

CONFIGURATION HANDBOOK

CAN105 CAN105BCD



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Device Presentation

The CAN105 is an analog to digital converter providing the transfer of an input signal (4...20 mA) on a parallel digital outputs (in Gray, Binary, or BCD format). The LCD screen allows a quick diagnostic of the device (display of input current value, display range, display of the digital outputs state).

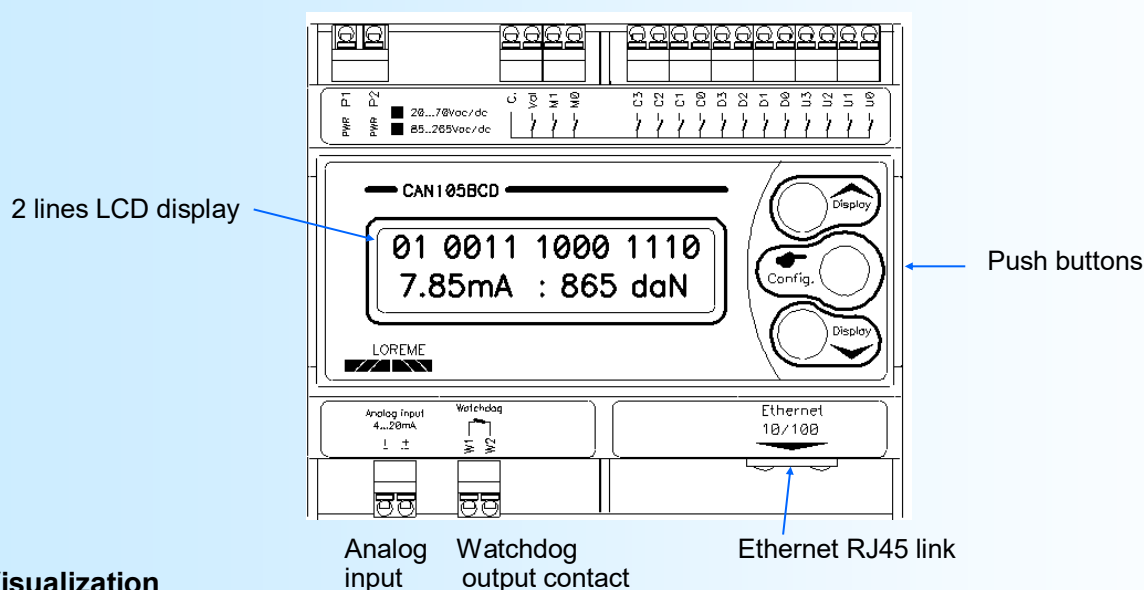
The device has different options:

- CAN105 : Configurable version : BCD, GRAY, BINARY
- CAN105BCD : 4...20 mA input, BCD output. Fixed version, specific customer code.
- CAN105xx/CMTCP : Ethernet MODBUS TCP link.

The technical data sheet is downloadable here: http://www.loreme.fr/fichtech/CAN105_eng.pdf

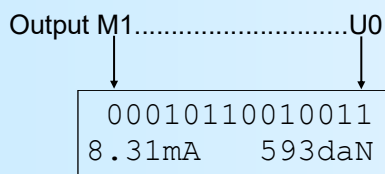
USER INTERFACE

Power supply Digital outputs (14 bits + validation + common)



Visualization

The CAN105 display the input current value, the display range value and the digital outputs state. The 'Display ▲ & ▼' buttons allows to display the output code in decimal instead of the binary code.



Configuration

The CAN105 is fully configurable via the front face. A press on the 'Config' button access to the configuration mode. A temporary message is displayed to show the device version (Revision Hard and Soft).

CONFIGURATION
ver 0.5

Note : The device leaves the configuration mode if no action are made within 90 seconds. It's only at the end of configuration that the new parameters are saved in memory.

Configuration via the front face

1) Protected configuration access

If the « Password » function is activated, entering a code is necessary to access the configuration.

MOT DE PASSE? ▲ & ▼ buttons to change the character.
 ---- (only alphanumeric characters are accepted: '0' to '9' and 'A' to 'Z').
 The 'Config' button validate the character.

The message 'CODE NON VALIDE!' is displayed if the password is wrong. The device return then to measure mode.

2) Outputs test

INSTALLATION? Press the ▲ button (Yes) to access the outputs test.
 (O-N) Press the ▼ button (No) to skip this menu.

Note: This topic allows you to test the outputs individually. When accessing the test, all output contacts are OFF except U0 which is ON. The output 'VAL' is active at state '1' during 80 ms and is at state '0' during 80 ms. The outputs are always updated during the '0' state of 'VAL'.

TEST SORTIES: Press the ▲ or ▼ button to change the active output.
 ->U0 = ON (the test order is: U0,U1,U2,U3,D0,D1,D2,D3,C0,C1,C2,C3,M0,M1)
 OK! The 'Config' button permit to leave the test and to return to measure mode.

The CAN105BCD version has a fixed configuration:
 4-20 mA input, BCD format, display range 0-2200 daN, output code 0-2200.
 This is why some configuration menu will not be accessible.

3) Input parameters configuration

CONFIG ENTREE? Press the ▲ button (Yes) to access to the input parameters.
 (O-N) Press the ▼ button (No) to skip this menu.

ECHELLE BASSE Low scale. Press ▲ to increase or ▼ to decrease the value.
 4.00mA 'Config' to validate the value (limits: 0 mA & 22 mA).

ECHELLE HAUTE High scale. Press ▲ to increase or ▼ to decrease the value.
 20.00mA 'Config' to validate the value (limits: 0 mA & 22 mA).

4) Output parameters configuration

CONFIG SORTIE? Press the ▲ button (Yes) to access to the output parameters.
 (O-N) Press the ▼ button (No) to skip this menu.

CODAGE A press on the buttons ▲ or ▼ allows you to choose the output format.
 BIN BCD <GRAY> 'Config' to validate the choice.

SIGNE? Allows you to choose the sign of the output code.
 OUI <NON>

RESOLUTION: Sets the number of output bits.
 14BIT

CODE 0%: Selects the output code when the input corresponds to the low measurement scale.
 0

CODE 100%: Selects the output code when the input corresponds to the high measurement scale.
 16383

LOGIQUE Choose the type of logic: normal or reversed.
 <NORMAL>INVERSE

Note:

The <normal> logic defines an output contact that is open at rest and closed when the output is active. <Reverse> logic defines an output contact that is closed at rest and open when the output is active.

GAMME AFFICHAGE? (O-N)	Press the ▲ button (Yes) to access to the display range parameters. Press the ▼ button (No) to skip this menu.
UNITE : %	3 characters for the display range unit.
NB DECIMALE : 1	Set the number of displayed decimals.
GAMME BASSE 0%	Set the displayed value when the input current is the low range.
GAMME HAUTE 100.0%	Set the displayed value when the input current is the high range.
FILTRE MESURE? (O-N)	Press the ▲ button (Yes) to access to the response time setting. Press the ▼ button (No) to skip this menu.
FILTRE MESURE 1.0 sec	Permits to filter the input current measure by setting the response time.

5) Configuration of the measurement rate

ECHANTILLONAGE? (O-N)	Press the ▲ button (Yes) to access to the rubric. Press the ▼ button (No) to skip this menu.
CYCLE DE MESURE? <25/s> 50/s	Allows you to choose the measurement rate, 25 or 50 measurements per second.

6) Configuration of measure filter and outputs refresh rate

FILTRE MESURE? (O-N)	Press the ▲ button (Yes) to access to the rubric. Press the ▼ button (No) to skip this menu.
FILTRE MESURE ? 1.0 sec	Adjust the filter time for input measure
CYCLE SORTIES ? (O-N)	Choose the refresh rate for outputs.
ACTIVER FCT ? <OUI> NON	Activate or not the « output cycle » function. This function is used to slow down the refresh rate of outputs. This function is often used with the filter measure
CYCLE SORTIES ? 1s	Choose the refresh rate of outputs and Value between 0.1s and 10s. The 0 value deactivate the function (See the chronogram on page 12)

7) Configuration of the communication parameters

COMMUNICATION? (O-N)	Press the ▲ button (Yes) to access to the rubric. Press the ▼ button (No) to skip this menu.
ADRESSE IP? 192.168.000.253	Press the ▲ or ▼ buttons to modify the IP address fields. 'Config' button to validate the field and switch to the next. Default factory address is 192.168.0.253.
MASQUE IP? 255.255.255.000	Press the ▲ or ▼ buttons to modify the IP mask fields. 'Config' button to validate the field and switch to the next. Default factory mask is 255.255.255.0.

8) End of configuration

MEMORISATION

This message is display only when the user enter in COMMUNICATION menu.

OK! This message indicates that all the parameters have been successfully saved.

Note:

If, during the configuration process, no buttons are pressed for more than 90 s, the device returns to measure mode without saving the new configuration.

Watchdog output

The CAN105 has a Watchdog output contact that ensures the unit is operating normally. This contact is closed during normal operation. It opens in the following cases:

- No supply voltage,
- Internal fault of the device,
- Sensor break current measurement (measurement < 10% of the input scale, measurement < 2.4 mA for a 4-20 mA scale).

Offset

In some cases, it is interesting to be able to modify the measurement by a simple action on the buttons. To shift the measurement, simply hold down the buttons ▼ & 'Config' for at least 1 second.

The display becomes:

OFFSET: 0	Offset value.
8.31mA 593daN	Measure value with offset.

A press on the buttons ▲ or ▼ allows to modify the value of the offset. The 'Config' button is used to memorize this value. If no action has been performed on the buttons for 30 s, the CAN105 exits 'Offset' mode and ignores the changes.

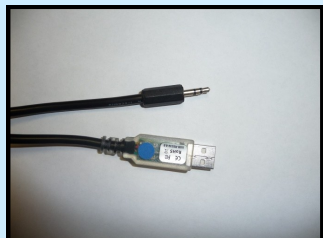
Note:

When the power is turned off, the offset remains active. To cancel the offset, simply call up the offset function, set the offset to zero and confirm with 'Config'.

RS232 link setting

The device can be configured or updated in terminal mode via an RS232 link.

Step 1: Driver installation for USB / RS232 adapter



- download driver at www.loreme.fr/download/ rubric accessories

- Click on executable file to install the driver,
- Plug the cable on a USB port, Windows install a new serial communication port **COMx** (x >= 4).

Note :

The use of the cable on another USB port don't generates a new communication port. Use of another adapter generates another communication port number (COMx) and requires the reconfiguration of the HyperTerminal.

Step 2: Setting of terminal emulation software (PC with windows).

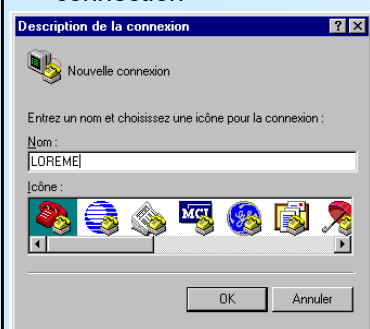
1 The terminal emulation software for PC « HyperTerminal » is resident in windows up to XP version. For later versions, it is downloadable on : **www.loreme.fr in download part** (www.loreme.fr/download/)

=> Run the downloaded software to install it.

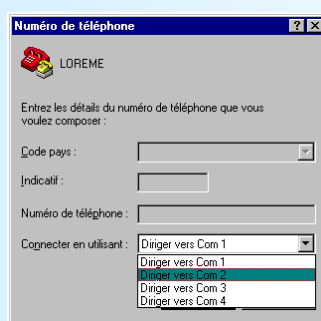
2 Start a "hyper Terminal" connection :

- Click on **"START"** button
- Go to **"All programs \ HyperTerminal Private Edition"**
- Click on **"HyperTerminal Private Edition"**

3 Enter name for the new connection

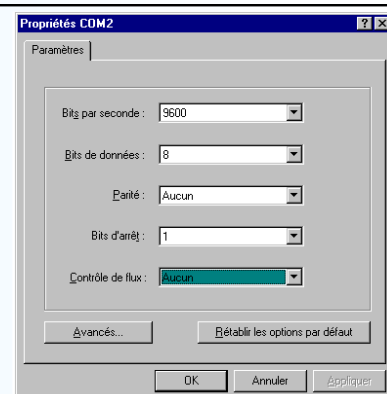


4 Choose the communication port related to the adapter.



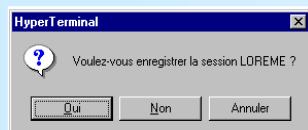
5

- Choose:
- 9600 bauds
 - 8 DATA bits
 - no parity
 - 1 stop bit
 - **XON/XOFF**



6 The PC is now in terminal mode, connect it to the device by plugging the RS232 cable. The measure is now displayed on the terminal. To access configuration, press 'C' key.

7 When leaving Hyper terminal, the following window will appear. By saving, the terminal session will start with the same configuration.



Thus, the shortcut **LOREME.ht** will permit to communicate with all LOREME devices.

Note: to modify the 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.

FIRMWARE update

To access to the firmware update function, you must first open an HyperTerminal session on a PC, connect the device to the PC with the RS232 link cable and then power on the device.

The following character is send to the terminal:

> <————— The device sends this character then it waits the « F » key during 0.5 s.

If the user has pressed the « F » key in the allowed time, the following message is displayed in the HyperTerminal windows:

FIRMWARE LOADER Rev2 READY TO TRANSFER...

The device is now in the firmware load mode and is waiting for the firmware file. This file is provide by LOREME and contain the firmware code in Intel HEX format.

Select the « Transfer », « Send a text file ... » in the HyperTerminal menu.
Select the directory and open the file. The HyperTerminal program begins to send the file to the device.

FIRMWARE LOADER Rev2 READY TO TRANSFER

***** <————— The star characters appears to show the progress of the uploading.

At the end, the message « **PROGRAMMING OK !** » is display if no errors occurs. Otherwise, these following message could be displayed:

- | | |
|-------------------------------|---|
| - SERIAL COM ERROR ! | Error during receipt. |
| - SERIAL TIMEOUT ! | Waiting time of receipt elapsed (60 s). |
| - PROGRAMMING FAILED ! | Programming error in the internal flash memory. |

Attention

*If an error occurs during the programming process, it is necessary to start again the whole procedure.
A bad programming leads to an inoperative device.*

MODBUS TCP communication

1) Feature

Protocol:	MODBUS TCP
Link:	Ethernet 10/ 100 base T
IP address by default:	192.168.0.253
Port:	502
Connector:	RJ45
Reading request:	function code 03,04
Write request:	Not supported
Type of data:	electrical measurement, status of outputs.
data format:	Measure in IEEE 32 bits floating point, outputs state in 16 bits format.

Note: The CAN105 only accepts one MODBUS TCP request at a time.

2) Data

2.1) Available data

All measures are accessible in reading mode. Data's are available in different formats:

- 2 words, 4 bytes, for measures in the 32 bits IEEE floating point format.
- 2 words, 4 bytes, for the binary outputs state.

2.2) Format of data

- Data in 32 bits IEEE floating point format
- Data send Most Significant Byte first (word 1: sign + exponent + mantissa MSB, word 2: mantissa)



- Data in 16 bits integer format for outputs state.
- Data send MSB first.

Byte 1		Byte 2			
15	MSB	8	7	LSB	0
				Bit 15: Measure default	Bit 5 : D1 output
				Bit 13: M1 output	Bit 4 : D0 output
				Bit 12: M0 output	Bit 3 : U3 output
				Bit 11: C3 output	Bit 2 : U2 output
				Bit 10: C2 output	Bit 1 : U1 output
				Bit 9 : C1 output	Bit 0 : U0 output
				Bit 8 : C0 output	
				Bit 7 : D3 output	
				Bit 6 : D2 output	

2.3) Exception frame

If the slave receive an corrupted frame (CRC16 or parity), it doesn't answer. If it is a frame error (data address, function, value), the slave send a exception frame. The exception frame is a 5 bytes frame long.

Details of the exception frame: The function code of the exception frame is identical to the question frame, but this MSB bit is set to 1. The error code indicate the reason of the exception frame

Error code	Details
\$01	Function code not allowed. Only the function code \$03 or \$04 are used by the INL100-150 (register reading function).
\$02	Data address not allowed
\$04	Slave busy. The internal communication slot is not in connection with the measure part.

3) Tables of measures

Register address in decimal (Hexadecimal)	Designation		Total words
100 (\$0064)	Input current (mA)	Word 1	1
101 (\$0065)		Word 2	2
102 (\$0066)	Display range value	Word 1	3
103 (\$0067)		Word 2	4
104 (\$0068)	Outputs state	Word 1	5

The current measure is in 32bits IEEE floating format
 The State of outputs is in 16bits integer format

4) Response time

The response time is the time between the transmission of the request and the receipt of the response by the master TCP Modbus. The CAN105 has a maximum response time of 35 ms. Since the module can only handle one TCP Modbus frame at a time, the time interval between two requests must be at least 40 ms (25 queries per second).

EMC Consideration

1) Introduction

To meet its policy concerning EMC, based on the Community directives **2014/30/EU** & **2014/35/EU**, the LOREME company takes into account the standards relative to this directives from the very start of the conception of each product.

The set of tests performed on the devices, designed to work in an industrial environment, are made in accordance with **IEC 61000-6-4** and **IEC 61000-6-2** standards in order to establish the EU declaration of conformity. The devices being in certain typical configurations during the tests, it is impossible to guarantee the results in every possible configurations. To ensure optimum operation 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 data sheet (direction of assembly, spacing between the devices, ...).
- Comply with the recommendations of use indicated in the technical data 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 centimeters 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

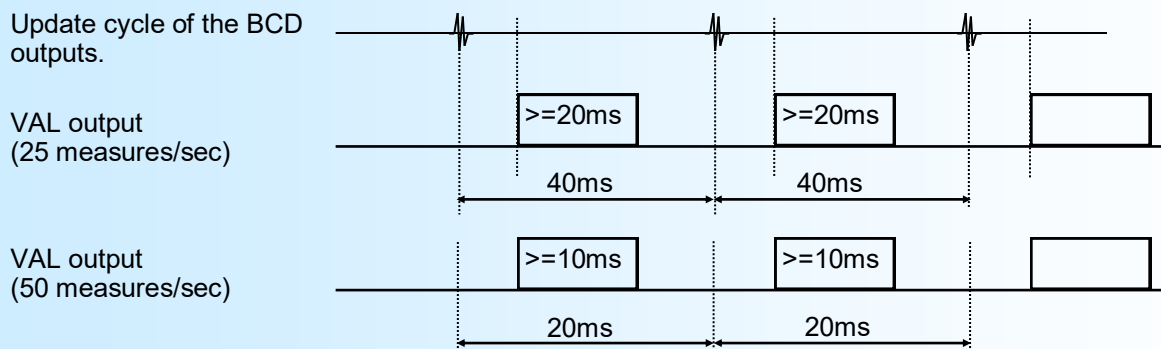
- Comply with the features indicated in the technical sheet (power supply voltage, frequency, allowance of the values, stability, variations ...).
- It is better that the power supply should come from a system with section switches equipped with fuses for the instrumentation element and that the power 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

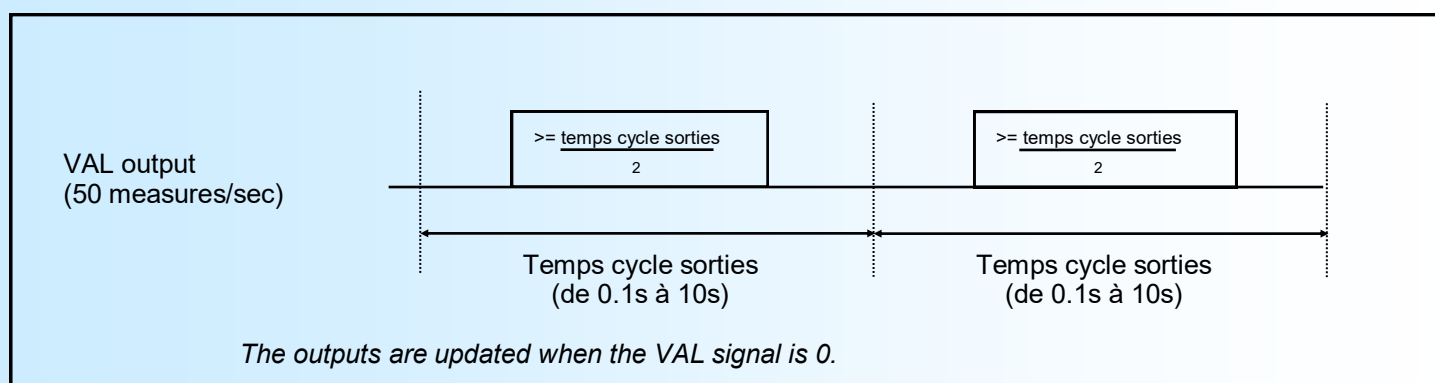
- In harsh conditions, it is advisable to use sheathed and twisted cables whose ground braid will be linked to the earth at a single point.
- It is advisable to separate the input / output lines from the power supply lines in order to avoid the coupling phenomena.
- It is also advisable to limit the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

Chronograms

CHRONOGRAMS FOR OUTPUTS UPDATE IN NORMAL OPERATION



CHRONOGRAM FOR OUTPUTS REFRESH WITH « OUTPUT REFRESH » FUNCTION

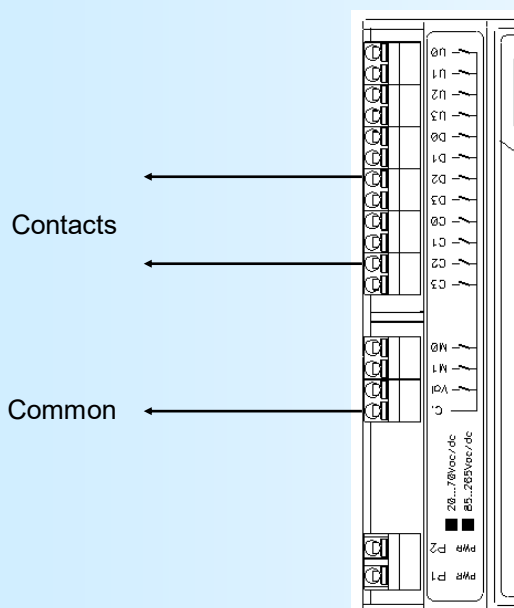


The outputs are stable and can be read during the VAL output high time.

Wirings

Output wiring example

Dry contact using

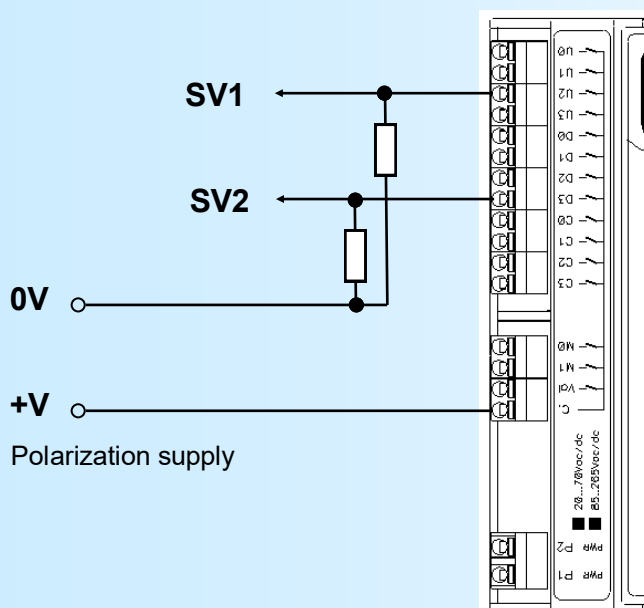


In <NORMAL> logic, The outputs contacts are "open" and "close" when the outputs are active.

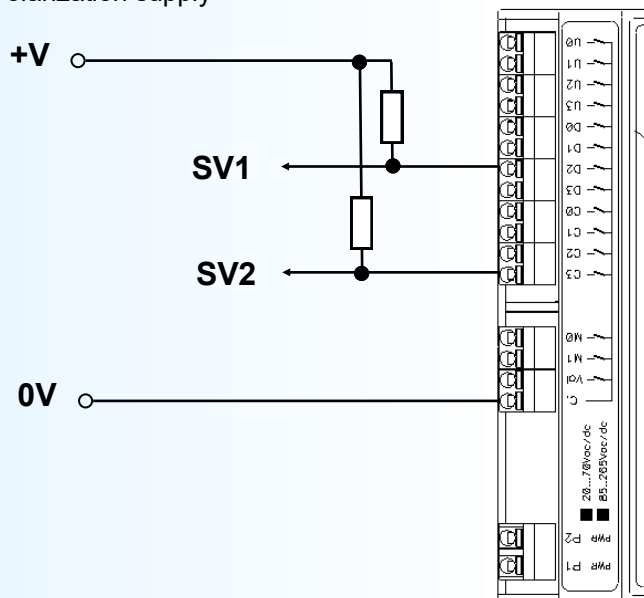
Using like Voltage outputs:

In <NORMAL> logic, the outputs SV1 and SV2 are at 0 V at rest and at +V when they are active.

In <NORMAL> logic, the outputs SV1 and SV2 are at + V at rest and at 0 V when they are active.

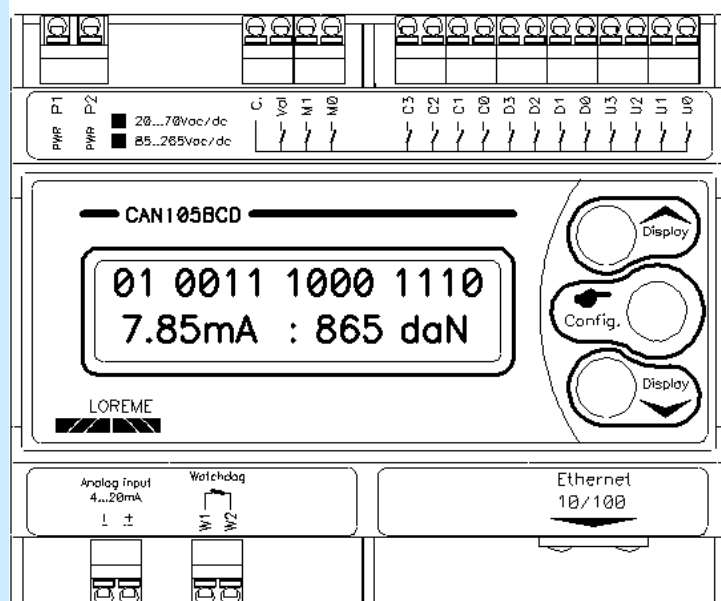
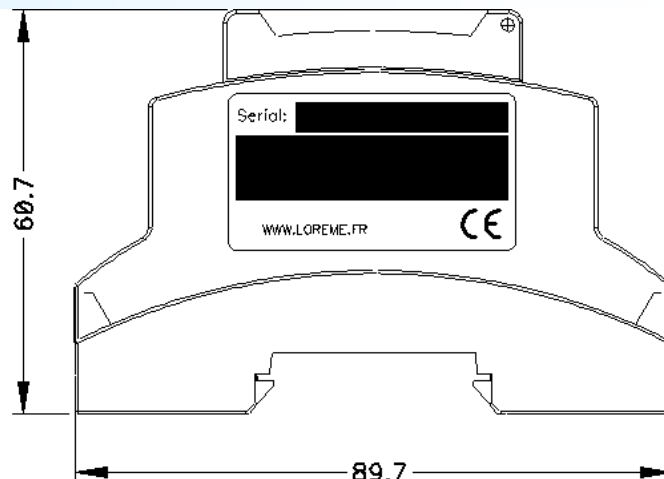
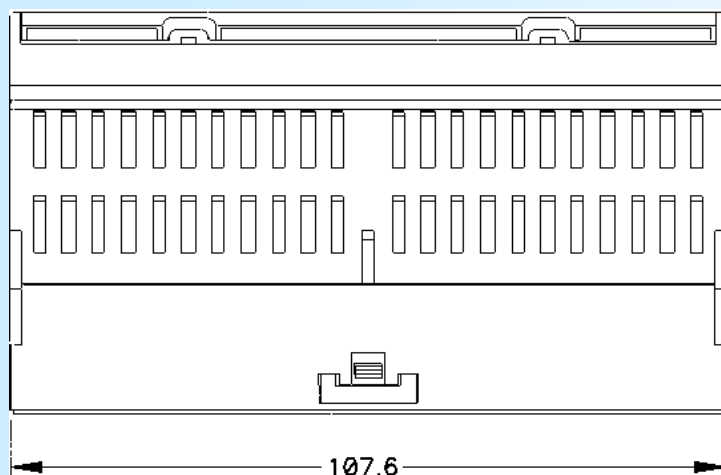


Polarization supply



Notes: The resistors are used for limit the current through the static relays outputs.

OUTLINES DIMENSION



Outputs detail:

C. : Outputs common.
Val : Outputs validation.

BCD format

BIN/GRAY format

M1 : Thousand (2^1)	bit13 (2^{13})
M0 : Thousand (2^0)	bit12
C3 : Hundred (2^3)	bit11
C2 : Hundred (2^2)	bit10
C1 : Hundred (2^1)	bit9
C0 : Hundred (2^0)	bit8
D3 : Decade (2^3)	bit7
D2 : Decade (2^2)	bit6
D1 : Decade (2^1)	bit5
D0 : Decade (2^0)	bit4
U3 : Unit (2^3)	bit3
U2 : Unit (2^2)	bit2
U1 : Unit (2^1)	bit1
U0 : Unit (2^0)	bit0 (2^0)

Watchdog : The contact opens if there is a problem with the device.