE (located on left site of the rack)
Total galvanic insulation of the rack (inputs / outputs / communication) : 1500 veff.
Universal power supply: 20 - 70 Vac / Vdc or 80 - 265 Vac / Vdc

Synoptic of a Profibus DP, Modbus-TCP, Modbus communicating inputs/outputs rack .



Communication concentrator description (CCL20) :

- CCL20 is a multi protocol communication concentrator bridging inputs / outputs cards of the rack and an industrial type network .
- It deals with 3 protocols: Modbus and Profibus on a RS485 link(subD9) and Modbus TCP on Ethernet 10/ 100 full duplex (rj45)
- It communicates continuously with the card present in the rack, thus ensuring the provision of the measures on the network.
- A simple request allows reading or writing the whole rack measures. CCL20 behaving like an only slave against the P.L.C.

Digital inputs / outputs card description (CNL20/2) :

CNL20/2 can be:
- a universal 2 channels input card (CNL20/2E)
- a 2 channels output card (CNL20/2S) (assignment carried out in factory)
- a multifunction card CNL20-2/ES configurable in universal converter type, in input or output mode.

This cards are configurable locally by RS232 link allowing to define their operating mode.
For inputs cards: measure type : mV ,Volt ,mA, Pt100 , thermocouple ,…
For outputs cards: command signal nature(4/20 mA ,0/20 mA ,0/10 V , …..)
For multifunction cards: operating mode (Converter, Input , Output).
Output / inputs cards ensure the fully rack galvanic insulation.

Digital inputs / outputs card description (ETL20 / STL20) :

- ETL20-16 cards have 16 logical inputs usable in polarized inputs from 5 to 50 Vdc. Inputs are galvanic insulated from the rack and have a common point between them. A led ramp in front face give inputs states.
- STL20-16 cards have 16 logical outputs on static relay with normally open contact, potential free (1 common point for the 16 outputs), interrupting capacity: 1A/ 60V. A led ramp in front face gives the outputs states.

General characteristics of the rack

Operating temperature	-10 à 60 °C
Strorage temperature	-20 à +85 °C
Influence	< 0.005 % / °C (full scale)
Humidity	85 % (no condensed)
Power supply	80 to 265 Vac - dc maxi consumption 70 VA

CCL20 : (network concentrator)

PROTOCOL	CHARACTERISTICS
PROFIBUS DP v0	9600 to 1.5M BPS Wiring sub D 9 pins female
MODBUS (JBUS)	4800 to 19200 BPS parity : pair , unpair , without Wiring sub D 9 pins femal
MODBUS TCP	10 / 100 MBS auto sense Wiring RJ 45

ETL20 : (logical input)

Voltage	from 5Vdc to 50Vdc for level 1 level 0 ==> < 3Vdc
Cycle time	20 ms

Temps de rafraichissement : 100ms

STL20 : (logical output)

Dry contact	maxi interrupting capacity : 1A 60V Interrupting mini current : NA endurance 1 000 000 switching
Cycle time	20 ms
Time out	fix to 3s

CNL20/2E : (analog input)

INPUT	RANGE	PRECISION
Voltage mV	-15 / 140 mV	+/- 20 µV
Voltage V	-15 / 140 V	+/- 2 mV
Impedance	> 1 MOhms	
Current	0 / 30 mA	+/- 20 µA
Impedance	50 Ohms	
Resistance	0 / 400 Ohms	+/- 0.1 Ohms
Pt100	-200 / 800 °C	+/- 0.3 °C
Polarization	0.3 mA	
Tc B	200 / 1800 °C	+/- 2 °C
Tc E	-250 / 1000 °C	+/- 0.3 °C
Tc J	-200 / 600 °C	+/- 0.4 °C
Tc K	-200 / 1350 °C	+/- 0.5 °C
Tc R	0 / 1750 °C	+/- 1.5 °C
Tc S	0 / 1600 °C	+/- 1.5 °C
Tc T	250 / 400 °C	+/- 0.4 °C
Compensation T°	-10 / 60 °C	+/- 0.2 °C

Others couples on request.

Sensor power supply	24 V filtered / limited to 25 mA
Potentiometer reference	5 V
Cycle time	160 ms

CNL20/2S : (analog output)

OUTPUT	RANGE	PRECISION
Current	0 ... 4 ... 20 mA	+/- 10 µA
Maxi load	1000 Ohms	
Cycle time	20 ms	

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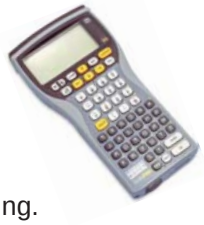
RS232 Configuration

The whole of the configuration parameters can be visualized and modified with any system emulating a terminal and equiped with RS232 link. The dialog and configuration parts being resident in device memory, no software or specific interface is necessary for their configuration. Two systems of terminal emulation are presented, the PSION WorkAbout and the PC.
Different procedures are enumerated below. The link is freely supplied on simple request.

PSION Workabout: (portable terminal)



To start up the PSION push the **"ON"** key.
At the presentation, push the **"MENU"** key.
Select **"SYSTEME SCREEN"** mode and validate by **"ENTER"**.
Icons display: **DATA CALC SHEET PROGRAM COMMS**

Select icon **"COMMS"** and validate by **"ENTER"**, on display, a cursor is flashing.
The **PSION** is now in terminal mode, and it's necessary to check his parameters.

For this, press the **"MENU"** key, then go to item **"Spec"**, **"Port"** and validate with **"ENTER"**.
Here, parameters should be: - Port: A - Baud rate: 9600
Then, go to menu **"Parameters..."** and validate by **"Tab"**
Here, parameters should be: - Data bits: 8 - Stop bits: 1
- Parity: None - Ignore parity: Yes
Validate now by pushing **"ENTER"** twice.
Press again **"MENU"**, then select **"Handshakes"** and validate with **"ENTER"**.
Here, put all parameters in **"Off"** state.

The terminal is now totally configured. plug the terminal to the device with RS232 link.
The measure is displayed and, to configure, push **"C"** on keyboard.

To quit terminal mode and switch off PSION, push the **"OFF"** key. When you start the **PSION** again, it start automaticaly and directely in terminal mode without re-start configuration.

PC with WINDOWS:

To start up terminal program:

0 1 - Clic on button **"START"**
2 - Tick off **"Programs \ Accessories \ Communication \ Hyper Terminal"**
3 - Clic on **"Hypertrm.exe"**

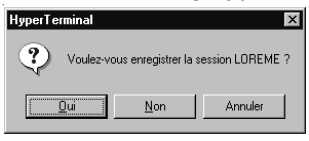
1 Enter a name for the new connection

2 Choose a communication port

3 Choose:
- 9600 bauds
- 8 data bits
- no parity
- 1 stop bit
- no flow control

4 PC is now in terminal mode, connect to device by plugging the RS232 link cable.
Measure is now displayed and to access configuration, press **"C"** key .

5 When leaving HyperTerminal, the following window will appear.



By accepting the reccording of the session, terminal mode will be able to be started again without using this procedure.

Thus, the short cut LOREME.ht will permit to communicate with all LOREME devices.

Note: to modify parameters of terminal mode whereas this one is already started, it is necessary, after having carried out the modifications, to close the terminal and to open it again so that the modifications are effective.

Visualization

1) Input channel (CNL20-2/E or CNL20-2/ES in P.L.C mode):

Model designation, channel adress	ENTREE X (INPUT X)
Measure value	10 mV
More messages can complete the measure:	
Sensor breaking (TC or Pt100) or measure range overflow	RUPTURE CAPTEUR (SENSOR BREAKING)
Overflow at 10 % of scale	DEPASSEMENT (OVERFLOW)
Other messages can inform of a possible problem:	
Input A/D converter default	DEFAUT MESURE (MEASURE DEFAULT)
Internal temperature sensor default in thermocouple measure	DEFAUT CAPTEUR (SENSOR DEFAULT)
Line lenght compensation default in Pt100 or resistance measure	DEFAUT LIGNE (LINE DEFAULT)
No exchange of data on the bus , adress not configured or bus defective	ABSENCE ECHANGE (EXCHANGE MISSING)
Address distribution default, two devices have the same adress	CONFLIT ADRESSE (ADDRESS CONFLICT)

2) Output channel (CNL20-2/S or CNL20-2/ES in P.L.C mode):

Model designation, channel adress	SORTIE X (OUTPUT X)
Output value	12.01 mA
More messages can complete the output:	
starting phase, output at 0 % of scale	DEMARRAGE (STARTING)
Refresh timeout reached, output put in security state	SECURITE (SECURITY)
Other messages can inform of a possible problem:	
No data exchange on the bus , address not configured or bus defective	ABSENCE ECHANGE (EXCHANGE MISSING)
Address distribution default, two devices have the same adress	CONFLIT ADRESSE (ADDRESS CONFLICT)

3) Converter mode channel(CNL20-2/ES only):

Operating mode	CONVERTISSEUR (CONVERTER)
Measure value	10 mV
Output value	12.01 mA
More messages can complete the measure:	
Sensor breaking (TC or Pt100) or measure range overflow	RUPTURE CAPTEUR (SENSOR BREAKING)
Other messages can inform of a possible problem:	
Input A/D converter default	DEFAUT MESURE (MEASURE DEFAULT)
Internal temperature sensor default in thermocouple measure	DEFAUT CAPTEUR (SENSOR DEFAULT)
Line lenght compensation default	DEFAUT LIGNE (LINE DEFAULT)

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4) TOR input channel (ETL20) :

Model designation, channel adress	ENTREE X (INPUT X)
Normal operating message	FONCTIONNEMENT OK (OPERATING OK)

Other messages can inform of a possible internal problem:

Logical inputs read default	DEFAUT BUS E/S (I/O BUS DEFAULT)
Write default of the front face Leds	DEFAUT BUS LED (LED BUS DEFAULT)

or a communication problem:

No data exchange on the bus, address not configured or bus defective	ABSENCE ECHANGE (EXCHANGE MISSING)
Adress distribution default, two devices have the same adress	CONFLIT ADRESSE (ADDRESS CONFLICT)

5)Digital output channel (STL20) :

Model designation, channel adress	SORTIE X (OUTPUT X)
Normal operating message	FONCTIONNEMENT OK (OPERATING OK)

Other messages can inform of a possible internal problem:

Logical inputs read default	DEFAUT BUS E/S (I/O BUS DEFAULT)
Write default of the front face Leds	DEFAUT BUS LED (LED BUS DEFAULT)
Starting phase, all output at 0!	DEMARRAGE (STARTING)
Refresh timeout reached, All outputs goes to 0 ! The timeout is fix. It's 3 seconds.	SECURITE (SECURITY)

or a communication problem:

No data exchange on the bus , address not configured or bus defective	ABSENCE ECHANGE (EXCHANGE MISSING)
Adress distribution default, two devices have the same adress	CONFLIT ADRESSE (ADDRESS CONFLICT)

Configuration

1) Method:

In configuration, different types of questions are asked. For each of them, several answers are possible. Here is their description:

1.1) Menu selection:

Example: ENTREE(INPUT)
O - N

The choice is done by typing the **"O"** or **"N"** keys.
This choice allows access to different configuration menus.

1.2) Parameter selection:

Example: TENSION(VOLTAGE) or TENSION(VOLTAGE)
(O-N) OUI (O-N) NON

Previous choice = OUI:	- type **"O"**	=>	validation, choice = OUI,
	- type **"Enter"**	=>	validation, choice = OUI,
	- type **"N"**	=>	change, choice = NON.
Previous choice = NON:	- type **"N"**	=>	validation, choice = NON,
	- type **"Enter"**	=>	validation, choice = NON,
	- type **"O"**	=>	change, choice = OUI.

Choices are made by typing **"O"** or **"N"** keys, and validation by typing displayed answer (**"O"** for YES and **"N"** for NO) or by **"Enter"**. Typing **"Enter"** key without modification allows to validate previous answer.

1.3) Value acquisition:

Example: ECHELLE BASSE (LOW SCALE)
4 mA

Two possibilities:
- The validation without modification by typing **"Enter"**,
- The modification with simultaneous display followed by validation with **"Enter"** key.

It is possible, when a mistake is made during a value acquisition, before validating it, to go back by pressing on "**DEL**" key. This re-displays the message without taking notice of the mistake.

1.4)Notes:

- In configuration mode, if there is no action during 2 minutes, device goes back in operating mode without taking notice of the modifications made before.

- In configuration mode, if you want go back to measure mode without taking notice of modifications made before, just press **"ESC"**.

2) CNL20-2/E or CNL20-2/ES input channel :

2.1)Operating mode (CNL20-2/ES only):

This rubric allows to select the card operating mode among the 3 following possibilities:
- Mode CONVERTISSEUR (CONVERTER mode). The card behaves like a programmable analog converter with an universal input and a 4-20 mA output (Operating without CCL20).
- Mode AUTOMATE ENTREE (INPUT P.L.C mode). The card behaves like a CNL20-2/E.
- Mode AUTOMATE SORTIE (OUTPUT P.L.C mode). The card behaves like a CNL20-2/S.

2.2) Communication:

The communication configuration is composed of 2 rubrics:
- **the channel adress** in the rack, configurable from 1 to 32,
- **the low and high scale** allowing to define the format in which measurement will be expressed. The measure is available in unsigned integer 16 bits format. It is given in percentage of the scale previously defined.

Note: this rubric is inactive on a CNL20-2/ES in converter mode.

2.3) Input:

The input possibilities are:

- Voltage (mV, V),	- Frequency (Hz),
- Current (mA),	- Pt 100 (°C), linearized or not,
- Resistance (Ω),	- Thermocouple (°C), linearized or not,

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For each input type, low and high scale choice and for a **CNL20-2/ES** in converter mode the range can also be configured. The range interprets the input signal in a physical size, witch facilitate the reading of the measured information.

Ex: Input 4-20 mA / Range 0-1000 kg
➔ Input = 12 mA, display= 500 kg

To configure the range, we must configure:

- the unit
- the decimals number
- low scale
- high scale

The display range unit is facultative. It only allows to interpret the real value on terminal. It's limited to 4 characters.

The decimal numbers is the number of digit displayed after the decimal point. This number is limited to 3.

Characteristics:

- Thermocouple:

Choice of thermocouple type, B, E, J, K, R, S, T (another on request).
Choice of compensation type, internal or external.
Choose **internal compensation** when thermocouple is extended up to device with a compensation cable.
Choose **external compensation** when thermocouple is not extended up to device with a compensation cable, but up to a compensation box where temperature will be known and stabilized. This is the value of temperature that will be typed as the external compensation value.

- Potentiometer:

Configure voltage input (V): - low scale: 0 V,
- high scale: 2.5 V.
Move potentiometer at the start and at the end of range, notice each value.
Change voltage input (V): - low scale = start range value,
- high scale = end range value.
See wiring diagram for potentiometer wiring.

- Sensor power supply:

To supply a converter in power looped mode and measure current in the loop, it's necessary to configure device in 4-20 mA current input. (See wiring diagram for sensor power supply and current input wiring.)

2.4) Special functions:

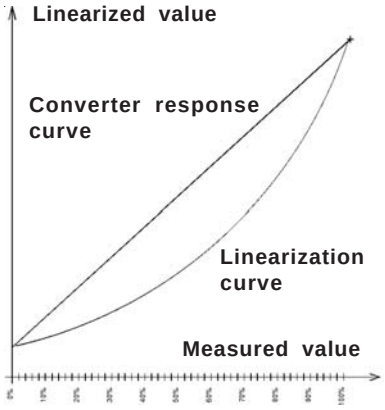
Device disposes of severals functions allowing to personnalize his operating.

The **square root** function executes a square root on the input range percentage. The result is reported on the output measure.

The **special linearization** function allows to personnalize a response curve by the configuration of correspondance points between measured input signal and analogical output.
When this function is choosed, it is directly validated, but linearization points are not modified. To modify linearization points, it is necessary to validate by YES the configuration suggest.

When **special linearization** is enabled, device uses linearization curve corresponding to configurated points (2).

To personnalize a response curve (2), it's necessary to set for each curve point the input value and the corresponding output value (maxi 26 points including input points 0 % and 100 %). So, for each measured point, device will make corresponding of linearized output value.



3) CNL20-2/S or CNL20-2/ES ouput channel:

3.1) Operating mode (CNL20-2/ES only):

see page 7 (chapter 2.1)

3.2) Communication:

The communication configuration is composed of 3 rubrics:
- **the channel address** in the rack, configurable from 1 to 32,
- **the low and high scale** allowing to define the format in which measurement will be expressed. The measure is available in unsigned integer 16 bits format. It is given in percentage of the scale previously defined.
- **the timeout**, defining the max time for the output value refreshing. The timeout can be activ or not if necessary, its value will be configured in ms between 0 and 60 s.

If the timeout is reached before the output value is refreshed, the output will be put in security (configurable value in the output rubrics).

Note: this rubric is inactive on a CNL20-2/ES in converter mode.

3.3) Output:

The ouputs possibilities are:

on the CNL20-2/S
- current output (mA),
- voltage output (V).

on the CNL20-2/ES
- current output (mA),

For each selected output, it is necessary to configure the low scale and the high scale, the security value and for the CNL20-2/ES in converter mode, the response time and the limitation.

The security value is a value to witch the output is set when refresh time interval exceeds the configured timeout or, for the **CNL20-2/ES** in converter mode, in case of sensor breaking.

The limitation allows to bound the output signal swing to the configured output scales for all input signal values. Only security value goes beyond this function.

The response time is adjustable from 200 ms to 60 s.

4) CNL20-2/E or /ES input measure offset

Sometimes, it may be interesting to modify the measure by a simple terminal keyboard intervention.
It can be used in many situations as sensor aging, an input refinement as a result of magnifying effect...

To shift the measure, it is necessary:
- to be in measure mode,
- type on **"+"** or **"-"** to access the function,
- on terminal the display become:
  - **105.2 DC** measure value with offset,
  - **OFFSET 10** offset function, offset value.
- use keys **"+"** and **"-"** to adjust offset, measure is directly modified.
- type on **"ENTER"** to memorize offset.

This function is only possible for an input channel (CNL20-2/E) or for CNL20-2/ES channel in converter mode or input P.L.C.

When the device is not supplied or is in configuration mode, offset stay active.To reset offset, it is necessary to start **"OFFSET"** function, put this value to zero with the **"+"** and **"-"** keys, then validate by **"ENTER"**.
In offset control mode, when there is no action on **"+"**, **"-"** or **"ENTER"** keys during 30 s, the device leave the mode without keeping the adjusted offset.

5) ETL20 / STL20 card configuration

For the logical input / output card, there is no configuration. Only the channel address must be positioned with the switchs located on the card (See page "Front face and wiring for ETL20 / STL20")

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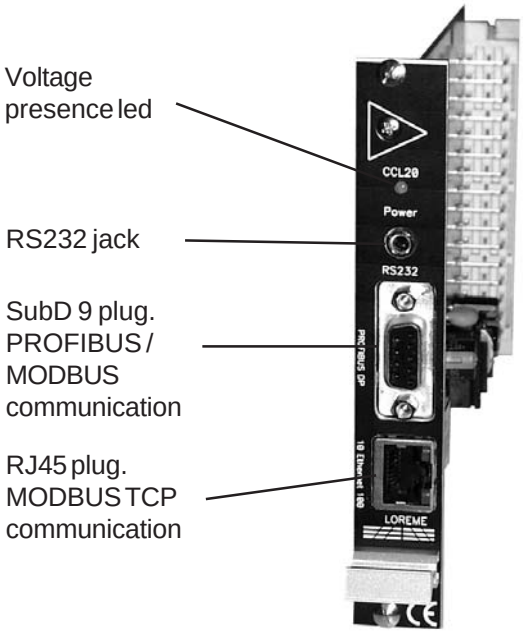
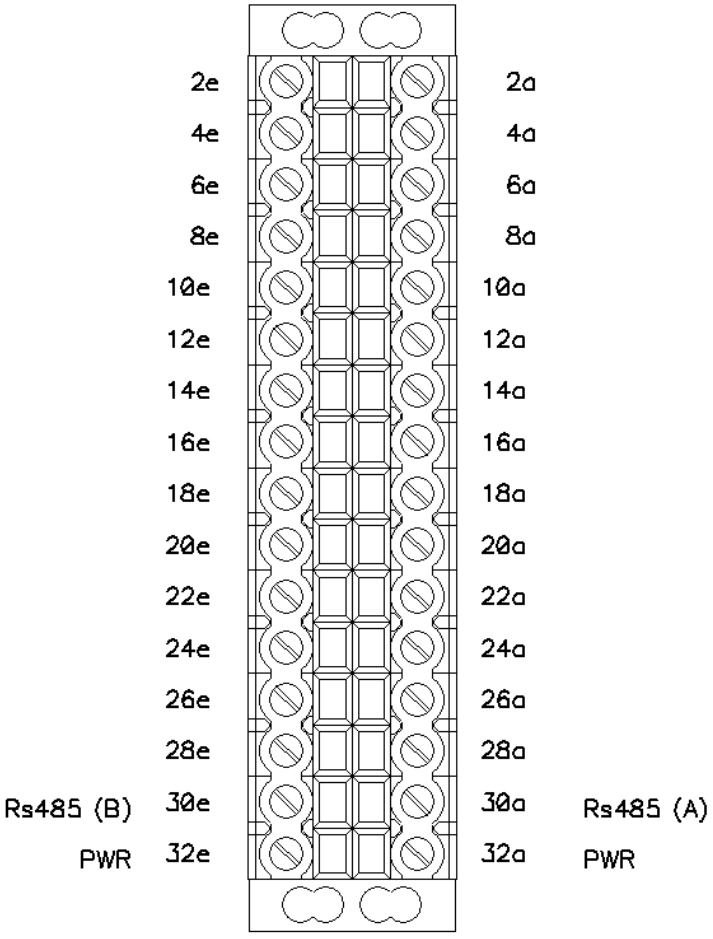
Front face and wiring

1) Front face



2) Wiring

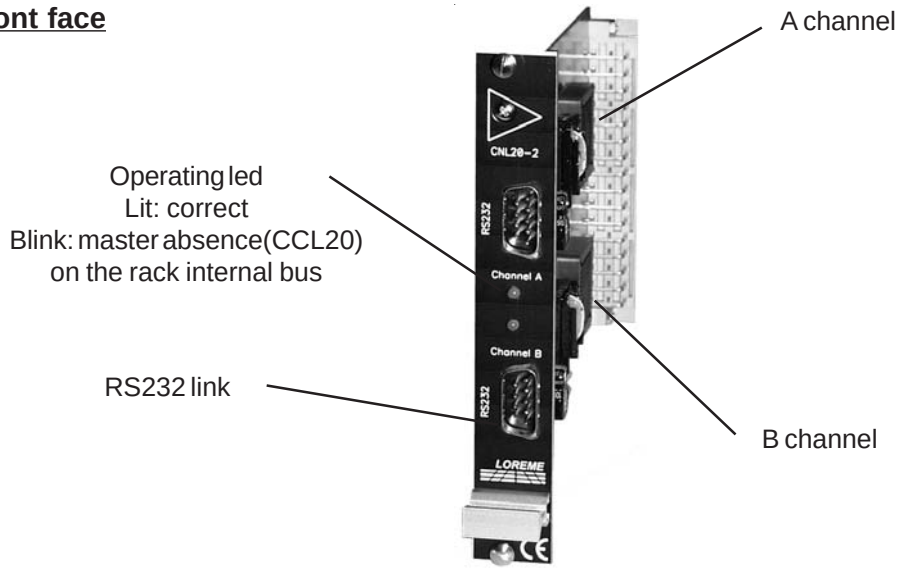


Power supply	32a, 32e
RS485 Internal bus	30a (A), 30e (B) (wired internal bus)

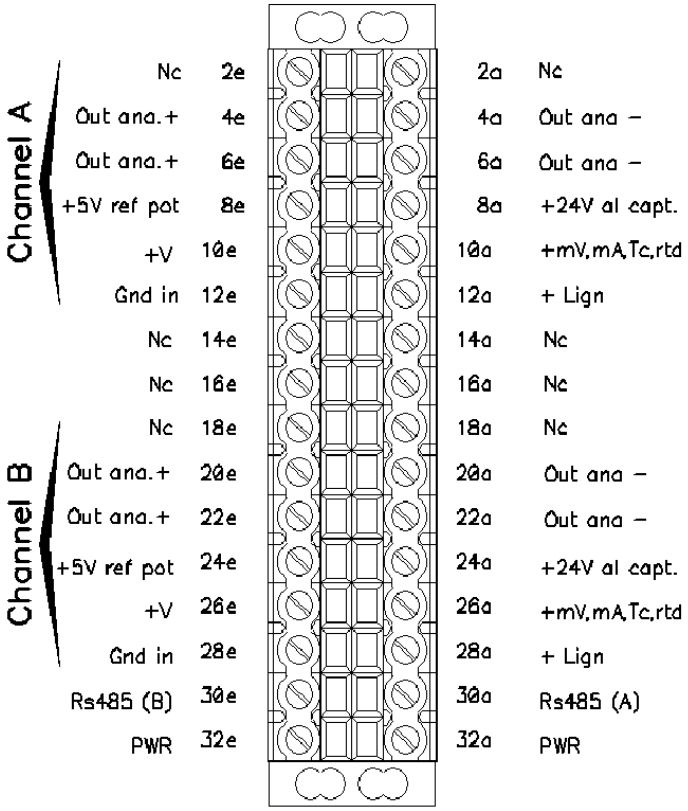
CNL20-2/E /S /ES

Front face and wiring

1) Front face



2) CNL20-2 ES wiring



Power supply	32a, 32e
RS485 internal bus	30a (A), 30e (B)

	Voie A	Voie B
mV, Tc input	10a(+), 12e(-)	26a(+), 28e(-)
Ohms input, Pt100 (2 wires)	10a/12a(+),12e(-)	26a/28a(+), 28e(-)
Ohms input , Pt100 (3 wires)	10a(+), 12a(lgn), 12e(-)	26a(+), 28a(lgn), 28e(-)
V input	10e(+), 12e(-)	26e(+), 28e(-)
Potentiometer input	8e(Réf), 10e(+), 12e(-)	24e(Réf), 26e(+), 28e(-)
mA input	10a(+), 12e(-)	26a(+), 28e(-)
Sensor power supply input	8a(+), 10a(-)	24a(+), 26a(-)
Digital output	4e-6e(+), 4a-6a(-)	20e-22e(+), 20a-22a(-)

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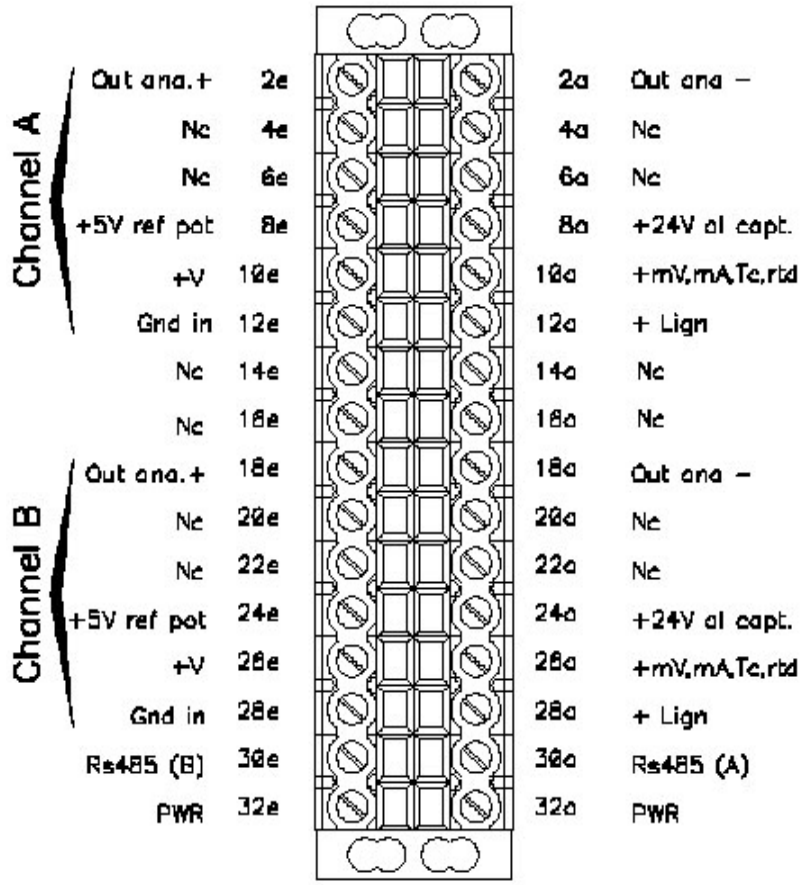
3) CNL20-2 E CNL20-2 S wiring



CNL20-2/E

Power supply	32a, 32e
RS485 internal bus	30a (A), 30e (B)

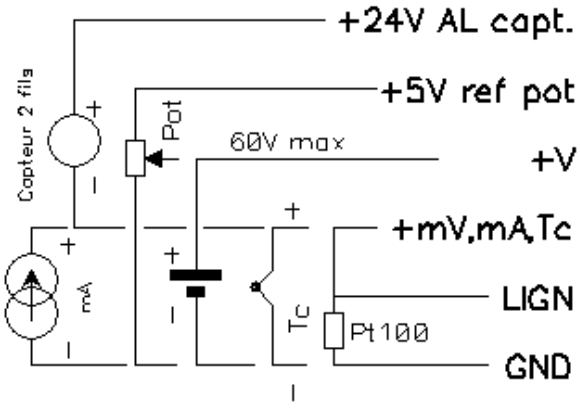
	A channel	B channel
mV, Tc input	10a(+), 12e(-)	26a(+), 28e(-)
Ohms input , Pt100 (2 wires)	10a/12a(+),12e(-)	26a/28a(+), 28e(-)
Ohms input, Pt100 (3 wires)	10a(+), 12a(lgn), 12e(-)	26a(+), 28a(lgn), 28e(-)
V input	10e(+), 12e(-)	26e(+), 28e(-)
Potentiometer input	8e(Réf), 10e(+), 12e(-)	24e(Réf), 26e(+), 28e(-)
mA input	10a(+), 12e(-)	26a(+), 28e(-)
Sensor power supply input	8a(+), 10a(-)	24a(+), 26a(-)

CNL20-2/S

Power supply	32a, 32e
RS485 internal bus	30a (A), 30e (B)

	A channel	B channel
Analog output	2e(+), 2a(-)	18e(+), 18a(-)

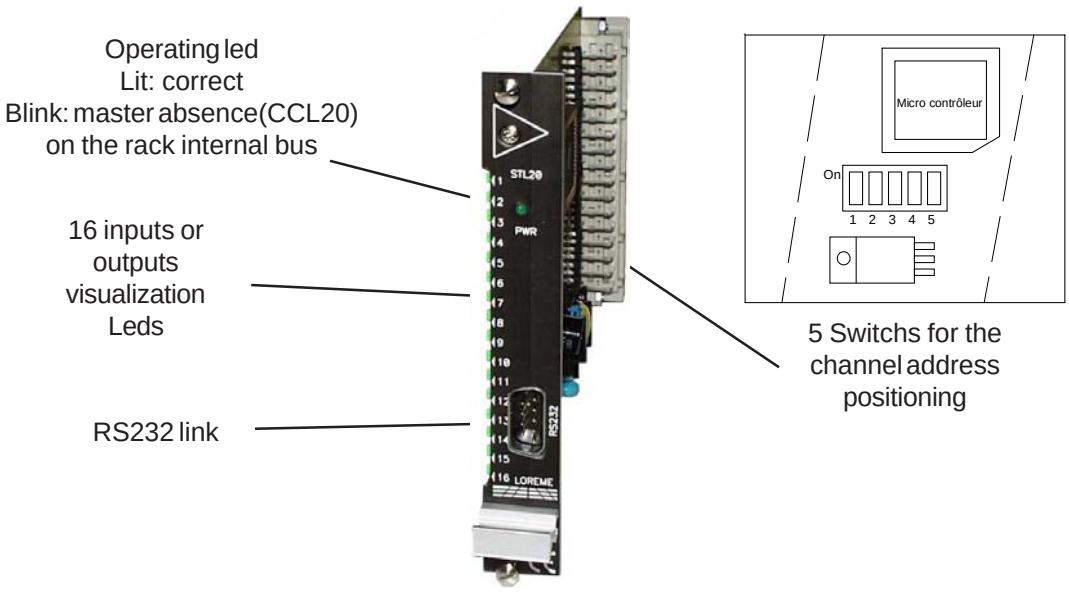
4) Wiring diagram



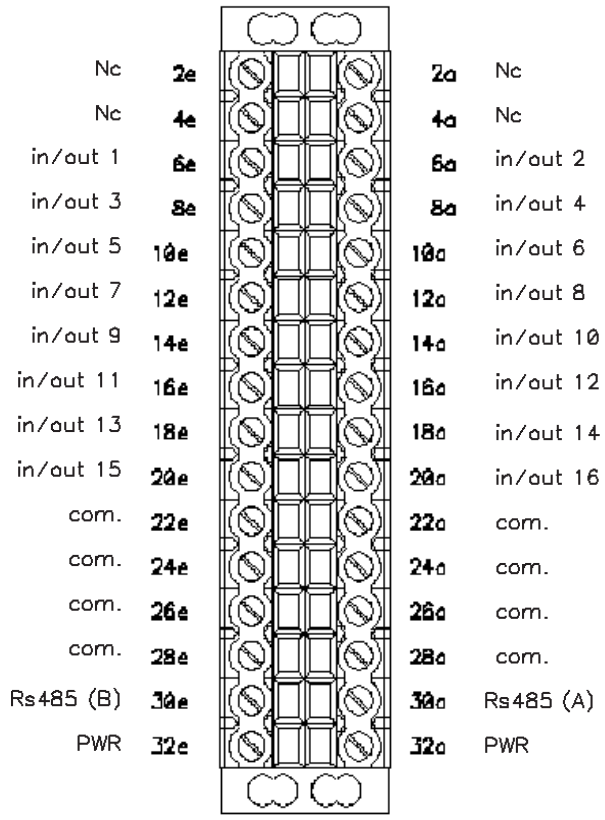
ETL20 / STL20

Front face and wiring

1) Front face



4) ETL20 and STL20 wiring



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ETL20 :

Power supply	32a, 32e
RS485 internal bus	30a (A), 30e (B)
Input (+):	
Input 1	6e
Input 2	6a
Input 3	8e
Input 4	8a
Input 5	10e
Input 6	10a
Input 7	12e
Input 8	12a
Input 9	14e
Input 10	14a
Input11	16e
Input 12	16a
Input 13	18e
Input 14	18a
Input 15	20e
Input 16	20a
Commun (-):	22a, 22e, 24a, 24e 26a, 26e, 28a ,28e

STL20 :

Power supply	32a, 32e
RS485 internal bus	30a (A), 30e (B)
Output (+):	
Output 1	6e
Output 2	6a
Output 3	8e
Output 4	8a
Output 5	10e
Output 6	10a
Output 7	12e
Output 8	12a
Output 9	14e
Output 10	14a
Output 11	16e
Output 12	16a
Output 13	18e
Output 14	18a
Output 15	20e
Output 16	20a
Commun (-):	22a, 22e, 24a, 24e 26a, 26e, 28a ,28e

4) Adress switchs:

5 switchs allow to position the channel address to a value between 1 and 32:

Switchs					Address
1	2	3	4	5	
					1
X					2
	X				3
X	X				4
		X			5
X		X			6
	X	X			7
X	X	X			8
			X		9
X			X		10
	X		X		11
X	X		X		12
		X	X		13
X		X	X		14
	X	X	X		15
X	X	X	X		16

Switchs					Address
1	2	3	4	5	
				X	17
X				X	18
	X			X	19
X	X			X	20
		X		X	21
X		X		X	22
	X	X		X	23
X	X	X		X	24
			X	X	25
X			X	X	26
	X		X	X	27
X	X		X	X	28
		X	X	X	29
X		X	X	X	30
	X	X	X	X	31
X	X	X	X	X	32

X : Position of switch in **ON**

CCL20 - Configuration by WEB page - Telnet - DOS

1) Adresse IP change for the modbus tcp use:

Two possible cases:
- you know the current IP adress: => see paragraphs 2 or 3
- you don't know the IP adress: => see paragraph 4

2) Configuration by WEB page:

WARNING: - Tested material on Java virtual device from Sun Microsystems, downloadable on www.sun.com
- The network mask of your computer must be configured in order to be in the same range as the device (ex: if the computer address is: 192.168.0.10, the mask will be: 255.255.255.0)

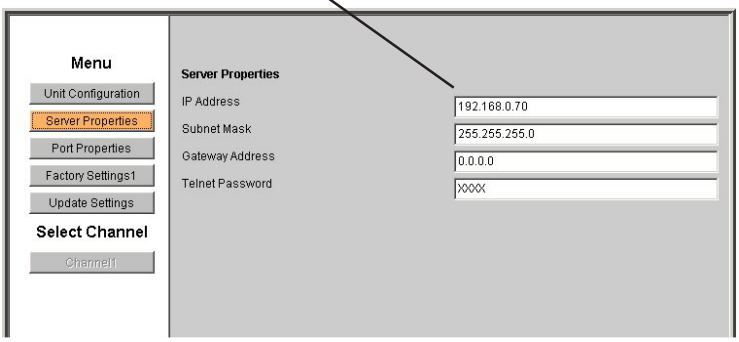
- Under windows, open the Internet Explorer programm.

- Entrer the IP adress of the concentrator (Default adress in factory output: 192.168.0.253) in the adress bar.

- The configuration window displayed then:

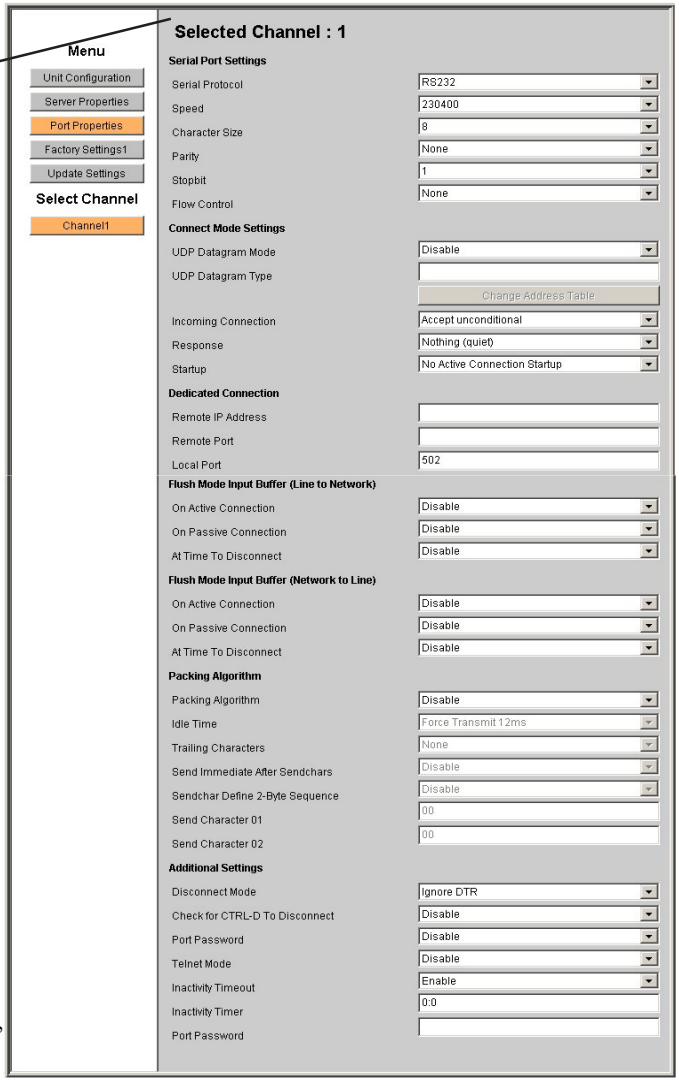
- Choose the section "Server Properties"

- An other configuration window display allowing the IP adress change and the network mask.



- Valid the change while clicking on "Update Settings".

Figure: 1



2.1) Return to the original configuration:

If you inopportunely changed a parameter making the device unusable, you can return to the original configuration.

Warning: This handling don't modifies the IP address neither the mask nor the bridge address!

- Click on "Factory Settings".

- Click on "Port Properties",

- Change the"**serial port settings**" in: 230400, 8bit, 1stop, without parited, without flow control.

- Change the "**local port**" in: 502

- Now, all parameters must correspond to the figure 1, if not the CCL20 will be inoperate.

- Click on "Update Settings" to memorize the new configuration.

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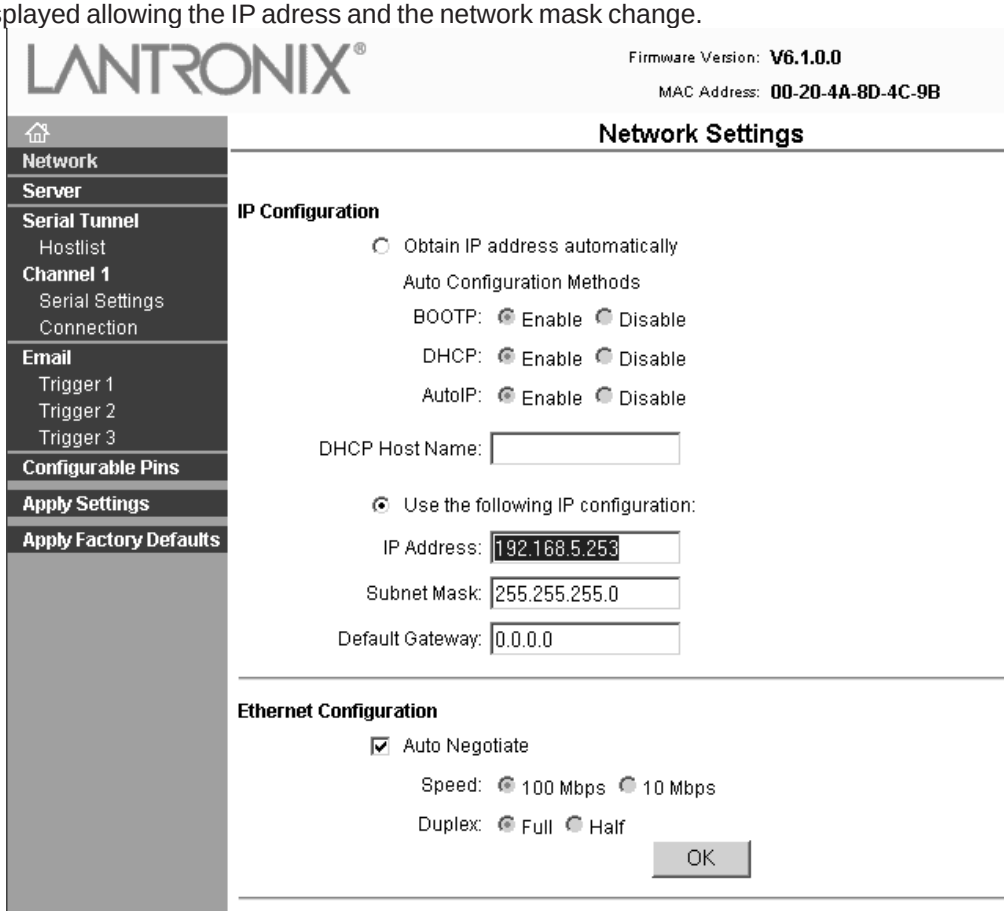
3) <u>Configuration by WEB page (New presentation):</u>

- Under windows, open Internet Explorer program. Enter the concentrator IP adress (Default adress on factory output: 192.168.0.253) in the adress bar.

- A window appear and ask for pass word and user name. **DON'T WRITE ANY NAME!**
PRESS ENTER TO CONTINUE.

- The configuration window displayed is then:

- Choose the section "Network"
- An other configuration window is displayed allowing the IP adress and the network mask change.



- Enter the new parameters.
- Push the "**OK**" button
- A message "Done!" appear temporarily

To finish:
Validate the change by clicking on "Apply Settings".

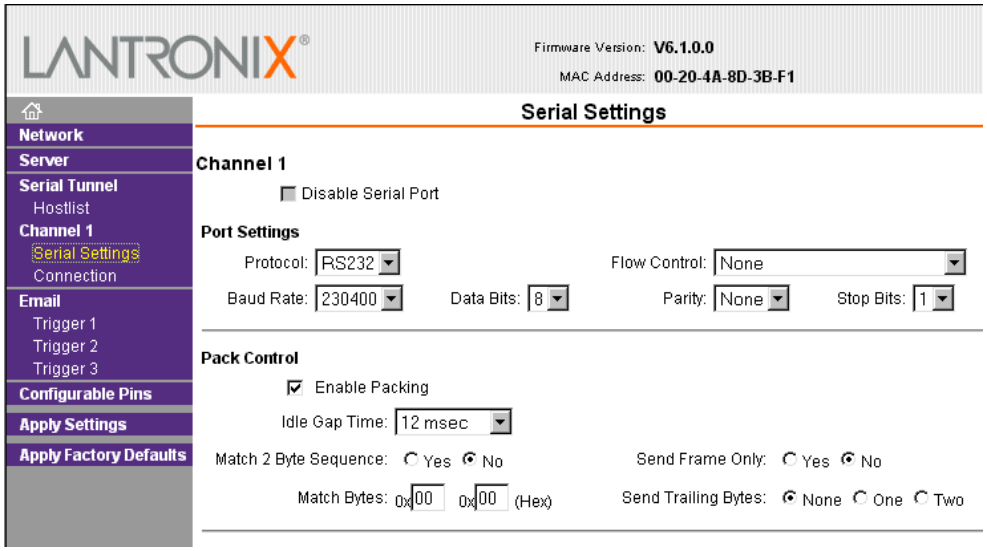
3.1) Return to original configuration:

If you accidentally changed a parameter making the device unusable, you can return to the original configuration. This handling don't modifies the IP address neither the mask nor the bridge address!

- Click on "**Apply Factory Settings**".

- Click on "**Chanel 1 / Serial settings**",
- In the part "**Port Settings**",
put the values:
- Protocol : RS232
- Baud Rate : 230400
- Data Bits: 8
- Parity : None
- Stop Bit: 1
- Flow Control: None

- In the part "**Pack Control**",
- Validate"**Enable Packing**" case
put the value :
- Idle Gap Time : 12 ms



- Press the **"OK"** button

- Click on "**Chanel 1 / Connection**". In the part "**Endpoint Configuration**", put the values:
- Local port: 502

- Push on the button "**OK**"
- Click on "**Apply Settings**" to memorize the new configuration.

4) Telnet configuration

In the DOS command window type the following command:

telnet xxx.xxx.xxx.xxx 9999 (xxx.xxx.xxx.xxx represent the concentrator IP adress, ex:"telnet 192.168.0.253 9999")

Once connection success, type ENTER to access configuration.
After the current parameters summary display, a menu is displayed:

Change setup:
0 Server configuration
1 Channel 1 configuration
2 E-mail setting
5 Expert setting
6 security
7 Factory defaut
8 Exit without save
9 Save and exit **Your choice?**

Type 0 to change the IP adress and/or the network mask.
To finish type 9 to load the changes or 8 to quit without changes.
Warning: In all cases it's important not to modify the other parameters.

5) IP address recovering by DOS commands :

This method allows to temporarily allot an IP address to the concentrator in order to configure it correctly.
Before to begin it is necessary to unmount the CCL20 from the rack to read MAC adress which is whriten the RJ45 plug. (this adress is 00-20-4A-80-3D-58 type).
Mount the concentrator in the rack and power it up.

- Open a DOS command windows, type the command:
ARP -s 192.168.0.253 00-20-4A-80-3D-58 (192.168.0.253 represent the new IP address)

- Etablish a connection by telnet on the port 1 by typing:
telnet 192.168.0.253 1 (This command must failed)

- Etablish a new connection with telnet (paragraph 3) or by internet explorer (paragraph 2) to configure the new IP adress

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CCL20 - Modbus exploitation

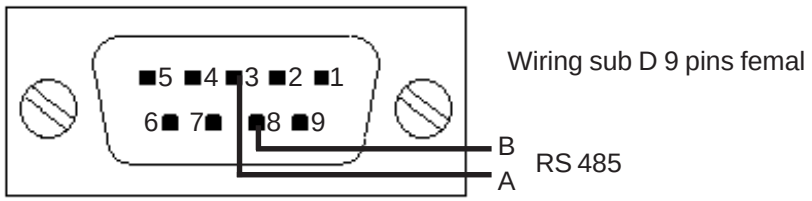
The protocol type used is Modbus in RTU mode .
The functions accepted by the concentrator are:
- words reading, code 03 ou 04
- words writing, code 06, 16 ($10 hexa)
-reading/writing, code 23 ($17 hexa)

The datas to read are consecutive and are classified by channel distribution order in the rack.
Other informations on the communication protocol are available on www.modbus.org

1) Characteristics:

Network:	MODBUS
Link:	RS485
Speed:	4800,9600,19200 bds
Protocol:	Modbus
Connector:	SubD 9 pins
Reading request:	Function code 03,04
Writing request:	Function code 06,16
Reading/Writing request:	Function code 23
Datas:	32 status words for maxi 32 channels, 32 input words for maxi 32 input channels, 32 output words for maxi 32 output channels.
Datas format:	Binary for status
Input/Output:	Unsigned 16 bits integer relative to a scale defined for the channel in local configuration.

2) Modbus wiring description:



Wiring sub D 9 pins femal

3) User data description:

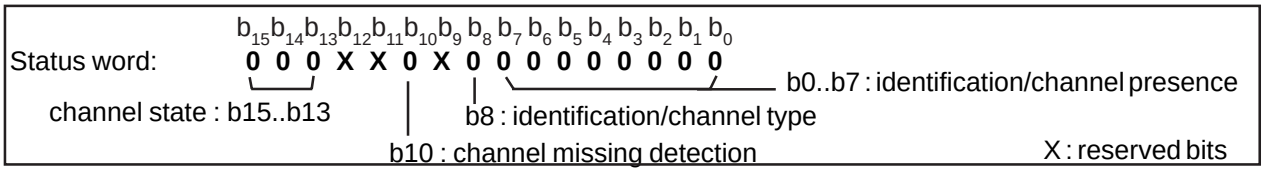
Three table are available for user:
A read access table for the channel control data. A read access table for the inputs channels measure datas. A read access table for the output values of the output channels.

3-1) Control datas:

The control datas are adressable from 1000 to 101f in hexadecimal, from 4096 to 4127 in decimal.

Hexa address	Decimal address	Data	Format
$1000	4096	Channel 1 control	16 bits
$1001	4097	Channel 2 control	16 bits
.....	.....	.....	.....
$101e	4126	Channel 31 control	16 bits
$101f	4127	Channel 32 control	16 bits

For each channel the status word signal its presence, identifies it by its address and type, and specifies its operating state:



- **identification/channel presence**,
  - Channel present : b10 = 0 and b0...b7 = channel address
  - Missing channel or address conflict: b10 = 1 and b0...b7 = 0
- **identification/channel type**,
  - Input channel: b8 = 1
  - Output channel: b8 = 0
- **Operating state of an input channel**,
  - Normal operating of the channel: b13, b14, b15 = 0
  - +/-10% scale overflow : b13 = 1
  - Sensor breaking / measure overflow: b14 = 1
  - Internal default : b15 = 1

- **Operating state of an output channel** ,
  - Normal operating of the channel : b14, b15 = 0
  - Starting phase, output value set to 0% of scale : b14 = 1
  - Security timeout, channel not refreshed in time, output is positionned in security value (timeout and security value configurable by RS232). b15 = 1

3-2) <u>Read table of inputs channels:</u>

Data measurement are addressable from 1020 to 103f in hexadecimal, from 4128 to 4159 in decimal.

Hexa address	Decimal address	Data	Format
$1020	4128	Channel 1 measure	16 bits
$1021	4129	Channel 2 measure	16 bits
.....	.....	.....	.....
$103e	4158	Channel 31 measure	16 bits
$103f	4159	Channel 32 measure	16 bits

Coding: The inputs channel values are given in points on 16 bits. They correspond to measure position relative to the scale defined in the communication menu in local configuration.

3-3) <u>Write table of outputs channels:</u>

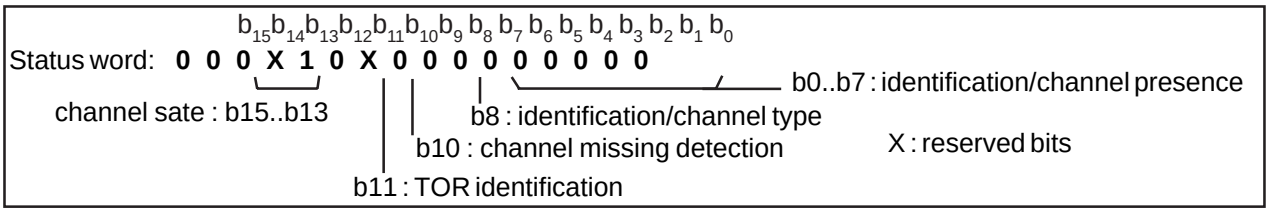
Output data are addressable 1040 to 105f in hexadecimal, from 4160 to 4191 in decimal.

Hexa address	Decimal address	Data	Format
$1040	4160	Channel 1 measure	16 bits
$1041	4161	Channel 2 measure	16 bits
.....	.....	.....	.....
$105e	4190	Channel 31 measure	16 bits
$105f	4191	Channel 32 measure	16 bits

Coding: The outputs channels values are given in points on 16 bits. They correspond to output position relative to the scale defined in the communication menu in local configuration.

3-4) <u>Control data for digital Input / Output channel:</u>

The control data are addressable from 1000 to 101f in hexadecimal, from 4096 to 4127 in decimal.



- **identification/channel presence**,
  - Channel present : b10 = 0 et b0...b7 = channel address
  - Channel missing or address conflict: b10 = 1 et b0...b7 = 0
- **identification/type voie**,
  - TOR input channel: b11 = 1 et b8 = 1
  - TOR output channel: b11 = 1 et b8 = 0
- **Digital input channel operating state**,
  - Normal operating channel : b15 = 0
  - Internal default : b15 = 1
- **Digital output channel operating state**,
  - Normal operating channel : b13, b14, b15 = 0
  - Starting phase, Positioned output value to 0. b14 = 1
  - Security timeout, Channel not refreshed in time, output is positionned to 0. b15 = 1
  - Internal default: b13 = 1

3-5) <u>Read table of digital inputs channels:</u>

Data measurement are addressable from 1020 to 103f in hexadecimal, from 4128 to 4159 in decimal.
Coding: Input digital state are given on 16 bits. Each bit correspond to a digital input: bit0 = input 1, bit1 = input 2, ...bit15 = input 16.

3-6) <u>Write table of digital outputs channels:</u>

Output data are addressable from 1040 to 105f in hexadecimal, from 4160 to 4191 in decimal.
Coding: Output digital state are written on 16 bits. Each bit correspond to a digital output : bit0 = output 1, bit1 = output 2, ...bit15 = output 16.

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CCL20 - Modbus/TCP exploitation

Protocol type used is ModbusTCP.
Functions accepted by concentrator:
- word reading, code 03 ou 04
- word writing, code 06, 16 ($10hexa)
- reading/writing, code 23 ($17hexa)

The datas to read are consecutive and are classified by channel distribution order in the rack.
Other informations on the communication protocol are available on www.modbus.org

1) Characteristics:

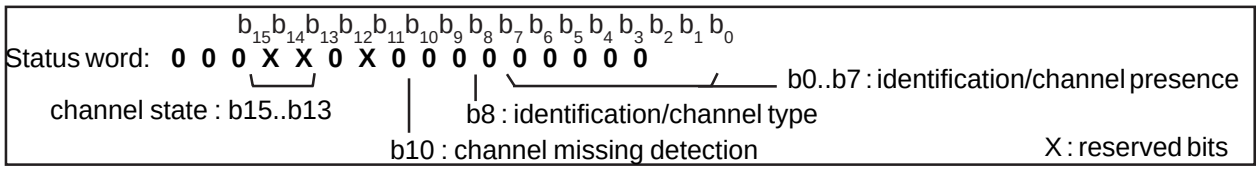
Network:	MODBUS TCP
Link:	Ethernet
Speed:	10/ 100 base T
IP address by default:	192.168.0.253
Port:	502 in exploitation, administration WEB page
IP protocol :	Modbus TCP
Connector:	RJ45
Reading request:	Code fonction 03,04
Writing request:	Code fonction 06,16
Reading/Writing request:	Code fonction 23
Datas:	32 states words for maxi 32 channels, 32 input word for maxi 32 input channel, 32 output words for maxi 32 output channel.
Datas format:	Binary state
Input/Output:	In unsigned 16 bits integer relative to a scale defined for the channel in local configuration.

2) User data description:
Three table are available for user:
A read access table for the channel control data. A read access table for the inputs channels measure datas. A read access table for the output values of the output channels.

2-1) Control datas:
The control datas are adressable from 1000 to 101f in hexadecimal, from 4096 to 4127 in decimal.

Hexa address	Decimal address	Data	Format
$1000	4096	Channel 1 control	16 bits
$1001	4097	Channel 2 control	16 bits
.....	.....	.....	.....
$101e	4126	Channel 31 control	16 bits
$101f	4127	Channel 32 control	16 bits

For each channel the status word signal its presence, identifie it by address and type, and specifies its operating state:



- **identification/channel presence**,
  - Channel present : b10 = 0 and b0...b7 = channel address
  - Missing channel or address conflict: b10 = 1 and b0...b7 = 0
- **identification/channel type** ,
  - Input channel: b8 = 1
  - Output channel: b8 = 0
- **Operating state of an input channel**,
  - Normal operating of the channel: b13, b14, b15 = 0
  - +/-10% scale overflow : b13 = 1
  - Sensor breaking / measure overflow: b14 = 1
  - Internal default : b15 = 1

- **Operating state of an output channel** ,
  - Normal operating of the channel : b14, b15 = 0
  - Starting phase, output value set to 0% of scale: b14 = 1
  - Security timeout, channel not refreshed in time, output is positionned value in security value (timeout and safety value configurable by RS232). b15 = 1

2-2) <u>Read table of inputs channels:</u>

Data measurement are addressable from 1020 to 103f in hexadecimal, from 4128 to 4159 in decimal.

Hexa address	Decimal address	Data	Format
$1020	4128	Channel 1 measure	16 bits
$1021	4129	Channel 2 measure	16 bits
.....	.....	.....	.....
$103e	4158	Channel 31 measure	16 bits
$103f	4159	Channel 32 measure	16 bits

Coding: The inputs channel values are given in points on 16 bits. They correspond to measure position relative to the scale defined in the communication menu in local configuration.

2-3) <u>Write table of outputs channels:</u>

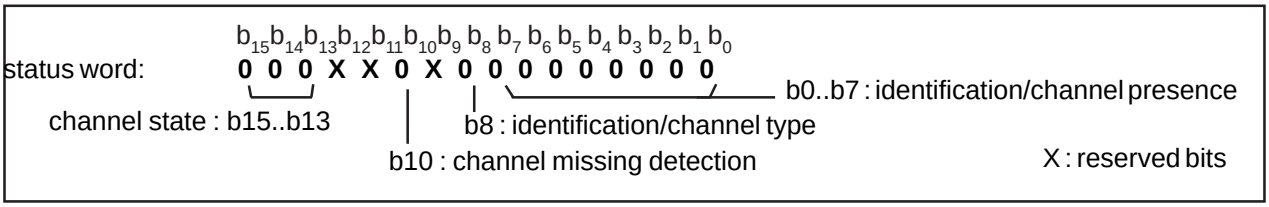
Output data are addressable 1040 to 105f in hexadecimal, from 4160 to 4191 in decimal.

Hexa address	Decimal address	Data	Format
$1040	4160	Channel 1 measure	16 bits
$1041	4161	Channel 2 measure	16 bits
.....	.....	.....	.....
$105e	4190	Channel 31 measure	16 bits
$105f	4191	Channel 32 measure	16 bits

Coding: The outputs channels values are given in points on 16 bits. They correspond to output position relative to the scale defined in the communication menu in local configuration.

2-4) <u>Control data for digital Input / Output channel:</u>

Thestatus data are addressable from 1000 to 101f in hexadecimal, from 4096 to 4127 in decimal.



- **identification/channel presence**,
  - Channel present : b10 = 0 et b0...b7 = channel address
  - Channel missing or address conflict: b10 = 1 et b0...b7 = 0
- **identification/type voie**,
  - TOR input channel: b11 = 1 et b8 = 1
  - TOR output channel: b11 = 1 et b8 = 0
- **Digital input channel operating state**,
  - Normal operating channel : b15 = 0
  - Internal default : b15 = 1
- **Digital output channel operating state**,
  - Normal operating channel : b13, b14, b15 = 0
  - Starting phase, Positioned output value to 0. b14 = 1
  - Security timeout, Channel not refreshed in time, output is positionned to 0. b15 = 1
  - Internal default: b13 = 1

2-5) <u>Read table of digital inputs channels:</u>

Input datas are addressable from 1020 to 103f in hexadecimal, from 4128 to 4159 in decimal.
Coding: Input digital state are given on 16 bits. Each bit correspond to a digital input: bit0 = input 1, bit1 = input 2, ...bit15 = input 16.

2-6) <u>Write table of digital outputs channels:</u>

Output datas are addressable from 1040 to 105f in hexadecimal, from 4160 to 4191 in decimal.
Coding: Output digital state are written on 16 bits. Each bit correspond to a digital output : bit0 = output 1, bit1 = output 2, ...bit15 = output 16.

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CCL20 - Profibus exploitation

CCL20 concentrator behaves like a DP slave. It accepts bus speeds from 9600bds to 1.5Mbds.
A female subD plug in front face is used for the profibus cable connection.

All changes on the network parameters must be done by a local reconfiguration.

1) Charactéristics:

Network:	PROFIBUS
Link:	RS485
Speed:	9600, 19200, 93.75K, 187.5K, 0.5M, 1.5M
Protocol:	PROFIBUS DP
Connector:	SubD 9 broches
Datas:	32 status words for maxi 32 channels, 32 input words for maxi 32 input channels, 32 output words for maxi 32 output channels.
Datas format:	Binary status
Input/Output:	In unsigned 16 bits integer relative to a scale defined for the channel in local configuration.

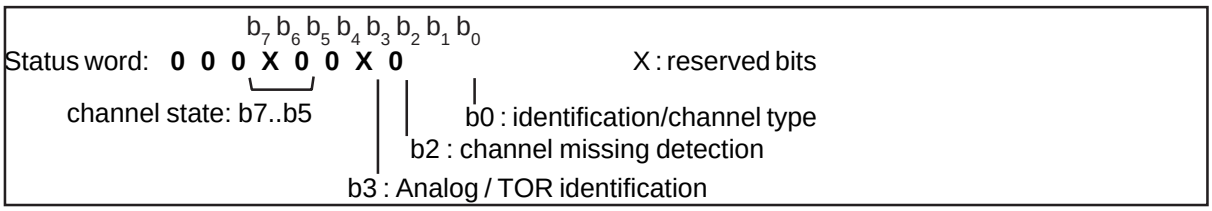
2) Implementation:

To use the concentrator we must first import the GSD file which can be find on: www.loreme.fr

The CCL20 configuration consist of :

- 32 output words (value on 1 word corresponding either to the output position relative to channel configured scale, or to the digital outputs states)
- 32 inputs bytes (channel control byte)
- 32 inputs words (value on 1 word corresponding either to the measure or the channel output value, or to the Tdigital input states)

2-1) Status byte :



- **identification/channel presence**,
  - Channel present : b2 = 0
  - Missing channel or address conflict: b2 = 1
- **identification/channel type**,
  - Analog input channel: b3 = 0 et b0 = 1
  - Analog output channel: b3 = 0 et b0 = 0
  - Digital input channel: b3 = 1 et b0 = 1
  - Digital output channel: b3 = 1 et b0 = 0
- **Operating state for an input channel**,
  - Normal operating of the channel: b5, b6, b7 = 0
  - +/-10% scale overflow : b5 = 1
  - Sensor breaking / measure overflow: b6 = 1
  - Internal default : b7=1
- **Operating state for an output channel** ,
  - Normal operating of the channel : b6, b7 = 0
  - Starting phase, output value set to 0% of scale: b6 = 1
  - Security timeout, channel not refreshed in time, output is positionned value in security value (timeout and safety value configurable by RS232). b7 = 1
- **Operating state for a digital input**,
  - Normal operating channel : b7 = 0
  - Internal default : b7 = 1
- **Operating state for a digital output**,
  - Normal operating channel : b5, b6, b7 = 0
  - Starting phase, Positionned value to 0. b6 = 1
  - Security timeout, channel not refreshed in time, output value is positionned to 0 b7 = 1
  - Internal default: b5 = 1

2-2) TOR input channel reading

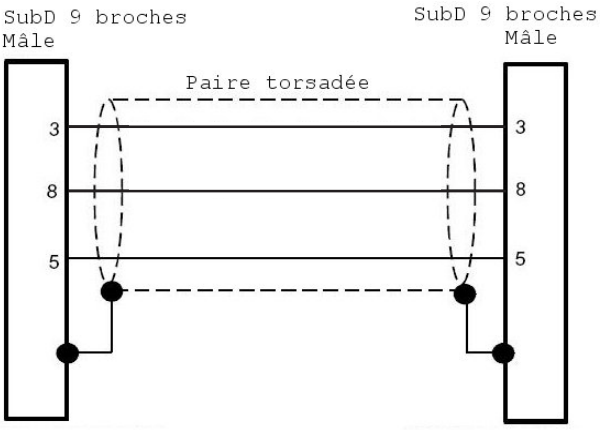
TOR input state is given,on 16 bits. Each bit correspond to a TOR input:
bit0 = input 1, bit1 = input 2, ...bit15 = input 16.

2-3) TOR output channel writing:

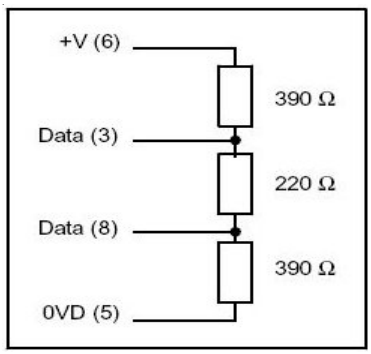
TOR output state is written on16 bits. Each bit correspond to a TOR output:
bit0 = output 1, bit1 = output 2, ...bit15 = output 16.

3) PROFIBUS wiring description:

Cable wiring:



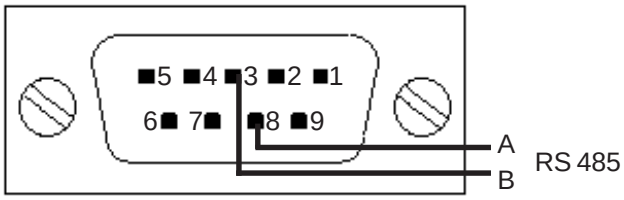
Endpoint resistance :



Profibus cable cahracteristics

Characteristics	Miniimum value	Nominal value	Maximum value	Comment
Impedance		150Ω		3 à 20 MHz
Wire Section	0.34 mm²			
Capacity(between lines)			30pF/m	
Capacity (line/ Casing)			75pF/m	
Resistance			110Ω/km	
Line lenght			400m	@ 500Kbit/sec
			200m	@ 1.5Mbit/sec

Female pins SubD 9 wiring



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EMC CONSIDERATION

1) Introduction:

IIn order to satisfy its policy as regards EMC, based on the Community directive 89/336/CE, the LOREME company takes into account the standards relative to this directive from the very start of the conception of each product.
As the devices are devised to work in industrial environments, the various tests are carried out in the sight of the EN 50081-2 and EN 50082-2 standards, in order to make out a statement of conformity.
As the devices lie in certain typical configurations during the tests, it is not possible to secure the outcomes in any possible configuration. To ensure the best functionning of each device, it would be judicious to comply with several recommendations of use.

2) Recommendations of use:

2.1) General remarks:

- Comply with the recommendations of assembly indicated in the technical sheet (direction of assembly, spacing between the devices, ...).
- Comply with the recommendations of use indicated in the technical sheet (temperature range, protection index).
- Avoid dust and excessive humidity, corrosive gas, considerable sources of heat.
- Avoid disturbed environments and disruptive phenomena or elements.
- If possible, group together the instrumentation devices in a zone separated from the power and relay circuits.
- Avoid the direct proximity with considerable power distance switches, contactors, relays, thyristor power groups, ...
- Do not get closer within fifty centimetres of a device with a transmitter (walkie-talkie) of a power of 5 W, because the latter can create a field with an intensity higher than 10 V/M for a distance fewer than 50 cm.

2.2) Power supply:

- Comply with the features indicated in the technical sheet (power supply voltage, frequency, allowance of the values, stability, variations ...).
- It is better that the power supply should come from a system with section switches equipped with fuses for the instrumentation element and that the power supply line be the most direct possible from the section switch.
- Avoid using this power supply for the control of relays, of contactors, of electrogates, ...
- If the switching of thyristor statical groups, of engines, of speed variator, ... causes strong interferences on the power supply circuit, it would be necessary to put an insulation transformer especially intended for instrumentation linking the screen to earth.
- It is also important that the installation should have a good earth system and it is better that the voltage in relation to the neutral should not exceed 1V, and the resistance be inferior to 6 ohms.
- If the installation is near high frequency generators or installations of arc welding, it is better to put suitable section filters.

2.3) Inputs / Outputs:

- In harsh conditions, it is advisable to use sheathed and twisted cables whose ground braid will be linked to the earth at a single point.
- It is advisable to separate the input / output lines from the power supply lines in order to avoid the coupling phenomena.
- It is also advisable to limit the lengths of data cables as much as possible.