



POWER FROM WITHIN

# DITEL CONTROLLER



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## 1. GENERAL CHARACTERISTICS

This document describes the technical, functional and operational characteristics of the DITEL module. DITEL device, when used with Mecc Alte genset control boards, lets you expand the available digital inputs and outputs on the Mecc Alte control board with 16 digital inputs and 16 digital outputs in addition to the standard inputs and outputs of the controller.

The device is available in two versions, with CANBUS or MODBUS RS485 communication. This document describes the CANBUS version.

CANBUS port has galvanically isolated communication lines. A further (non isolated) RS232 connection is available via Jack to configure the device. Connection with Mecc Alte boards is via CANBUS, with dedicated EX-BUS protocol.

The device has 2 output connectors for controlling the optional Mecc Alte E611209350XXX, DITEL MODULE 8 OUTPUTS, either at 12V or 24V.

The device can be installed on a DIN guide.


Currently, the following boards are compatible with the DITEL CANBUS:

Board	DITEL 16IN CPU modules	DITEL 8 OUT modules	N. Additional Inputs	N. Additional Outputs
GC310/350	1	2	16	16
GC500	1	2	16	16
GC315	2	4	32	32
GC400	2	4	32	32
GC600	4	8	64	64
DST4601/PX	2	4	32	32
DST4602	10	20	160	160
MC200	2	4	32	32
MC400	2	4	32	32
HS315	2	4	32	32
RN200	2	4	32	32

The available modules have the following codes:

1. **E6112094401xx** : DITEL CANBUS 16 INPUT, 12 / 24VDC (CPU module).
2. **E6112093500xx** : DITEL 8 OUTPUT relay module, 24VDC input.
3. **E6112093501xx** : DITEL 8 OUTPUT relay module, 12VDC input.

Up to two **E61120935XXXX** 8 RELAY MODULE units can be connected to each inputs module using a flat-cable with 10 conductors.

 **Note: The 8 relay module E61020935XXXX does not require external power.**

The states of all the inputs and outputs managed by the DITEL are available through the CANBUS port of the Mecc Alte control board.

The device has 16 opto-insulated inputs which are acquired with the relevant filters. The input is acquired by earthing the corresponding pin.

## 2. TECHNICAL SPECIFICATIONS

<b>Input voltage</b>	BASE MODULE : <b>7÷32 VDC</b> 12V Relay module : <b>9÷16 VDC</b> (holding voltage 3V) 24V Relay module : <b>18÷30 VDC</b> (holding voltage 5V) Reverse polarity protection
<b>Current absorbed</b>	220 mA (@ VDC=30V) Vout=10V, Zout=100 ohm
<b>Power Consumption</b>	5 W (non-active inputs and outputs all active)
<b>Contacts outputs</b>	1NO, 1NC, 1COM
<b>Contact rating</b>	5 A max, 250 V max
<b>Operating temperature</b>	-20 °C to 60 °C
<b>Humidity</b>	From 30 to 90 % (condensate free)
<b>Weight CPU Module</b>	180 g
<b>Weight 8 Relay Module</b>	150 g
<b>Panel mounting</b>	By DIN bar EN50022
<b>EMC Conformity</b>	EN61326-1
<b>Safety</b>	built in conformity to EN61010-1
<b>Protection degree</b>	IP20

## 3. LED Indicators

LED	COLOUR	FUNCTION
<b>IN 1 ÷ IN 16</b>	Red	Indicates the corresponding input <b>(6)</b> is active (lit when earthed).
<b>POWER ON</b>	Green	Lit when the device is powered <b>(6)</b> .
<b>REMOTE</b>	Yellow	<b>Fixed ON</b> = CANBUS communication OK (Error Active, commands received from board) <b>Flashing ON 0.9 sec OFF 0.1 sec</b> = CANBUS connection ok but commands not received (Error Active, commands not received) <b>Flashing ON 0.3 sec/OFF 0.2 sec</b> = Error passive (no valid messages on CANBUS, CANBUS not connected) <b>OFF</b> (every 5 sec. flash ON) = BUS OFF

Note: In normal conditions, REMOTE led **(6)** should be lit fixed to indicate the canbus communication is active and stable.

## 4. Installation instructions

The device is designed to be mounted on a DIN 46277 guide in an upright position. It requires adequate ventilation to function properly. Avoid installing above and/or near devices that produce heat.

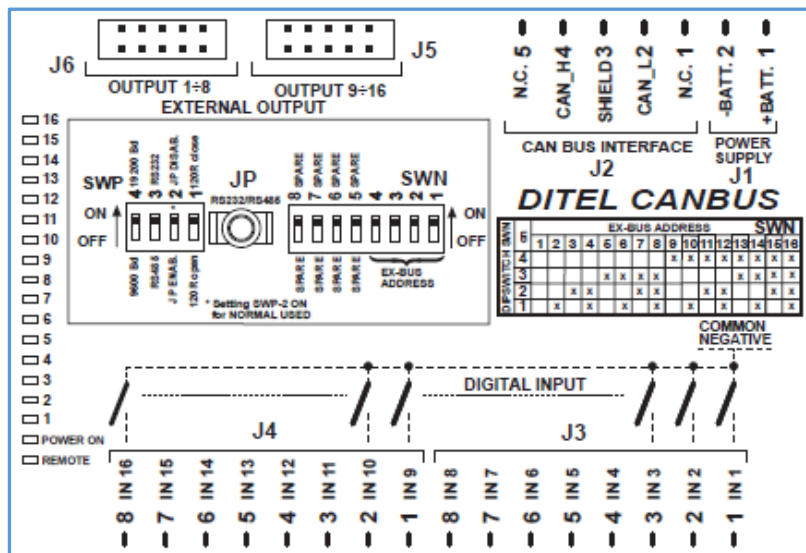
**Only use screened cable to connect to the reading inputs;** connect the screen at a ground point near the input connectors.

**For CANBUS connection** use the appropriate cable, e.g. KELUKABEL 800571.

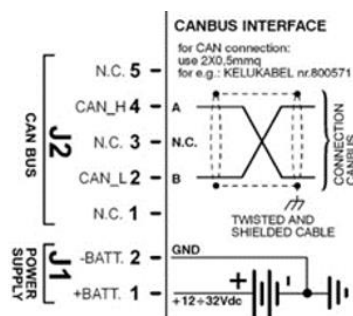
**CANBUS terminations:** to minimize reflections, the first and last device in the CANBUS network must have a termination resistor connected in parallel with the **120 ohm ½ W** line.

## 5. Connections

The DITEL has a CANBUS communications bus which is insulated from the input/output circuits and the built-in logic. This gives the transistors high voltage immunity and eliminates problems caused by variations in the input voltages of the devices connected by the bus.



### 5.1 CANBUS interface connections and power



## 5.2 CPU 16 Inputs module

The connections are made using removable terminals, plus 2 flat-cable connectors for the external connection to 2 x 8 relay module boards.

Internally the device consists of 2 boards: CPU module board + Modular 16 inputs telesignal board.

Each input has a signal LED.

- LEGEND**  
 1 - dipswitches  
 2 - Digital outputs 1÷16  
 3 - CANBUS  
 4 - Supply  
 5 - Digital inputs 1÷16  
 6 -LEDs

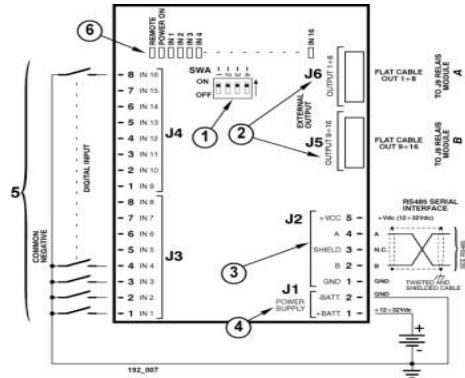


Fig. CPU 16 inputs E61120944xx

## 5.3 8 outputs relay module (optional) (ref. - fig. 2)

**Note: Up to two relay modules can be connected to the 16 inputs CPU main board.**

The max. current at each output is 1A; CAT III insulation.

The relay modules are powered directly by the inputs module connection through a flat-cable with 10 conductors. Each output has a signal LED (3). The leds light when the corresponding output is active, in other words when the contact closes between COM and NO.

- LEGEND**  
 1 - Digital outputs 1÷8 / 9÷16  
 2 - Relais contacts outputs 1÷8 / 9÷16  
 3 - Warning lights out

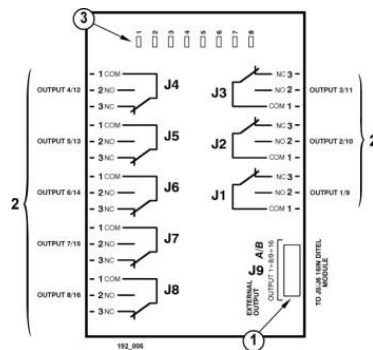


Fig. 2 - Relay Outputs Board

## 5.4 DITEL Modules Interconnection (ref. - fig. 3)

the DITEL CPU module must always be present with its 16 inputs, while the connection of one or two 8 relay modules is optional depending on the number of outputs required.

As shown in the following diagram, 2 flat cables come out of the DITEL CPU module to connect 2 x 8 relay modules.

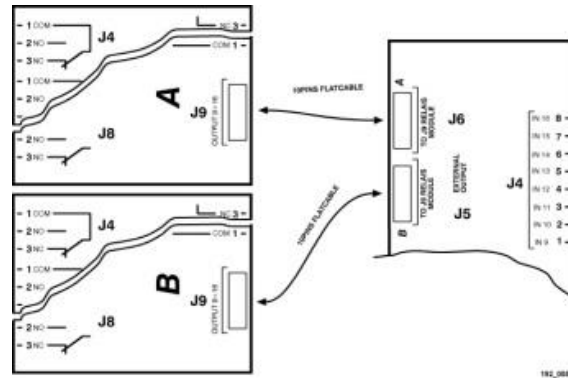


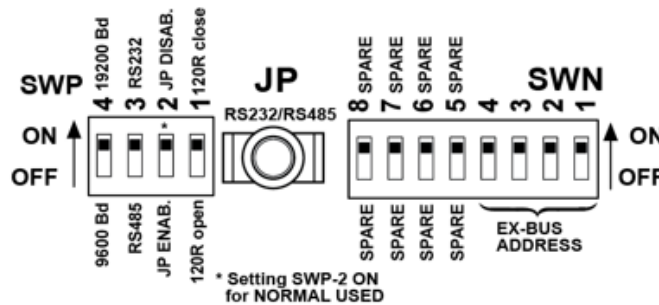
Fig. 3 - Board interconnection

**! Important: the modules must be assembled on the same DIN bar (the modules of the same group must be as close as possible to each other)**



## 6. Configurations

### 6.1 Ditel 16 Input



SWN	Description	ON	OFF
1,2,3,4	Ex-bus address on Canbus	See table of addresses	See table of addresses
5,6,7,8	Not used	-	-

Select Ex-Bus address:

SWN	EX-BUS ADDRESS															
id	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SW4					X	X	X	X		X	X	X	X	X	X	X
SW3				X	X		X	X				X	X		X	X
SW2			X	X			X	X			X	X			X	X
SW1		X		X		X		X		X		X		X		X

**Note: the switch variations have immediate effect.**

The switch **SWP** is a 4-way switch and sets the serial port available on the **JP** (stereo jack) and **J2** connectors (ref. Fig 1b):

- **Dip1 (120 OHM ON/OFF):** it allows to connect/disconnect the 120 ohm impedance termination resistor on the JP RS485 serial port (**only if necessary and only if this port is set as RS485**)
- **Dip 2 (Serial port enable/disable):** it enables/disables the serial port on the **JP** stereo jack. With the RS485 insulated version (E6102094400xx) the serial port on the **J2** connector is shared with that on the **JP** jack. To select which port has to be used it is necessary to act on the switch 2 of **SWP**. The serial ports **J2** and **JP** **cannot be used together**. To use the serial port on **J2**, the **JP** connector must be disconnected.

**Note: use the JP serial port only for the mapping configuration**

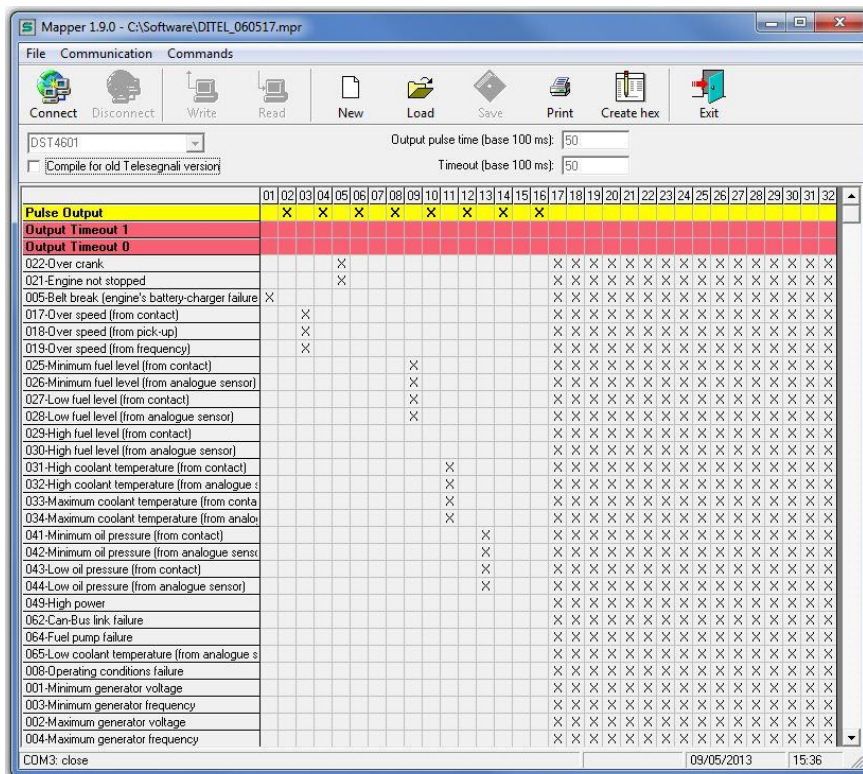


- **Dip 3 (RS232/RS485):** it sets the **JP** (stereo jack) serial port alternatively as RS232 or RS485 (not insulated)
- **Dip 4 (9600/19200 Bd):** it sets the baud rate of the **JP** and **J2** serial ports

SWP	Description	ON	OFF
1	Line impedance termination (only JP port)	RS485 line impedance 120Ω inserted	RS485 line impedance 120Ω not inserted
2	JP serial port enabling	JP RS232/RS485 serial disabled	JP RS232/RS485 serial enabled
3	JP serial port selection	JP set as RS232	JP set as RS485
4	JP and J2 serials Baud Rate	Baud rate= 19200	Baud rate = 9600

## 7. Mapper

Mapper is the PC software utility that allows you to configure the DITEL.

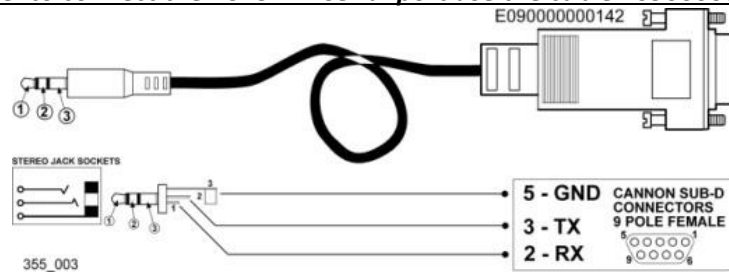


DITEL CANBUS only needs to configure some parameters concerning the possible use of the outputs for signalling the absence of communication and the communication timeouts.  
 As far as output mapping is concerned, this function was used in the old boards that were connected to the DITEL via RS485.

## 7.1 Connect DITEL to Mapper

The configuration requires the connection to a PC via RS232 (JP connector) or RS485 (J2 connector) and the use of the program **Mapper**.

**⚠ Note: to connect the RS232 JP serial port use the cable E090000000142**



- Select the correct serial port on the PC (Menu **Communication** → **Select Communication resource**)



- Set the correct communication parameters: **9600, N, 8, 1**
- Set the Modbus address (Menu **Communication** → **Serial address** : default=1)
- Click **Connect**, verify the communication :



- Click **Read** to transfer the configuration from DITEL module to PC.
- You can Modify parameters.
- Click **Write** to transfer the new configuration from PC to DITEL module.

## 7.2 Mapper paramaters

The paramaters that affect the functionality of the DITEL CANBUS module are as follows:

➤ **PULSE OUTPUT**

The impulse outputs allow automatic deactivation in the case of direct control. Every output can be set as an impulse output. The impulse duration can be set (for all outputs).

➤ **TIMEOUT**

communication is considered 'lost' when there is no canbus communication for the set timeout (Holding Register 501).

N.B.: the REMOTE led lights when the board receives a valid canbus command. If no request is received the REMOTE led turns flashing or off after the set timeout.

➤ **OUTPUT TIMEOUT 1**










The outputs enabled in 'Timeout 1' are activated when the canbus communication is considered 'lost', after the set timeout. When the transmission returns, the outputs return to the initial deactivated rest condition.

➤ **OUTPUT TIMEOUT 0**

The outputs enabled in 'Timeout 0' function as outputs enabled in 'Timeout 1' but with inverted logic: they are normally active and are deactivated when the communication is considered 'lost'.

In the mapper, the first row is for impulse outputs, the second and third for Timeout outputs. Also in this case, if an output is mapped on one or more outputs it cannot function as an impulse output.

## 7.3 Mapper commands

 Connect	Open the connection with the DITEL module (send continuous requests to check the connection).
 Disconnect	Close the connection with the DITEL module.
 Write	Send the current parameters and mapping to the DITEL module (it must be connected) DITEL memorises the new configuration permanently in eeprom
 Read	Detects the parameters and mapping saved in the memory of the DITEL module (it must be connected)
 New	Cleans the mapping to save another one
 Load	Reads the mapping saved to file (you can select the folder and file to read)
 Save	Save the current mapping to file (Select disk, path and destination file)
 Print	Send current mapping to printer (connected to PC or in a network)
 Create hex	Create a file for external eeprom programmer. Used by the DITEL module with eeprom on base, the memory of the DITEL module cannot be programmed with an external programmer. In this way the programmer can save the mapping on more than one eeprom at the same time.
 Exit	Exit Mapper program

## 8. Modbus Registers

The Ditel manages the transmission of up to approximately 51 modbus registers. Requests that exceeds the transmission buffer generate an error message (exception). In reception, the commands that exceed the dimension of the buffer will not be processed.

### Input Register

Input Register	Number of registers	Description	Note
00001	1	Digital INPUTS (1..16)	Displays the current state of the 16 inputs connected to the 16 Inputs Module.
00002	1	DIP SWITCH (bit 0-3: 4 current low bits, bit 8-11: 4 high bits with pwr on)	Read switch on CPU DITEL board
00201	1	CANBUS – Interface presence	0=not available, 1=ok, interface available
00202	1	CANBUS status	0= Error active, 1=Error passive, 2=BusOff
00203	1	CANBUS – Trasmission errors	
00204	1	CANBUS – Receiving errors	
00205	2	CANBUS – Overrun errors	
00207	2	CANBUS – Transmitted messages counter	
00209	2	CANBUS – Received messages counter	
00211	1	EX-BUS address	

### Holding Register

Holding Register	Number of registers	Description	Note
00001	1	Digital OUTPUTS (1-16)	Reads and writes 16 digital Out. requires additional outputs board. (n.b. : the outputs can be timed, in other words to power down automatically, check the timers for output impulses)
00357	1	P.0105 – Pulse output mapping	Every bit activate the pulse function on the correspondig output. Allow automatic deactivation in case of direct control.
00358	1	P.0101 – Pulse duration	Configure the duration of the ON status in case of pulse output.
00501	1	P.0100- Communication Timeout	1= 0,1 sec
00502	1	P.0111- Mapping of activated Outputs in case of timeout	Every bit activate the corrispondig digital output. Selected outputs are normally OFF, go ON when communication drops out.
00503	1	P.0112 - Mapping of deactivated outputs in case of timeout	Every bit activate the function on the corresponding digital output. The selected outputs are normally ON, go OFF when communication is lost.

## 9. CanBus specifications (EX-BUS proprietary protocol)

CAN speed: 250 kbit/s

CAN settings: **sample point at 75%, 11bit identifier (standard format)**

**Messages transmitted EX-BUS:**

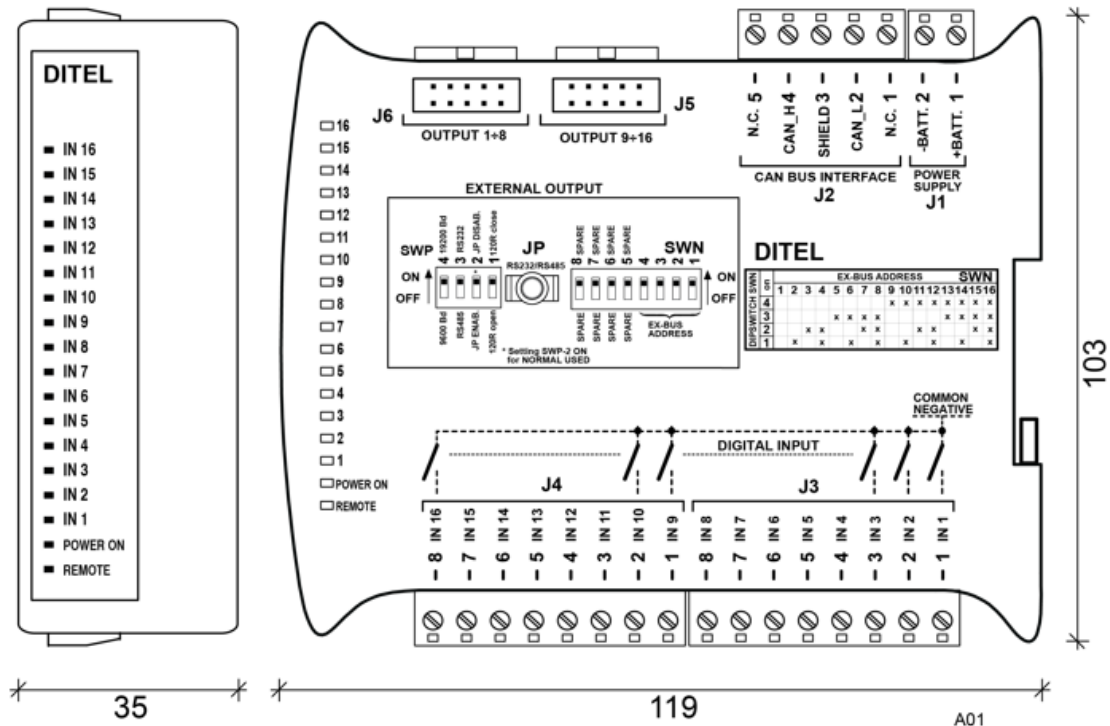
ID	MIX	L. data	Description
<b>0x400 – 0x40F</b>	MXD-DITELIN	8 byte	Data: contains the 16 input and 16 Output status. Transmission freq.: 500 msec, and when status changes
<b>0x500 – 0x50F</b>	MXD- DITELOUT	8 byte	Digital output command (16 bit)
<b>0x400 – 0x40F</b>	MXS-DITEL	6 byte	<b>Diagnostics.</b> Contains: board type, firmware revision, CAN error counters, alarm states. Transmission freq.: 1 sec.

**Note:** each module transmits with a single ID. The ID selection is made with SWN switches 1-4 (EX-BUS ADDRESS). To change the EX-BUS address, after modifying the switches, turn the DITEL module off then on again.

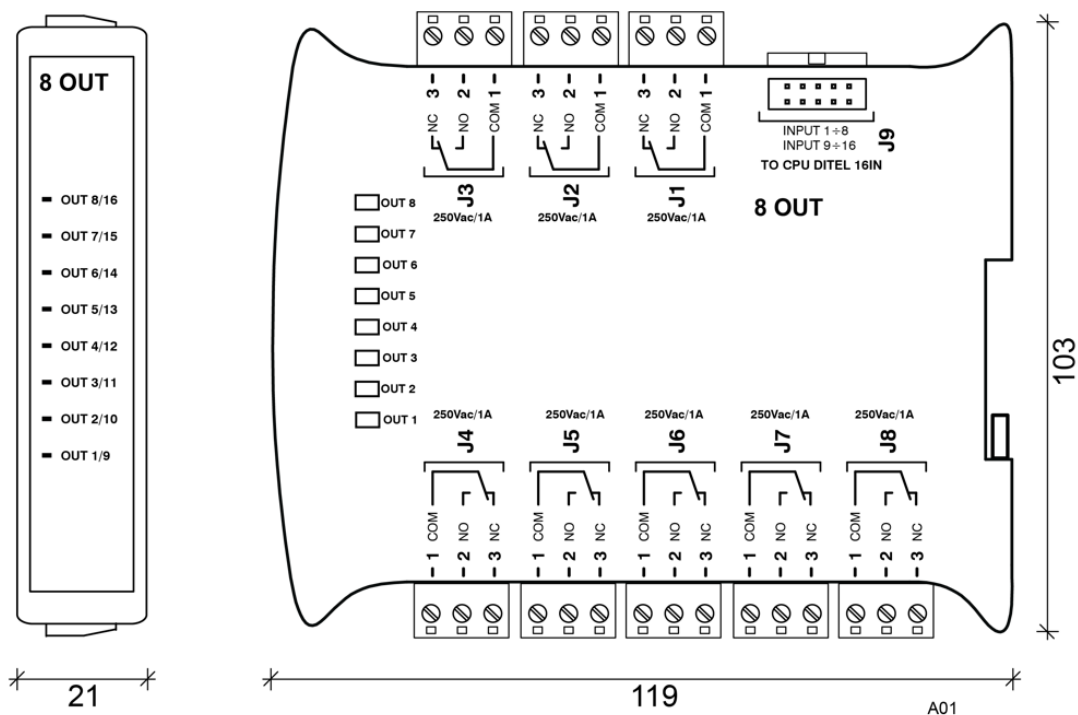
For further information on EX-BUS protocol, refer to EAAS0346xxxx specifications.

## 10. Dimensions

### 10.1 DITEL 16 IN (CPU)



### 10.2 DITEL 8 OUT (OPTIONAL MODULE)







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