



POWER FROM WITHIN

CANBRIDGE CONTROLLER

SMARTeCHⁱ

TECHNICAL MANUAL

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1 General Information

This document describes the technical and functional characteristics and how to use the CANBRIDGE device.

Item Code:

E610210810000 - CAN BRIDGE ETHERNET 12/24V REV.00

E610210810100 - 12/24 CAN BRIDGE REV.00

Options:

E620210810000 - CAN BRIDGE EXP. MODULE

2. Overview

The CAN BRIDGE is a device that can be used as a platform in various solutions for the following applications:

- a) Interconnecting two PMCBus networks and distributing the load with more than 16 generators and a total bus length of over 125 meters.
- b) Isolating the PMCBus network in the common network board (used for load distribution) to which all the CANBRIDGE devices are connected.
- c) Providing a redundancy function for the PMCBus to guarantee a Backup line and avoid failures that could interrupt the load distribution system.
- d) Share PMCBUS communication lines between 2 implants interconnected by tie.
- e) Monitor the system and acquire the principal quantities via Ethernet (gateway IEC 60870-5-104).

Characteristics of the CAN BUS channel:

PMCBus protocol

CAN settings: 250 kbit/s, sample point 75%

COM1 is a dedicated port for configuration and firmware updates.

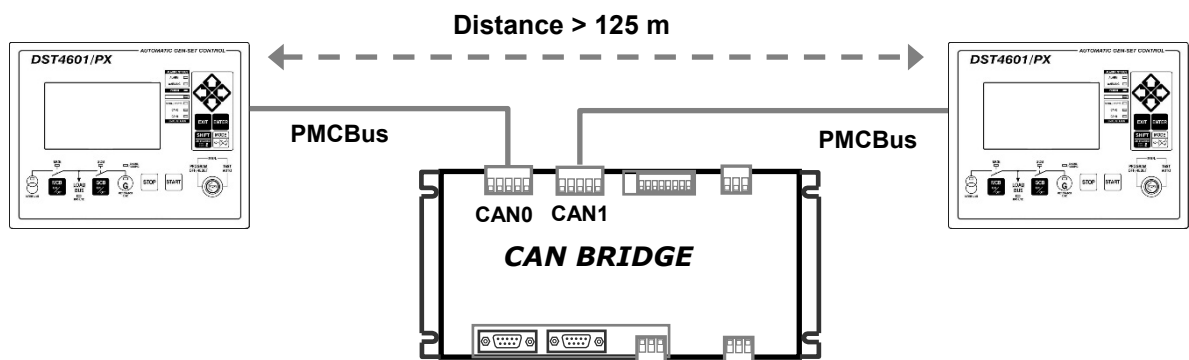
3. Basic characteristics

This device can be powered with a voltage range from **7 to 32 VDC** and comes with the following ports and connectors:

- 1) A standard RS232 serial - COM1 (on **J202** or **JA**)
- 2) A configurable RS232/RS485 serial port - COM2/COM3 (**J204/J205** or **JB/JC**)
- 3) An isolated/non-isolated RS485 serial port - COM4 (**J208** or **JD**)
- 4) Two isolated CAN interfaces - CAN0 and CAN1 (**J203/J206** or **JE/JF**)
- 5) Two digital inputs - INPUT1 and INPUT2 (**J207.1-3** or **JG.6-8**)
- 6) Two relay outputs - OUT1 and OUT2 (**J207.5-8** or **JG.1-4**)
- 7) Optionally you can install an Ethernet interface module so the CanBridge can connect to an Ethernet 10 BaseT network with TCP/IP (**J1**) protocol.
- 8) The CAN BRIDGE EXP MODULE can be installed as an option. This adds the following features to the CanBridge: third can, usb, memory expansion, clock.

4. Applications

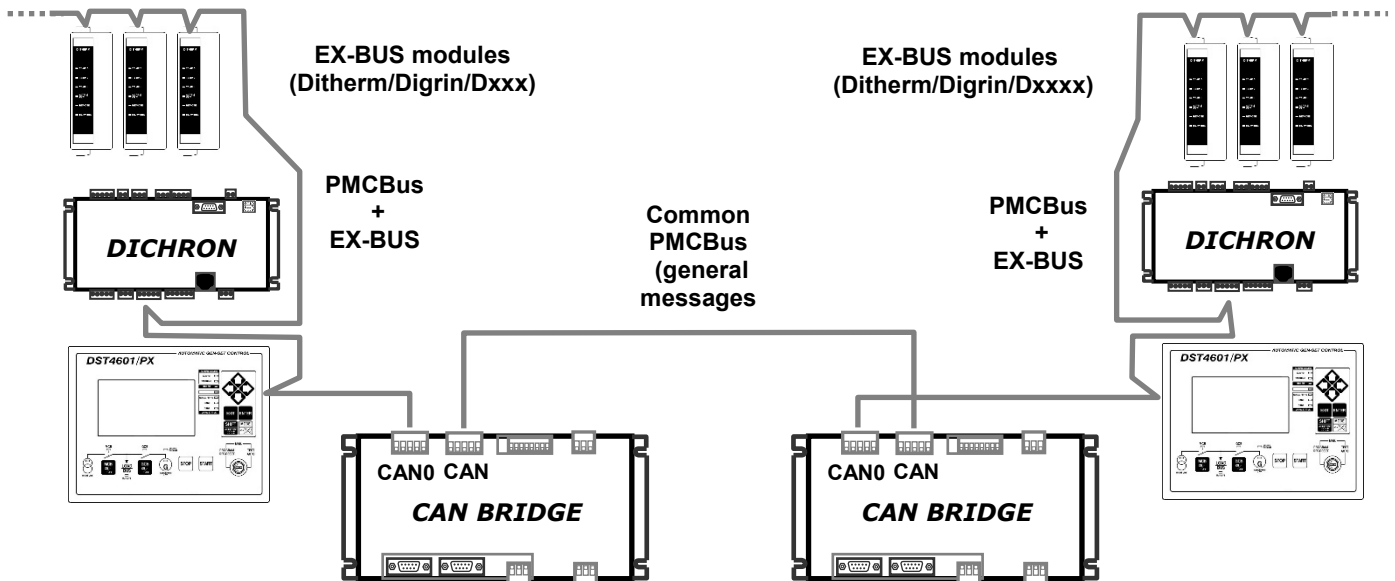
4.1 Application A - Repeater



The maximum total distance of the PMCBus line is 125 m.

If the distance is greater, one or more CANBRIDGE devices must be installed. In this case, regenerating the signal and electrically isolating the CAN lines at the same time represents an advantage.

4.2 Application B - Isolator



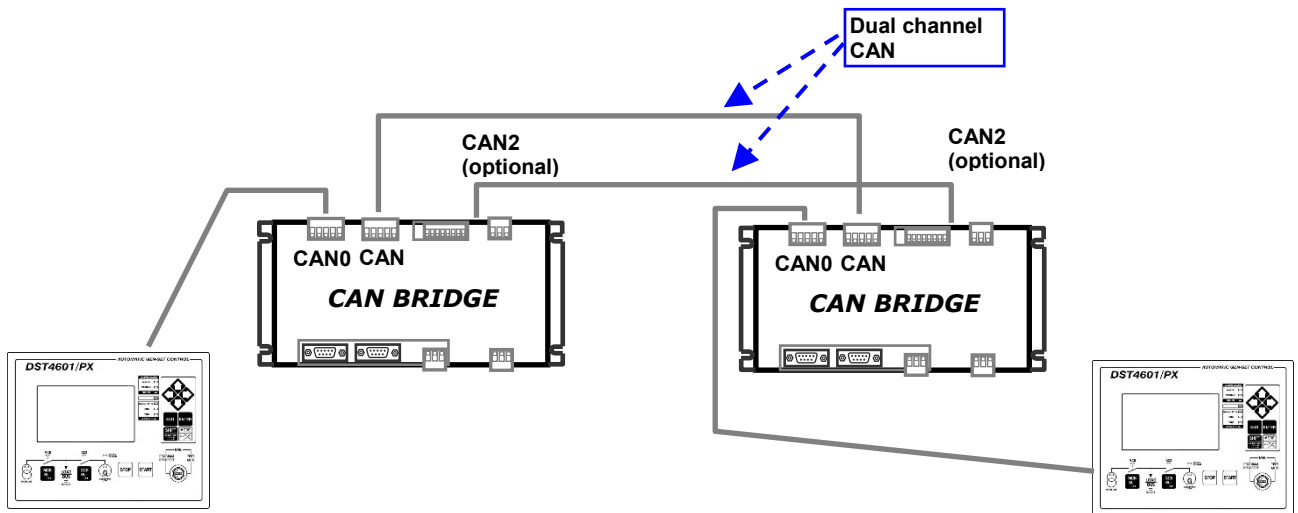
In this case, the task of the device is to isolate the internal board communications so only information useful for other devices is transmitted to the common external bus; this reduces the load on the common external bus.

Another advantage is to electrically isolate the bus and optimize the length of the external PMCBUS line.

Only messages useful for overall system operation will go through the common PMCBUS. All EX-BUS messages are ignored. PMCBUS messages useful for single generator operation (i.e. those between DICHRON and DST4601/PX) are not exported. This reduces data traffic so multiple systems can be connected on the PMCBUS line.

Currently up to 24 CANBRIDGE devices can be connected to the same CAN line. A CAN line cannot be longer than 125 m. Other CANBRIDGE devices in a "repeater" configuration should be used for greater distances.

4.3 Application C - Redundant CAN



The following option is required for this configuration: **E620210810000 - CAN BRIDGE EXP. MODULE.**

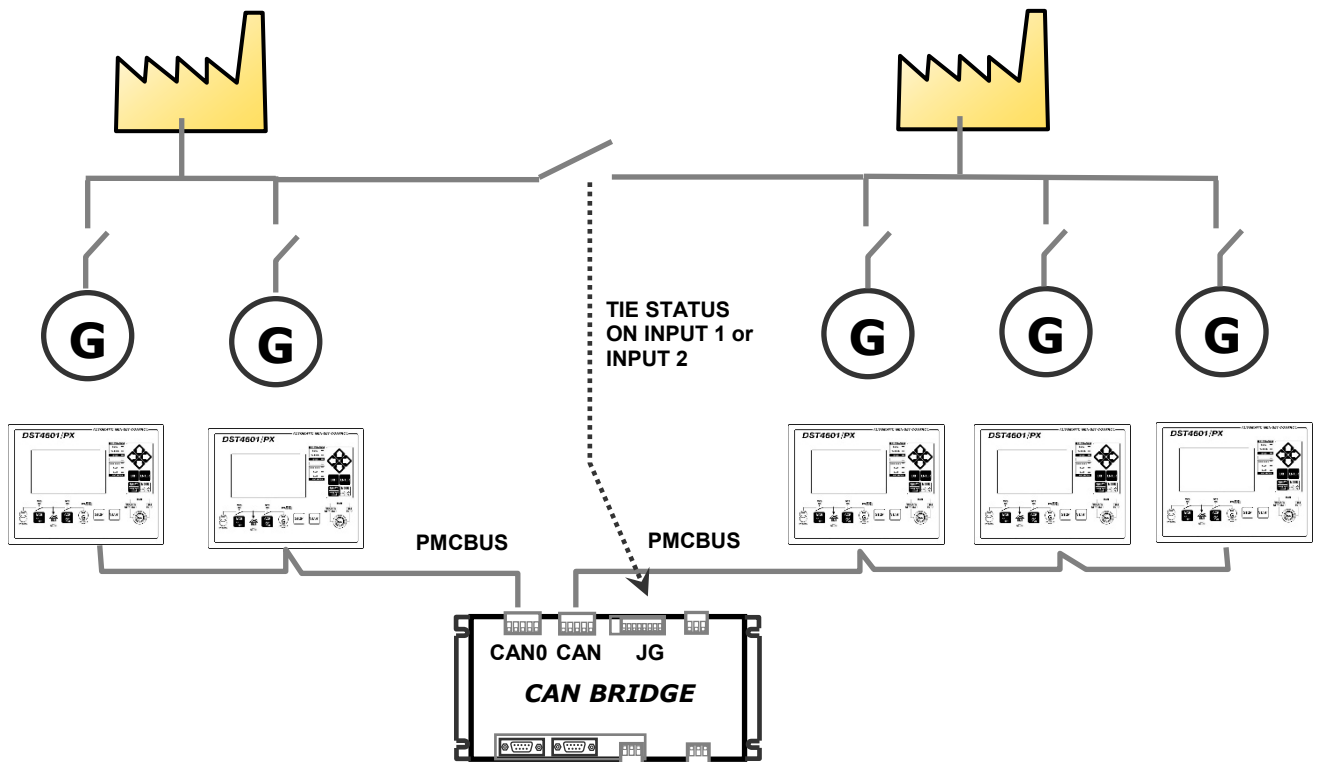
CANBRIDGE automatically acknowledges the presence of the third optional CAN. There is therefore no need to set parameters, redundancy is automatic.

If one of the two lines (CAN1 or CAN2) is disconnected or fails, the system continues to operate.

As long as one of the two lines remains operational, this is sufficient.

When connecting more than 2 units, the automatic message routing function transferring messages from the faulty line to the functional line protects the system also in the case of a failure on both lines (as long as the failure is not in the same section).

4.4 Application D - Tie

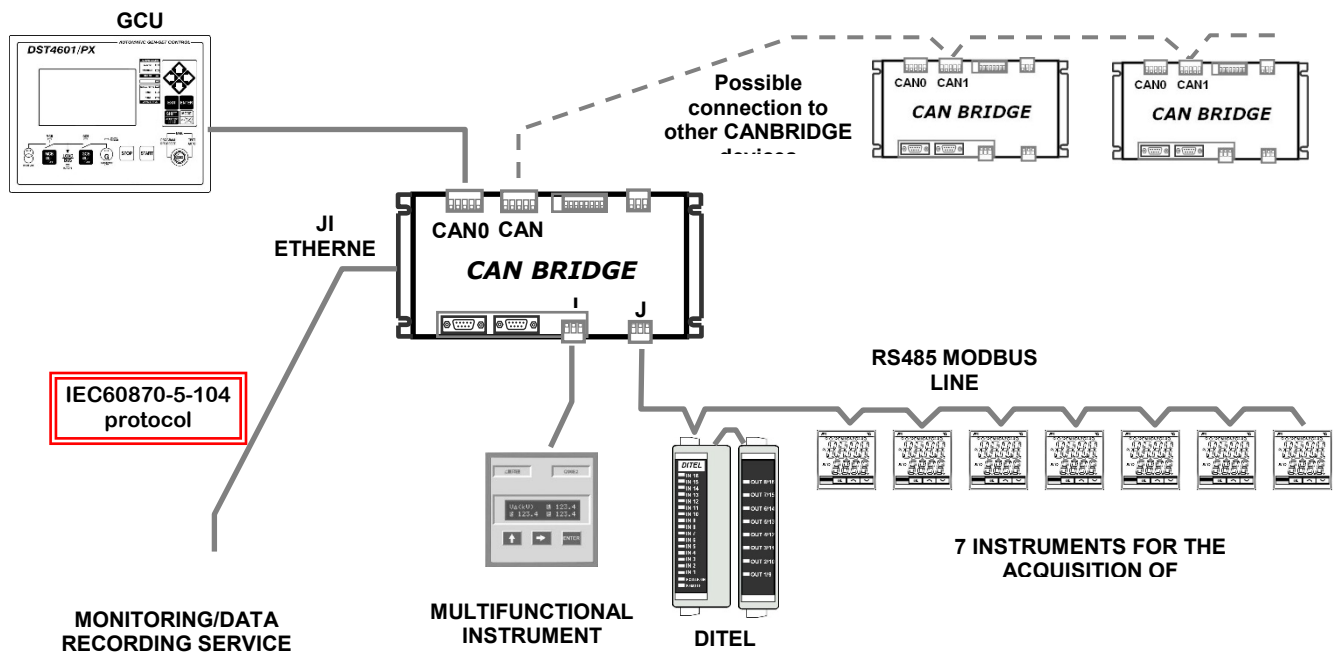


In this case the CanBridge can merge or separate the PMCBUS communication of the boards depending on the status of the tie. The status of the tie must be related to one of the 2 inputs (INPUT 1 or INPUT 2) of connector JG. BoardPrg can be used to configure the input function used to "Block messages between the 2 CAN channels".

Parameter "P.803 - N. generators on PMCBUS" must be set to zero on all boards. Otherwise, when the lines are disconnected the boards generate the alarm "incorrect number of generators on PMCBUS".

The digital input determines whether to tie or separate the 2 networks. When the input is operational it separates the 2 communication channels, letting all messages pass when at rest.

4.5 Application E - Gateway IEC60870-5-104



This configuration requires the board with code:

E610210810000 - CAN BRIDGE ETHERNET 12/24V REV.00

which also includes the additional Ethernet module.

Through the Ethernet network connection, the CanBridge device can interact with control board DST4601/PX and collect data from various devices:

The JD RS485 serial port can be used to connect a DITEL module (16 inputs and 8 digital outputs) and up to 7 devices to acquire temperature. A multifunctional instrument on serial port JC RS485 is used to read voltages, current and power in Medium Voltage applications.

Used to interface with a Supervision system, or for recording system data: a Windows service was developed specifically to connect via Ethernet and record all the data gathered by the CanBridge device.

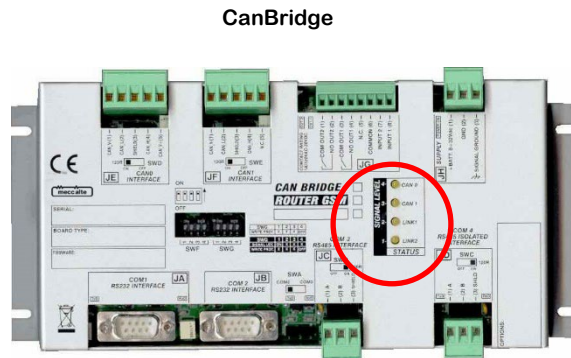
The Can Bridge can communicate through an Ethernet port with IEC 60870-5-104 protocol. The control board (DST4601/PX) must be set to Extended-bus (P800-PMCB ENABLE = 2-EXTENDED) and connected to port CAN0 of the CanBridge.

Each CanBridge supports up to six simultaneous connections (PC Supervision or other) using IEC60870 protocol. The Can Bridge sends all the data received from the GCU and connected auxiliary equipment with an interval of 1 second, for all open sessions. It can also receive commands to be forwarded directly to the GCU (Start and stop genset, change speed and power setpoint, etc.).

5. Status Leds

The base device has 4 yellow leds. The yellow led CAN2 is on the Third CAN option (CAN2 Interface).

On the CanBridge Ethernet module there is a green led (above connector RJ45) which indicates the operation of the Ethernet module (led running).



LED	Function	Notes
CAN 0	CAN 0 line status	See CAN Line Status Table
CAN 1	CAN 1 Line Status	See CAN Line Status Table
LINK1	Indicate the number of active IEC60870 Ethernet connections	See No. IEC60870 Connections Table
LINK2		
CAN2	CAN 2 Line Status	On Third CAN Option. See CAN Line Status table

CAN Line Status Table

(CAN0, CAN1, CAN2 led indication)

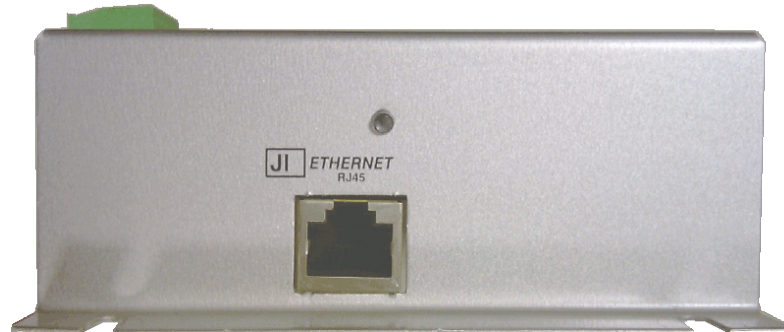
Led Status	CAN line status
ON	Error Active, connected, ongoing communication.
OFF	Error Active, no message received.
Flashing 25% ON	Error Passive
Flashing 75% ON	Bus Off

No. IEC60870 Connections Table

N. Connections	LINK1 Led	LINK2 Led
0	OFF	OFF
1	Flashing 25% ON	OFF
2	Flashing 75% ON	OFF
3	Fixed ON	OFF
4	Fixed ON	Flashing 25% ON
5	Fixed ON	Flashing 75% ON
6	Fixed ON	Fixed ON

6. CanBridge with Ethernet module

The CanBridge with product code **E610210810000** takes an additional module for Ethernet connections:



The CanBridge uses the Ethernet line to send data and receive commands using IEC 60870-5-104 protocol (see paragraph "4.5 Application E - Gateway IEC60870-5-104").

The MODBUS/TCP and MODBUS/UDP protocols are also active, used only for access to the CanBridge ModBus registers. This lets you to configure the CanBridge through an Ethernet network.

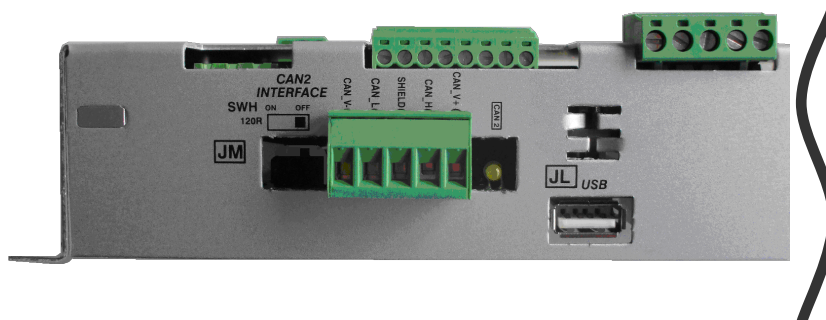
The devices connected to the CanBridge (both on a CAN line and a serial lines) cannot be accessed using MODBUS protocol.

The green led located above connector JI flashes to show the Ethernet module is functioning properly.

7. Third Can expansion module

Optional: **E620210810000 - CAN BRIDGE EXP. MODULE.**

The expansion module connectors are on the top of the CANBRIDGE:



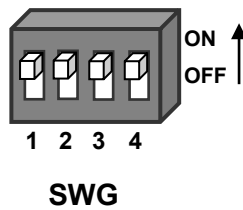
This module adds the following functions:

- a third isolated Can port (**JM**) called CAN2 used in redundancy with CAN0 PMCBus,
- Slave USB 2.0 port (**JL**) for connecting the CanBridge to a PC with a higher speed than with standard serial ports. The USB port lets you connect using MODBUS RTU for CANBRIDGE configuration.
- 8 Mbit static RAM (1024 Kword x 8 bit) with a 3V rechargeable buffer battery. Data is stored for a minimum of 90 days, with the board turned off.
- Real Time Clock (RTC) with rechargeable buffer battery

- 256Kb non-volatile serial memory (F-RAM)
- Low voltage reset and watchdog timer
- Power-Fail Warning
- Serial Number with write-lock

8. Configurations

This electronic device has two banks of four switches. Bank SWF is connected to the Ethernet expansion board (currently not used). Bank SWG is used directly by the CanBridge board:

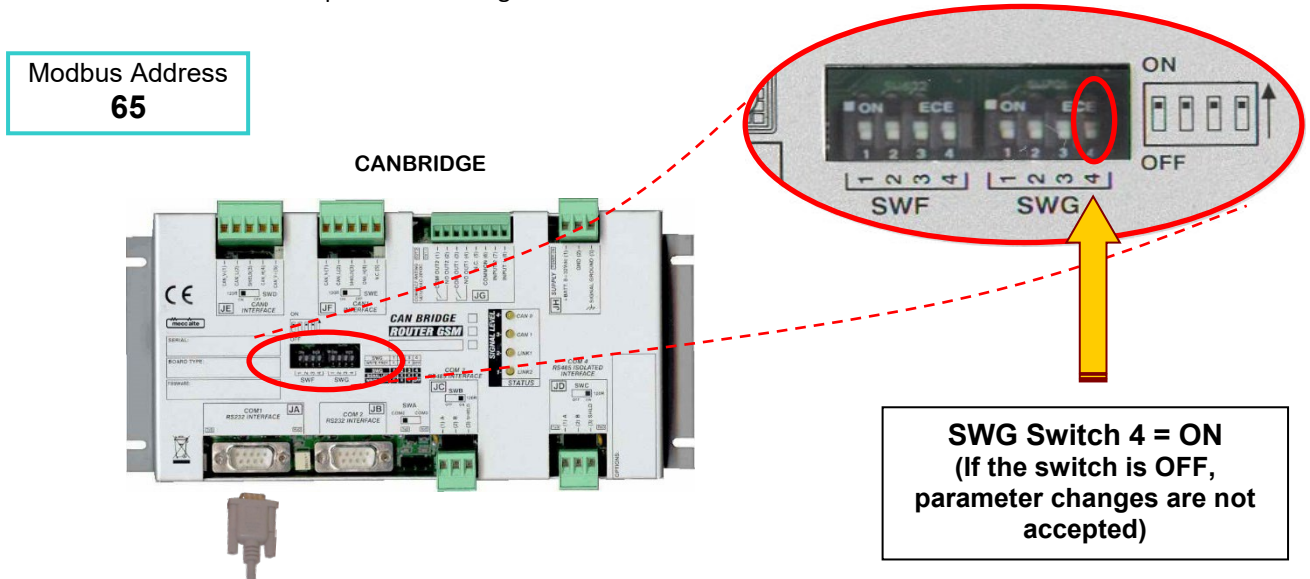


SWG	Description	ON	OFF
1	Not used	--	--
2	Not used	--	--
3	Not used	Use addres 254 over PMCBus	Use addres 65 over PMCBus
4	Parameter protection	Changing parameters allowed	Changing parameters not allowed

N.B. On the programming channel (COM1 - JA-RS232) the Modbus address is fixed **65 (41H)**, and the transmission parameters are fixed **9600, N, 8, 1**.

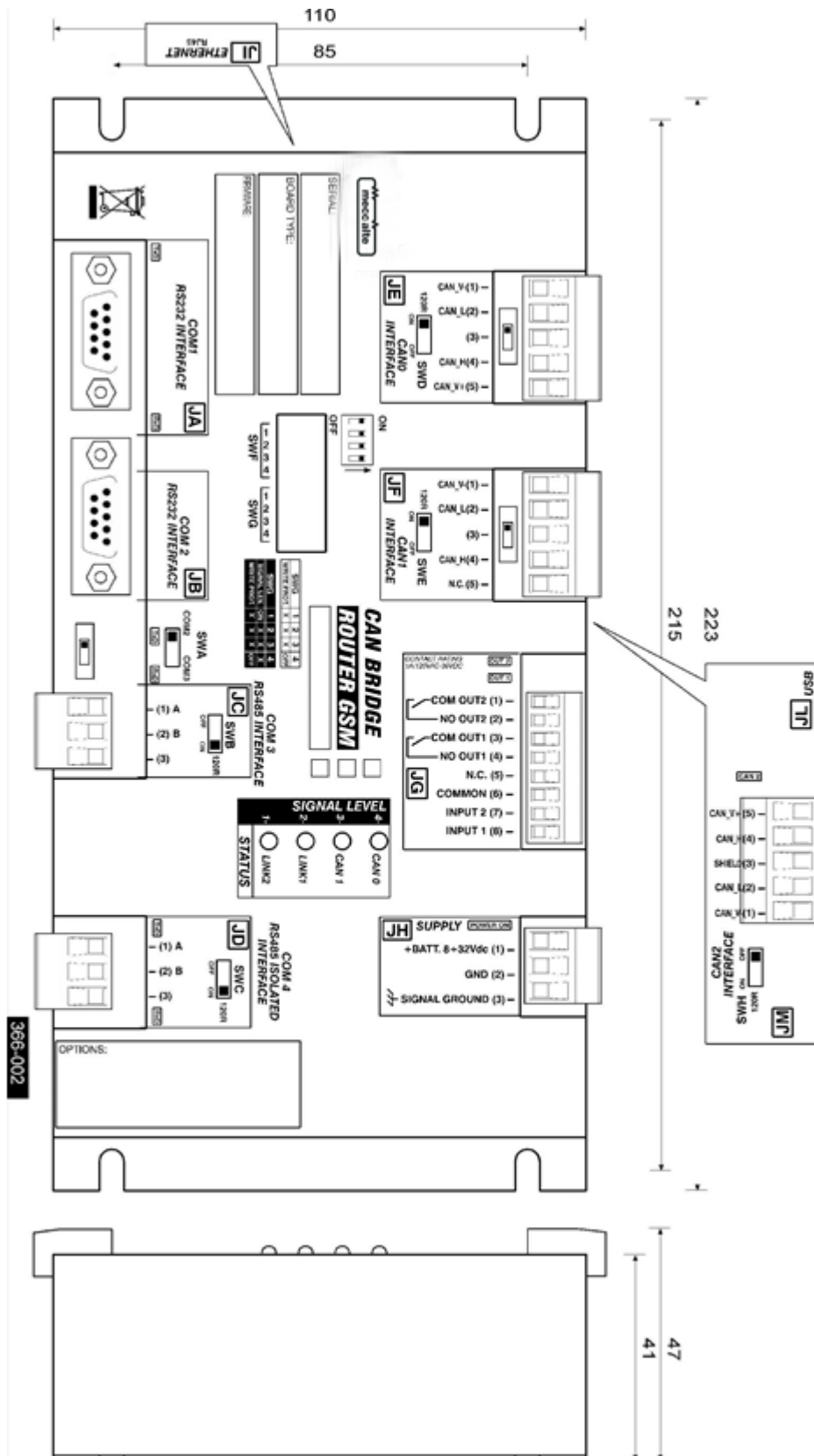
9. Board configuration

SWG switch 4 ON to enable parameter changes.



Connect from PC to RS232 serial port COM1 (JA) of the board using the **BoardPrg** software configuration. (On this channel, the Modbus address and the transmission parameters are fixed, while they can be configured on the others, so they must be known). Transmission characteristics: **9600, N, 8, 1**.

10. Dimensions



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