



POWER FROM WITHIN

DANCE CONTROLLER

SMARTTECH⁺
A DIVISION OF MECC ALTE

USER MANUAL

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1. Introduction

1.1 General info

Ensure to read this manual carefully before operating the device.

In this manual, functional, operational and technical features of **DANCE (Data Network Communication Equipment)** are described.

Item code:

E61020582xxyy - DANCE 12/24V REV.0

DANCE device allows to connect to the Ethernet devices with serial port (genset controllers and auxiliary devices). It's a Modbus TCP / Modbus RTU converter.

It must be connected to a standard Ethernet network that supports TCP/IP protocol. The max. speed managed by the network interface is 100 MegaBit/second.

Dance supports standard DHCP, DNS and NTP network protocol (refer to the dedicated paragraphs).

It's equipped with two serial ports: one RS232 port and one RS485 port. Devices can be connected through RS232 or RS485 ports. Through software configuration you can define serial ports characteristics and which port is used to connect devices. Connected devices must support Modbus RTU protocol. These devices must be SLAVE, which means that they can only answer to queries and they can't send any information by their own initiative.

Max. serial communication speed is 115200 BAUD.

DANCE must be configured with BoardPrg software (see paragraph dedicated to configuration).

After installing and configuring DANCE, you can communicate with the devices connected to the serial port through any PC connected to the network, specifying the IP address assigned to DANCE and the Modbus address of the device. The PC must use Modbus/TCP protocol, able to work on Ethernet network. DANCE converts Modbus/TCP messages in Modbus/RTU and transmits them on the selected serial port. After receiving it, the answer is converted to Modbus/TCP and is transmitted on Ethernet to the IP address that had sent the request.

DANCE works as network concentrator: in fact, it supports up to six simultaneous network connections. This means that the devices can be queried "simultaneously" by six different PCs. This wouldn't be possible otherwise, as the master/slave setting of the Modbus protocol allow only a master (who sends the queries) and many slaves (who answer to them). Obviously, the more simultaneous connections, the worse the performance of the single connection.

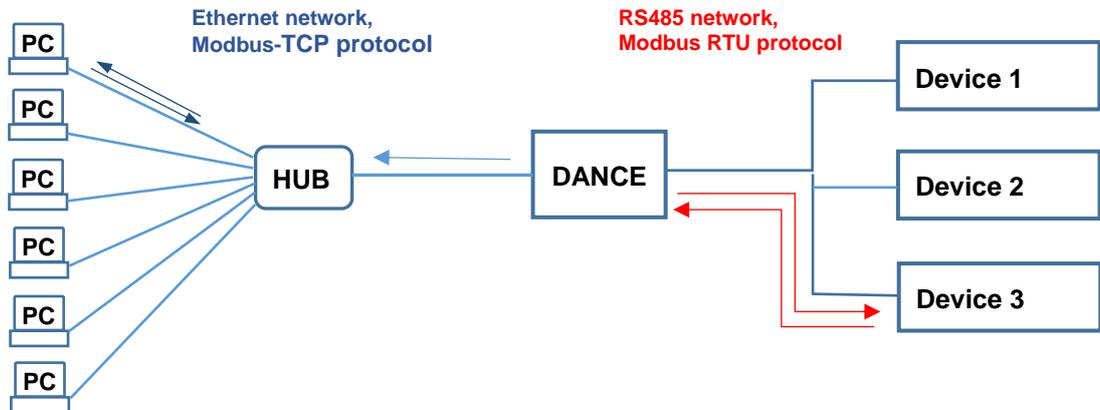
Through integrated Web server, you can access through browser to view the data of the genset.

Moreover, through **MECC ALTE SUPERVISOR**, you can connect directly to the plant.

Connection through serial line allows to acquire various data related to the genset. Moreover, there are also two dry contact relays and eight digital inputs for status and command acquisition.

The device works with both 12 and 24Vdc nominal voltage, in any case between 8 and 32Vdc.

The following diagram shows the information flow in a practical example:



1.2 Reference documents.

- [1] MECC ALTE EAAM0470xxXA (DANCE parameters table).
- [2] MECC ALTE EAAS0341xxEN (serial communication).
- [3] MECC ALTE EAAM00458xx (BoardPrg .xx guide).
- [4] MECC ALTE EAAP0457xxXA (USB driver installation guide).
- [5] MECC ALTE EAAM0489xxEN (DANCE installation guide).

1.3 Prerequisites

The device can be configured and modified through the PC software **MECC ALTE Board Programmer4** [3] (hereinafter called "BoardPrg"), which can be downloaded for free from MECC ALTE website

BoardPrg can be used with all MECC ALTE devices; the connection to the PC can be direct through Serial RS232 and USB Ports, or by Ethernet. See the dedicated manual for further instructions.

In addition, it allows to save the configuration file and use it on other devices with the same features.

In this document there is no detailed description of all programming parameters: see document [1] for further information. This document is to be considered part of this manual.[1]

1.4 Conventions

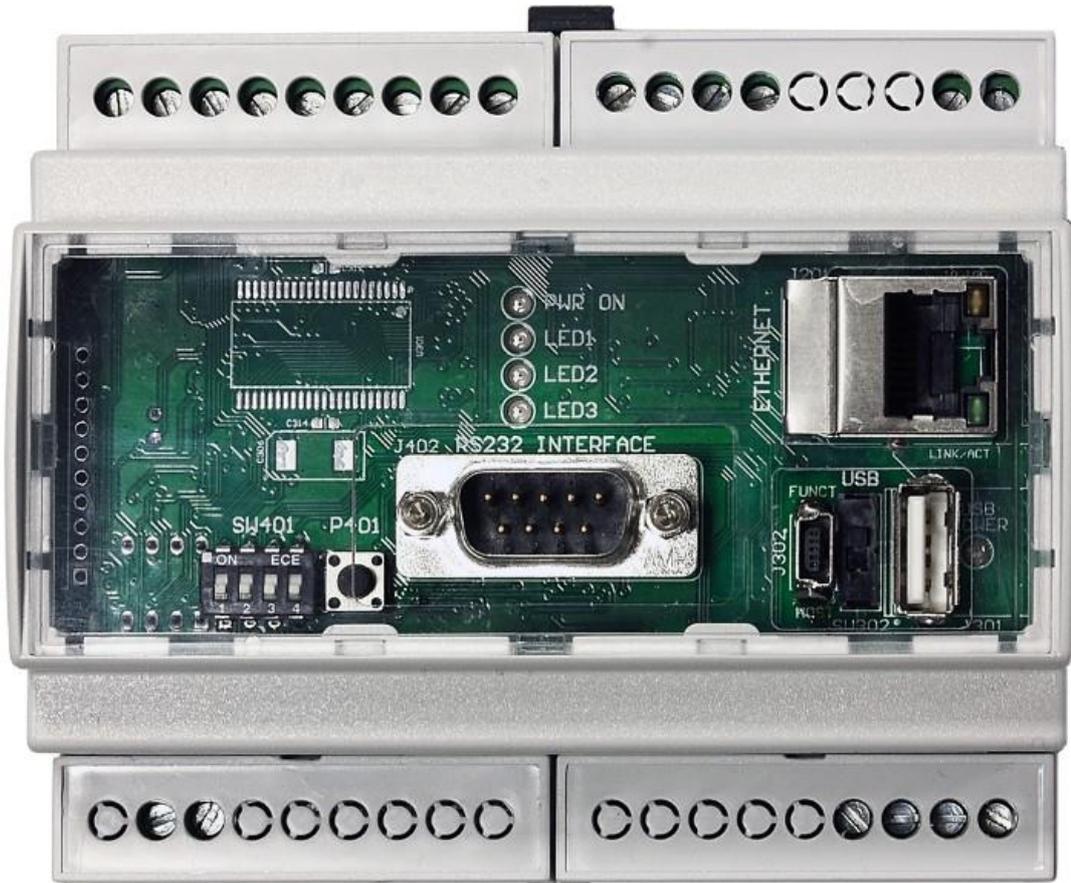
In the manual, a vertical bar at the right of the paragraphs shows the changes with respect to the previous versions. In the tables, changes are highlighted in grey.

1.5 Software revisions

Throughout the manual there will be references to software revisions of the controllers. These revisions will be indicated with the MECC ALTE code assigned to them, which is written on the side of the controller. The code format is the following: EB0250217XXYY, where "XX" is the main software revision, while "YY" is the secondary revision. Therefore, code EB02502170201 refers to the software revision "2.01" of the controller.

2. Views of the device

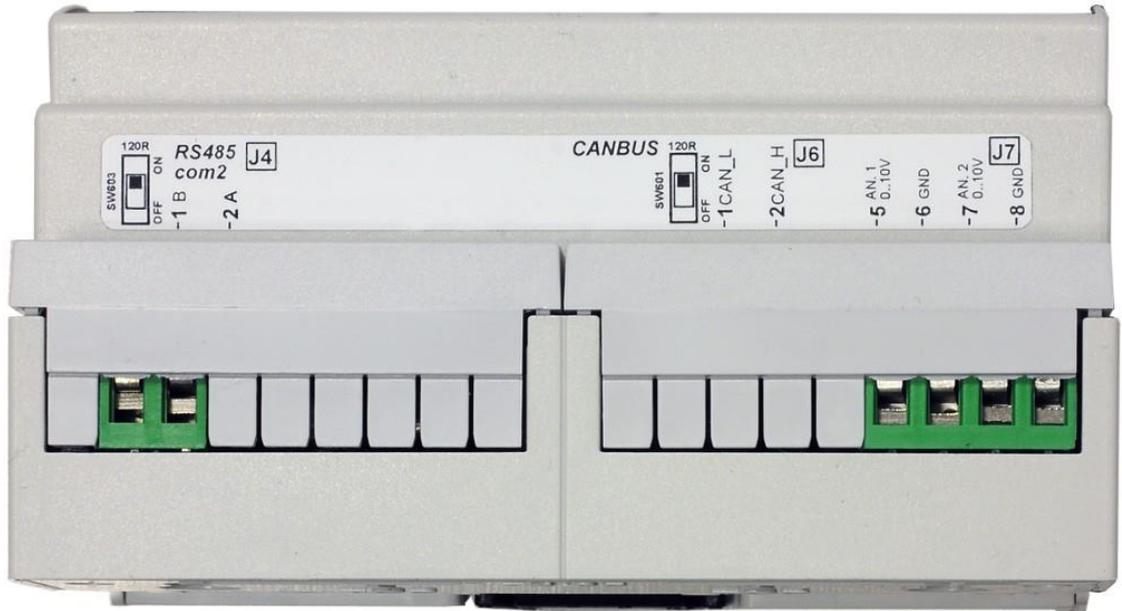
Front view:



Upper view:



Lower view:



Side view:



3. Technical features

Supply power voltage VBATT:	From 8 to 32Vdc with uninterrupted operation. Protection against polarity reversal with built-in self-resetting fuse. 12 bit battery voltage measurement resolution.
Max. current consumption during operation.	Max. 100mA @ 13.5 VDC Max. 65mA @ 27.0 VDC
Digital inputs	8 opto-insulated digital inputs with terminal in common, connectable to both supply positive and negative; The maximum voltage applicable between the common terminal and the single input is ± 32 VDC. The maximum insulation voltage with reference to GND is 42,4 Vrms or VDC. When they are open, the voltage on input terminals is equal to the voltage on common terminal. Activation/deactivation threshold: 1,2VDC Typical current with closed contact: 5mA @ VBATT= 13.5VDC 10mA @ VBATT= 27.0VDC
Relay outputs:	Two relay outputs with NO dry contacts, max. 500mA @30VDC Max. voltage referred to GND is 250 Vrms o VDC; higher voltages or currents need an external relay with suitable features. Each relay output is reconfigurable by parameter. Outputs can be managed through Modbus.
Ethernet port	One 10/100Mbps full-duplex Ethernet interface 10T/100Tx Auto HP Auto-MDIX support compliant IEE802.3/802.3u (Fast ethernet) compliant ISO802-3/IEEE802.3 (10BASE-T)
Analog inputs	Two analog inputs 0..10VDC Input impedance: 330kohm 12 bit measure resolution. The input allows differential measurement to compensate measurement negative differences with respect to GND. Compensation range: -9/+5VDC
RS232 serial port	One standard non insulated TIA/EIA RS232 port TX, RX, DTR, DSR, GND Baud rate selectable through software: 300, 600, 1200, 2400, 4800, 9600* , 19200, 38400, 57600, 115200 Parity: None* , Even, Odd Stop bit: 1,2 Type of transmission: Modbus RTU Master* , Modbus RTU Slave 9 pole male CANON type DB connector * Default Setting

RS485 serial port	<p>One standard insulated TIA/EIA RS485 port DATA+ (A) , DATA- (B) Half Duplex Baud rate selectable through software: 300, 600, 1200, 2400, 4800, 9600*, 19200, 38400, 57600, 115200 Parity: None*, Even, Odd Stop bit: 1,2 Type of transmission: Modbus RTU Master* External termination resistance fitted (120R)</p> <p>* Default Setting</p>
USB 2.0 port	<p>One USB 2.0 port with two operating modes:</p> <p>Function mode* Connection to PC Connector: Mini-USB type B Transmission mode: Modbus RTU Slave* Modbus address: = 1* Max. distance: 6m (20 feet)</p> <p>Host mode Pen driver management Connector: USB type A Max. output current: 280mA@5Vdc with automatic overload protection.</p> <p>* Default Setting</p>
R.T.C.	A real time clock/calendar feeded with an internal rechargeable 3Vdc battery
Storage temperature	From -20°C to +60°C
Operating temperature	From -20°C to +60°C
Dimensions	106 (L) x 90 (H) x 58 (P) mm
Protection degree	IP20 (external)
Mounting	DIN guide (EN60715) according to DIN 43880 regulations
Material	Auto-extinguishing Blend PC/ABS
Weight	250g

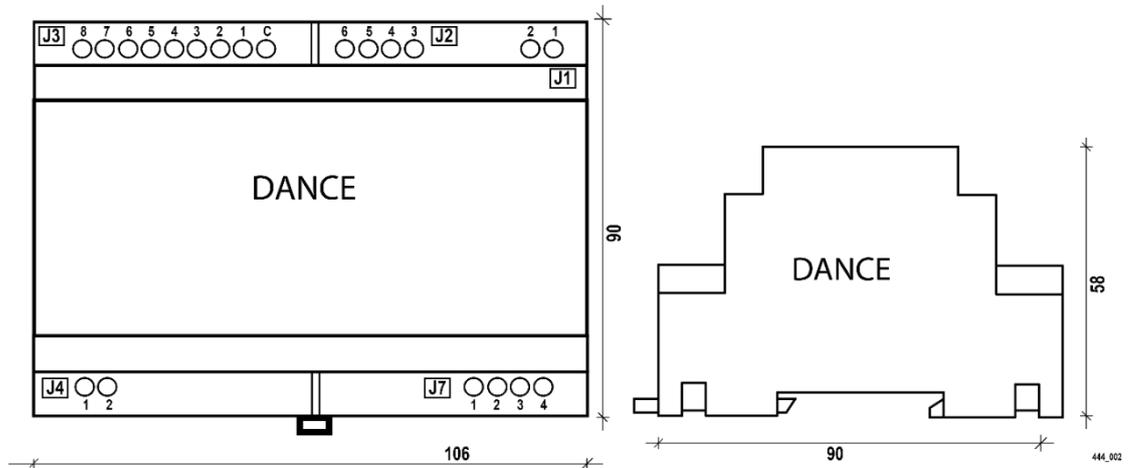
4. Installation

4.1 Package content

- 1 **Dance**
- 1 installation guide
- 1 USB-A male/USB Mini-B male cable (for PC connection)
- 1 x 2 mt. serial RS232 f/f Crossover cable (on request)

4.2 Device dimensions

The device is designed to be mounted on a **DIN 43880** guide in upright position. Proper operation requires adequate ventilation. Avoid mounting over and/or close to heat sources.



5. Connections

DANCE LEGENDA

1. RS232 serial
2. Dip Switches
3. **AUX button**
4. **Ethernet connector**
5. Led indicator
6. **USB 2.0 Function**
7. USB selection switch
8. USB Host
9. USB device feeding led indicator
10. **J1** connectors - feeding and **J2** - digital outputs
11. **J3** connector: digital inputs
12. **J4** connector: RS485
13. **J7** connector: analog inputs

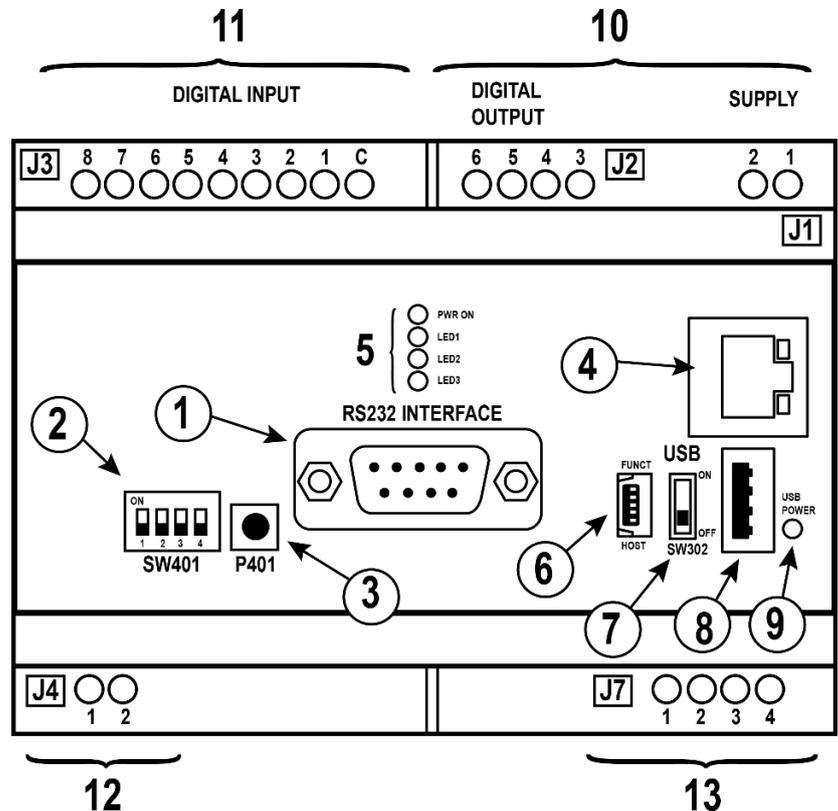


Fig. 1 – DANCE indications

5.1 Device supply - J1 connector (ref. 10)

- 2 pole terminal
- Solid wire section: 0.2 ÷ 2.5 mm² (IMQ) 24÷14 AWG (UL)
- Strands wire section: 0.2 ÷ 2.5 mm² (IMQ) 24÷14 AWG (UL)
- Max tightening: 0.6 Nm
- Stripping length: 6.5 mm

Connector	Terminal nr.	Pin	Function
J1 Ref. 10	1	+BATT.	Positive input main supply (8...32 Vdc)
	2	GND	Negative input main supply (8...32 Vdc)

Connect the device DC supply to the terminal 1 of J1 (positive input, +Vbatt) and terminal 2 of J1 (negative input, GND). Even if the device is protected by an internal self-resetting fuse, it's compulsory to use a 1A protection fuse at J1 terminal 1 (+VBATT).

The supply voltage when using the device is the one of the genset starting battery; it can be supplied also by a specific power supply.

Max. aplicable voltage is 32Vdc.

When the green power on led (PWR ON) on the front of the device is on, there's supply voltage.

! **WARNING!** In compliance with safety rules, you must guarantee a mains insulation not lower than a safety transformer compliant with IEC61558-2-6 rule or equivalent.

i **INFORMATION!** During the installation, connect the battery positive as last operation.

5.2 Relay outputs - J2 connector (ref. 10)

- 4 pole terminal.
- Solid wire section: 0.2 ÷ 2.5 mm² (IMQ) 24÷14 AWG (UL)
- Strands wire section: 0.2 ÷ 2.5 mm² (IMQ) 24÷14 AWG (UL)
- Max tightening: 0.6 Nm
- Stripping length: 6.5 mm

Connector	Terminal nr.	Pin	Function
J2 Ref. 10	3	OUT1	Common dry contact relay 1 (max 0.5A 30V)
	4	OUT1	Open dry contact relay 1 (max 0,5A 30V)
	5	OUT2	Common dry contact relay 2 (max 0,5A 30V)
	6	OUT2	Open dry contact relay 2 (max 0,5A 30V)

The device is equipped with two dry NO contact relay outputs (max 0,5A @30VDC). Max. voltage referred to GND is 250 Vrms o VDC; higher voltages or currents need an external relay with suitable features.

5.3 Optoinsulated digital inputs - J3 connector (ref. 11)

- 9 pole terminal
- Solid wire section: 0.2 ÷ 2.5 mm² (IMQ) 24÷14 AWG (UL)
- Strands wire section: 0.2 ÷ 2.5 mm² (IMQ) 24÷14 AWG (UL)
- Max tightening: 0.6 Nm
- Stripping length: 6.5 mm

Connector	Terminal nr.	Pin	Function
J3 Ref. 12	C	COMM. INPUT	Digital input common connectable to the main supply positive or negative
	1	IN1	Digital input nr. 1
	2	IN2	Digital input nr. 2

Connector	Terminal nr.	Pin	Function
	3	IN3	Digital input nr. 3
	4	IN4	Digital input nr. 4
	5	IN5	Digital input nr. 5
	6	IN6	Digital input nr. 6
	7	IN7	Digital input nr. 7
	8	IN8	Digital input nr. 8

On this connector there are 8 opto-insulated digital inputs.

The digital inputs common is available on terminal C of J3, and it is possible to connect both positive and negative of the DANCE main supply voltage and both positive and negative of an external DC second source.

If the common terminal C of J3 is connected to positive, the inputs will be activated by connecting the input terminals 1..8 of J1 to negative (IN1..IN8).

If the common terminal C of J3 is connected to negative, the inputs will be activated by connecting the input terminals 1..8 of J1 to positive (IN1..IN8).

The max. applicable voltage between the common terminal C of J3 and the single inputs (terminals 1..8 of J3) is max ± 32 VDC.

The maximum insulation voltage, with reference to the device supply negative (terminal 2 of J1-GND) is max 250 Vrms o VDC.

5.4 Insulated RS485 serial interface (com2) - J4 connector (ref. 12)

- 2 pole terminal.
- Solid wire section: $0.2 \div 2.5 \text{ mm}^2$ (IMQ) 24÷14 AWG (UL)
- Strands wire section: $0.2 \div 2.5 \text{ mm}^2$ (IMQ) 24÷14 AWG (UL)
- Max tightening: 0.6 Nm
- Stripping length: 6.5 mm

Connector	Terminal nr.	Pin	Function
J4 Ref. 12	1	RS485 B	Inverting Receiver Input A/Driver Output A
	2	RS485 A	Noninverting Receiver Input A/Driver Output A

The device is equipped with an insulated RS interface (COM2). On terminal 2 and 1 of J2 connect respectively signal A (Noninverting Receiver Input A/Driver Output A) and signal B (Noninverting Receiver Input A/Driver Output A) of RS485 bus.

Connect the devices on the data line, avoiding star connections; ensure that the first and last device on the line have a 120 ohm termination resistor. In case DANCE is the first or last device, ensure to connect a 120 ohm 1/2 W termination resistor on terminals 1 and 2 of J4.

As an alternative, you can connect the internal resistance switching SW603 to ON position. In order to access to this switch, the terminal cover must be removed.

This electrical connection also requires a 120 ohm shielded cable.

The default serial port is set as: **Modbus RTU Master, 9600,N,8,1.**

! **ATTENTION!** Only one Master port can be selected. Through the parameter “P.1101 Master serial port”, you can select COM1 (RS232) or COM2 (RS485) port.

5.5 0-10V analog inputs - J7 connector (ref. 13)

- 4 pole terminal.
- Solid wire section: 0.2 ÷ 2.5 mm² (IMQ) 24÷14 AWG (UL)
- Strands wire section: 0.2 ÷ 2.5 mm² (IMQ) 24÷14 AWG (UL)
- Max tightening: 0.6 Nm
- Stripping length: 6.5 mm

Connector	Terminal nr.	Pin	Function
J7 Ref. 13	5	AN1 0..10V	AN1 measurement analog input with voltage from 0 to 10 Vdc with ground reference dedicated to terminal 6 of J7
	6	AN1 GND	Reference ground input dedicated to analog input AN1 IN 0..10V
	7	AN2 0..10V	AN2 measurement analog input with voltage from 0 to 10 Vdc with ground reference dedicated to terminal 8 of J7
	8	AN2 GND	Reference ground input dedicated to analog input AN2 IN 0..10V

The device is equipped with two analog inputs for voltage signals; the measurement range is included between 0 and 10VDC.

Connect the positive input of the analogue measure to the terminal 5 or 7 of J7 and the ground reference to the terminal 6 or 8 of J7. The voltage to measure must be referred to the same potential of the supply negative J1-2, GND; it is better to supply the device or the transducer with the same source that supplies Dance.

! **WARNING!** In compliance with safety rules, you must guarantee a mains insulation not lower than a safety transformer compliant with IEC61558-2-6 rule or equivalent.

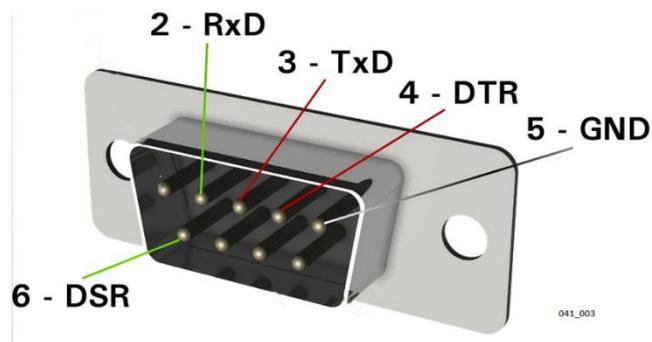
5.6 RS232 serial interface (com1) - (ref. 1)

- Standard **non insulated** TIA/EIA RS232 serial.
- 9 pole male CANON type DB connector
- Max. distance: 12m (39 feet).

Dance is equipped with a serial port suitable with the specifications EIA-RS232 (COM1). It can be externally accessed through the 9 poles male DB connector of the same type of the ones used on PC. This serial port can be used for the MODBUS RTU communication towards the SLAVE device or the PC for Programming/Settings: by default, it is set as **Modbus RTU Master, 9600,N,8,1**.

The connector pinout is standard, as shown below:

Pinout	Function
1	N.C.
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	N.C.
8	N.C.
9	N.C.



In order to connect directly a PC or another RS232 equipment to the devices, you need to use a crossover cable CANON 9 poles female on both terminals, as the following connection diagram:

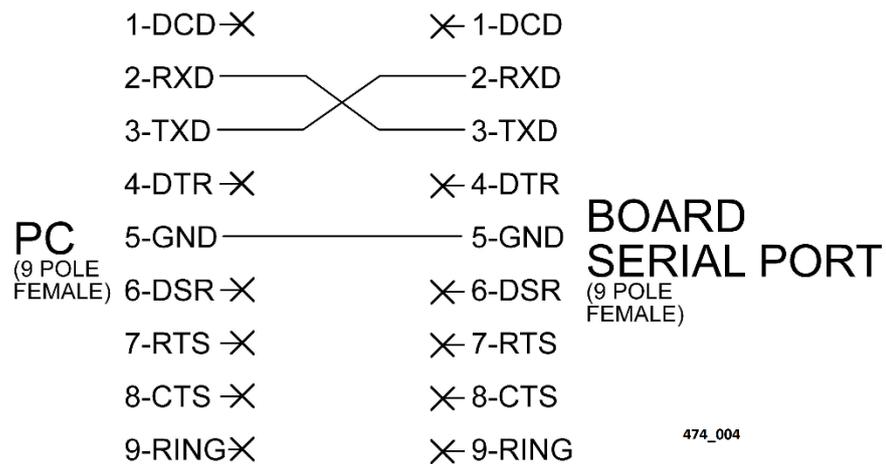


Fig. 2 – RS232 serial cable

As an alternative, you can use a Crossover cable that can be ordered with the following MECC ALTE code: **E090000000048 CROSS OVER RS232 DB9P F/F MT2 AT CABLE**.

! ATTENTION! Only one Master port can be selected. Through the parameter “P.1101 Master serial port”, you can select COM1 (RS232) or COM2 (RS485) port.

5.7 USB2.0 interface

Dance device has only one USB port, shared with two connectors with two different operation modes:

- Mini-USB type B connector for **Function** mode.
- USB type A connector for **Host** or **Function** mode, depending on the SW302 switch selection (ref.7).

 **WARNING!** The two connectors can't be used simultaneously to connect two devices.

5.7.1 Function mode - Mini-USB type B connector (ref. 6)

- USB2.0 port for PC connection
- Mini-USB type B connector
- Max. distance: 6m (20 feet)

Mini-USB type B connector is dedicated just to USB 2.0 Function mode (slave), regardless to the SW302 switch status.

USB protocol can't be used permanently in industrial plants, due to the limited cable length and the relevant sensibility to electric interferences also on the PC. For this reason, **the USB connection cable must be used only when it is necessary to operate with the device and must be removed from the connector when the operation is over.**

For the USB connection, a cable USB-A male/USB Mini-B male is needed.



The connection to a PC through the USB cable is used for two purposes:

- Firmware upload on the device
- Parameters programming

The upload/update of the device firmware is a specific MECC ALTE operation. In addition to the FW to upload, a particular procedure and dedicated software are required; therefore, this operation must not be carried out by the installer, except for specific cases agreed with MECC ALTE.

The USB port can be used to set the parameters with BoardPrg software, as an alternative to the Ethernet or the RS232/RS485 serial connection.

It is necessary to install the driver **CDC_Mecc Alte_Win.inf** supplied by MECC ALTE on the PC; for the driver installation, refer to document[4].

After installing the driver, the PC will acknowledge the DANCE device as a new serial port, which has to be used exactly as a RS232 serial port.

5.7.2 Host mode - USB type A connector (ref. 8)

- USB2.0 Host port for Pen Driver connection
- USB type A connector
- Max. output current: 280mA@5Vdc with automatic overload protection

When SW302 switch is positioned on HOST, the USB port is used as USB 2.0 HOST (Master).

This USB 2.0 Host port is set to manage a Pen Driver.

The "USB POWER" led indicator (ref. 9) shows whether a peripheral USB device is connected to the connector or not.

The led is off when the peripheral device is disconnected or due to the overload protection activation.

Software is still under development and an update will be needed to use this feature.

When the SW302 switch is positioned to Function, the USB port can be used as USB 2.0 Function port (slave) for a connection with a PC.

5.8 ETHERNET 10/100Mbps interface (ref. 4)

- Shielded 8p RJ45 connector
- Link/Activity green led
- 10/100Mbps orange led

DANCE device is equipped with a full-duplex Ethernet 10/100Mbps LAN interface compliant with IEEE802.3/802.3u (Fast ethernet) and ISO802-3/IEEE802.3 (10BASE-T) standards.

DANCE is able to automatically detect network speed and negotiate between 100BASE-TX and 10BASE-T, as well as full and half-duplex. It also supports HP Auto-MDIX feature, which means that automatically applies an internal cross, when needed, allowing to use both direct (EIA/TIA-568A or EIA/TIA-568B) and crossover cables.

Two integrated leds built-in in RJ45 connector allow to **physically** check the connection between Ethernet interface and any possible network switch, router, PC...

Link/Act green led shows physical connection status:

- Led off = Ethernet port isn't connected (link is down)
- Led on = Ethernet port is connected with an external device (switch, router, pc...)
(link is up, no activity)
- Led blinking = Ethernet port is connected with an external device (switch, router, pc...) and they're exchanging data
(link is up, with activity)

Yello led (**10/100**) shows the connection speed of Ethernet port:

- Led off = 10Mbps connection
- Led on = 100Mbps connection

Yellow "LED2", located on the front of the device (ref. 5) shows the connection status with the remote server: you can find more information in the following chapter (indicators).



INFORMATION! Max distance for 10/100Mbps connection in CAT5 is 100mt.

6. Indicators (ref. fig. 1)

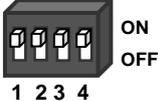
Led off	Fixed led on	Blinking led
□	■	◻

Signal		Function
POWER ON  Ref. 5	■	The device is powered.
	□	The device is not powered.
LED 3 "WEB"  Ref. 5	■	Web page required (it remains on for 200msec after sending a web page) Or data transmission status
	□	No web page required No data trasmission
LED 2 "TCP"  Ref. 5	■	TCP activity on Ethernet port: - Data successfully sent to server through TCP - or active Modbus/TCP communication
	◻	Fast blinking 50% (period 0.2s) "SERVER" connection attempt failed.
	◻	Slow blinking 50% (period 0.6 s) "SERVER" connection attempt in progress or data sending.
	□	No activity on the Ethernet port (no data sending to the "SERVER" , no active connection)
LED 1 "MODBUS"  Ref. 5	■	MODBUS RTU serial communication in progress. the connected controller answers correctly to Modbus requests (on RS232 or RS485).
	□	MODBUS RTU serial communication in stand-by. The controller does not react to the Dance requests, or no controller has been configured.

When the yellow leds alternatively blink, Dance is in programming mode. In this mode the device can be connected through RS232 serial (with fix 9600 baud speed and Modbus 1 address) to a PC, to allow programming through BoardPrg.

When the 3 led blink simoultaneously, Dance is in programming mode and is connected to a PC (communication in progress).

7. Pushbuttons and DIPSWITCHES (ref. fig. 1)

object	Function
<p>Button AUX</p>  <p>Ref. 2</p>	<p>Pressing the AUX button for more than 5 seconds (LED1/LED2/LED3 light up one after the other) the device enters in programming mode.</p> <p>You can press the button again to exit this mode.</p>
<p>DIPSWITCH SW701</p>  <p>Ref. 4</p>	<p>SW701 – 1: Reserved, leave on OFF.</p> <p>SW701 – 2: Reserved, leave on OFF.</p> <p>SW701 – 3: Reserved, leave on OFF.</p> <p>SW701 – 4: Reserved, leave on OFF.</p>
<p>SWITCH USB</p> <p>FUNCT HOST</p>  <p>Ref. 10</p>	<p>Moves USB supply to Host or Function connector.</p>
<p>SWITCH 120R</p> <p>ON OFF</p> 	<p>Enables the external 120 ohm termination resistance on RS485 line.</p>

8. Parameters configuration

8.1 DANCE configuration modes

DANCE must be configured through with **BoardPrg** software (connecting DANCE to a PC).

8.1.1 Parameters configuration via BoardPrg

Before using the device, operating parameters must be configured.

You can find the complete parameter list in the document **EAAM0407XXXA[1]** (DANCE parameters table).

For the configuration, the device must be connected to a PC through RS232 serial (com port) or USB.

If the device is connected to ethernet network and the IP address is known, it can be configured through network connection too.

Refer to chapter **5.4 RS232 serial connector (ref. 3)** or to chapter **5.5 USB connector (ref. 1)** to establish the type of cable to use. Note that, in order to use USB connection,

MECC ALTE CDC_Mecc Alte_Win.inf must be installed in the PC; for the driver installation, refer to document [[4]

After installing the driver, the PC will acknowledge the DANCE device as a new virtual serial port, which can be used exactly as a physical RS232 serial port.

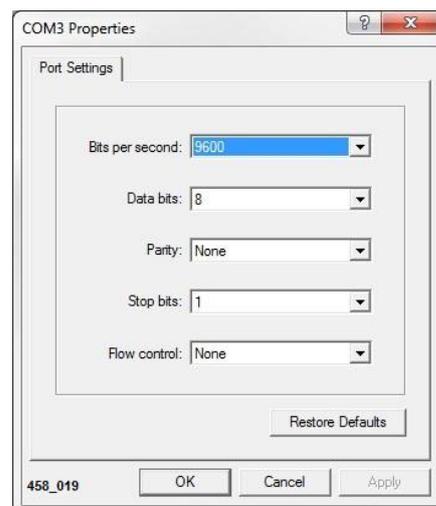
Use **BoardPrg** software (**version 3.22** and higher) to change parameters following the indications below:

- Connect the SERIAL or USB cable between the PC and the DANCE device.
- Turn on DANCE and press “**AUX**” button: hold it for at least 5 seconds, until the yellow Leds 1-2-3 turn on one after the other.



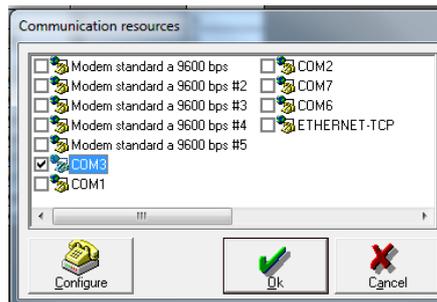
INFORMATION! In case of USB connection, it is not necessary to press the “AUX” button.

- Start “BoardPRG ” software or higher version.
 - Enter **Communication**
 - **Select the communication resource**
 - Select the communication resource available on the PC (e.g. “COM3”)

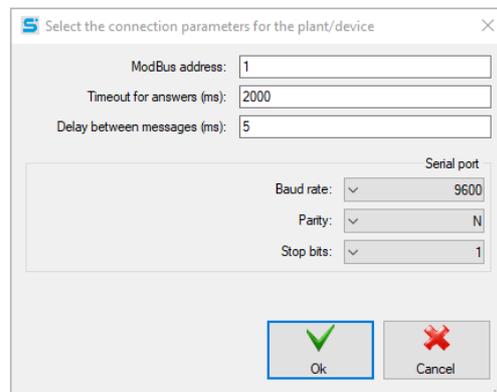


- Enter **Configure** and check that the serial communication parameters are the DANCE default ones: **9600, N, 8, 1**

- confirm with OK



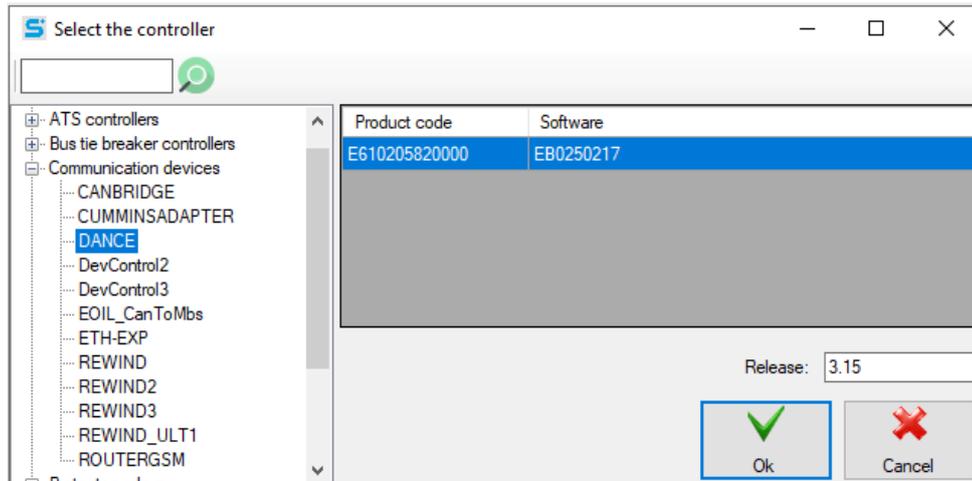
- confirm with OK
- Enter **Communication**
 - **Select the address**
 - Set DANCE address (default value is **1**)
 - Confirm with OK



On the center and right lower side, you will see the settings configured before, which means **COM3 (9600, 8, N, 1)** and **Serial Address 1**. "Closed", written next to the serial configuration, means that the communication is not active yet.



- Enter **File**
 - **Select the device**
 - Select **DANCE**, possible **Subtype** and indicate the **Revision of the device you have**.



- confirm with **OK**
- Select “Connect” and check that on the lower right side the number of the transmissions increase.
- Select **configuration** to open the list of parameters
- Select **read** to acquire the parameters on the connected DANCE device
- Select **copy** to transfer the values read from the column “On the device” to the column “On the PC”.

 **INFORMATION!** Check that LED1 “MODBUS” is on to indicate the correct communication.

 **Important:** Read the parameters (Read command), and transfer the values to the New Value column, where you can edit them (Copy command).

Now, you can configure the device.

You may now save the configuration on a PC (Save), and reload it (Load) later to configure other modules in the same way.

Select **Transmit** and wait for the data to be transmitted.

A green tick  for every parameter in the “Parameter” column confirms that the values set in the Dance device correspond with the ones saved in the PC.

A yellow triangle  indicates that the values are different.

8.2 Modbus registers

8.2.1 Input Registers

Register	Format	N	MEASUREMENT	U.M.
0001	BOOL_01	1	Digital input status	-
0002	BOOL_01	1	Digital output status	-
0003	BOOL_01	1	Dip switch status	-
0004	BOOL_01	1	Dip switch status at starting	-
0005	BOOL_01	1	Button status (1=pressed, 0=not pressed)	-
0006	BOOL_01	1	Led image (LED1,2,3)	-
0011	SHEX_04	4	Actual IP address (fix or DHCP)	-
0016	SHEX_04	4	Actual subnet mask (fix or DHCP)	-
0021	SHEX_04	4	Router gateway address (fix or DHCP)	-
0026	SHEX_04	4	DNS server address	-
0108	SHEX_03	3	Device ID (used by SMARTCLOUD)	-
0119	US_00	1	TCP connection status (0=not active, 1=active)	-
0120	US_00	1	Max. number of sockets managed (currently 6)	-
0121	US_00	1	TCP socket n.1 status (0= not connected, 1= starting, 2= waiting for data, 3= open, 4= receing data, 5= waiting for answer, 6= ready to transmit, 7= waiting for ack)	-
0122	US_00	1	TCP socket n.2 status	-
0123	US_00	1	TCP socket n.3 status	-
0124	US_00	1	TCP socket n.4 status	-
0125	US_00	1	TCP socket n.5 status	-
0126	US_00	1	TCP socket n.6 status	-
0130	US_00	1	Max. number of modbus/TCP transactions managed (currently 10)	-
0131	US_00	1	Modbus/TCP n.1 transaction - TCP socket index assigned (0xff=free)	-
0132	US_00	1	Modbus/TCP n.2 transaction - TCP socket index assigned (0xff=free)	-
0133	US_00	1	Modbus/TCP n.3 transaction - TCP socket index assigned (0xff=free)	-
0134	US_00	1	Modbus/TCP n.4 transaction - TCP socket index assigned (0xff=free)	-
0135	US_00	1	Modbus/TCP n.5 transaction - TCP socket index assigned (0xff=free)	-
0136	US_00	1	Modbus/TCP n.6 transaction - TCP socket index assigned (0xff=free)	-
0137	US_00	1	Modbus/TCP n.7 transaction - TCP socket index assigned (0xff=free)	-
0138	US_00	1	Modbus/TCP n.8 transaction - TCP socket index assigned (0xff=free)	-
0139	US_00	1	Modbus/TCP n.9 transaction - TCP socket index assigned (0xff=free)	-
0140	US_00	1	Modbus/TCP n.10 transaction - TCP socket index assigned (0xff=free)	-
0150	US_00	1	Max. number of modbus/RTU transactions (currently 13)	-
0151	US_00	1	Modbus RTU n.1 transaction - status (0=free, 1=not free, 2=answering, 3=no answer, 4=timeout)	-
0152	US_00	1	Modbus RTU n.2 transaction - status	-

Register	Format	N	MEASUREMENT	U.M.
0153	US_00	1	Modbus RTU n.3 transaction - status	-
0154	US_00	1	Modbus RTU n.4 transaction - status	-
0155	US_00	1	Modbus RTU n.5 transaction - status	-
0156	US_00	1	Modbus RTU n.6 transaction - status	-
0157	US_00	1	Modbus RTU n.7 transaction - status	-
0158	US_00	1	Modbus RTU n.8 transaction - status	-
0159	US_00	1	Modbus RTU n.9 transaction - status	-
0160	US_00	1	Modbus RTU n.10 transaction - status	-
0161	US_00	1	Modbus RTU n.11 transaction - status	-
0162	US_00	1	Modbus RTU n.12 transaction - status	-
0163	US_00	1	Modbus RTU n.13 transaction - status	-
0198	BOOL_01	1	Ethernet interface status	-
0199	BOOL_01	1	Ethernet interface presence 0 = physical Ethernet not detected, out of order 2 = physical Ethernet detected, but cable disconnected 3 = Ethernet cable connected	-
801	STR_09	9	Firmware date and time. E.g.: " 02/02/2015 16:40"	-
1471	UL_00	2	Analog inputs - conversion counter	-
1473	US_00	1	Analog input n.1 - converter points	-
1474	US_00	1	Analog input n.2 - converter points	-
1475	US_00	1	Analog input n.3 - converter points	-
1477	US_08	1	Analog input n.1 - V value (with 8 decimal bits)	V
1478	US_08	1	Analog input n.2 - V value (with 8 decimal bits)	V
1479	US_08	1	Analog input n.3 - V value (with 8 decimal bits)	V
1481	US_00	1	Analog input n.1 - input 1 voltage 0-10 V	mV
1482	US_00	1	Input Analog 2 – input 2 voltage 0-10V	mV
1483	US_00	1	Analog input 3 – battery voltage	mV
1487	UL_00	2	Analog input 1 – percentage (ris. 0.1 %)	%
1491	UL_00	2	Analog input 2 – percentage (ris. 0.1 %)	%
11001	SHEX_06	6	Network interface MAC (1 byte for every register)	-
12001	SHEX_06	6	Device ID (1 byte for every register)	-

8.2.2 Holding Registers

Register	Format	N	MEASUREMENT	U.M.
0001	US_00	1	Clock - seconds	sec
0002	US_00	1	Clock - minutes	min
0003	US_00	1	Clock - hours	h
0004	US_00	1	Clock - month day	-
0005	US_00	1	Clock - week day	-
0006	US_00	1	Clock - month	-
0007	US_00	1	Clock - year	-
0032	UL_00	2	Device working hours counter (absolute, saved on non-volatile memory)	h
0034	US_00	1	Device working minutes counter	m
0036	US_00	1	Time from Power On: days	d
0037	US_00	1	Time from Power On: hours	h

Register	Format	N	MEASUREMENT	U.M.
0038	US_00	1	Time from Power On: minutes	m
0039	US_00	1	Time from Power On: seconds	s
0041	UL_00	2	Engine working hours (calculated by Dance)	h
0047	UL_00	2	Hours left before maintenance (calculated by Dance)	h
0049	US_00	1	Minutes counter for time left before maintenance	m
1001	BOOL_01	1	Digital output status	-
13101	BOOL_01	1	Master serial port selection (0=none, 1=COM1 RS232, 2=COM2 RS485)	-
13178	UL_00	2	COM1 –RS232 serial port speed	-
13180	US_00	1	COM1- RS232 serial port configuration	-
13181	BOOL_01	1	Modbus registers order on COM1	-
13183	STR_12	12	Name associated to DANCE (identifies the device in the network when DNS is active)	-
13256	UL_00	2	COM2 –RS485 serial port speed	-
13258	US_00	1	COM2 RS485 serial port configuration	-
13259	BOOL_01	1	Modbus registers order on COM2	-
13655	SHEX_02	2	IP address (used when DHCP is not active)	-
13657	SHEX_02	2	Subnet Mask (used when DHCP is not active)	-
13659	SHEX_02	2	Network gateway (used when DHCP is not active)	-
13661	US_00	1	Modbus/TCP port (default = 502)	-
13662	US_00	1	WEb server port (default = 80)	-
13663	BOOL_01	1	Modbus registers order (Ethernet)	-
13664	US_00	1	NTP server port (0= NTP server disabled)	-
13665	SHEX_02	2	NTP server address (0= NTP server disabled)	-
13667	SHEX_02	2	Primay DNS server	-
13669	SHEX_02	2	Secondary DNS server	-
13671	US_00	1	DHCP client port (0= DHCP server disabled)	-
13672	US_00	1	DHCP server port (0= DHCP server disabled)	-
13673	SHEX_02	2	DHCP server address (0= DHCP server disabled)	-
13752	US_00	1	Controllers interrogation pause (between interrogation series). expressed in tenths of second	0.1 sec
13753	US_00	1	Answer waiting timeout (expressed in tenths of second)	0.1 sec
13761	US_00	1	Controller n.1 - Modbus address	-
13762	US_00	1	Controller n.1 - type	-
13763	US_00	1	Controller n.2 - Modbus address	-
13764	US_00	1	Controller n.2 - type	-
13765	US_00	1	Controller n.3 - Modbus address	-
13766	US_00	1	Controller n.3 - type	-
13767	US_00	1	Controller n.4 - Modbus address	-
13768	US_00	1	Controller n.4 - type	-
13769	US_00	1	Controller n.5 - Modbus address	-
13770	US_00	1	Controller n.5 - type	-
13771	US_00	1	Controller n.6 - Modbus address	-
13772	US_00	1	Controller n.6 - type	-
13773	US_00	1	Controller n.7 - Modbus address	-
13774	US_00	1	Controller n.7 - type	-

Register	Format	N	MEASUREMENT	U.M.
13775	US_00	1	Controller n.8 - Modbus address	-
13776	US_00	1	Controller n.8 - type	-
				-

Note: in the Modbus register list there are the basic device parameters. You can find the complete and updated parameter list in the document Parameter table.

9. Network parameters

9.1 IP address

IP address (Internet Protocol Address) univocally identifies the device connected to a network. IP address and subnet mask are the two essential parameters.

It's very important to make sure that THERE AREN'T any Ethernet device with the same IP address in the same network.

If there is a DHCP server, this parameter isn't used. In fact, DHCP server transmits the IP address that Dance device must use.

Default IP address is 192.168.0.1

If the device must be use in a corporate network, contact the network administrator to get an available IP address.

9.2 Subnet mask

The subnet mask defines a range in a subnetwork. In this way the device can look for the recipient in a defined range without using a router. Subnet mask is generally 255.255.255.0 (class C).

In order to communicate, two devices must be in the same subnet, otherwise a router or gateway is needed.

If a DHCP server is used, subnet mask will also automatically acquired.

9.3 Network gateway

A network gateway allows to send data outside a subnet. if all the devices are connected to the same subnet and don't need external connections, a network gateway isn't needed.

If a DHCP server is used and correctly configured, it provides network gateway address too.

9.4 Dynamic Host Configuration Protocol (DHCP)

If a device is connected to a network with DHCP server, the following network parameters can be automatically assigned:

IP address subnet mask, default gateway, DNS server addresses, NTP server address.

Default value is 0.0.0.0 (disabled). As a consequence, fix parameter configured in DAncee are used.

Contact your network administrator to configure this parameter.

9.5 Domain Name System (DNS)

If Dance is connected to a network with DNS server, it can be connected through name as well as through IP address.

If a DHCP server is used, DNS server IP address is automatically acquired and this parameter is ignored.

Device name is identified through parameter P.0801 Plant Name.

Two DNS servers can be set (primary and secondary).

Default value is 0.0.0.0 (disabled).

9.6 Network Time Protocol (NTP)

Dance supports NTP protocol, which allows to synchronize its internal clock.

Default value is 0.0.0.0 (disabled).

If a DHCP server is used, NTP server data are automatically acquired.

9.7 Simple Network Management Protocol (SNMP)

The SNMP protocol (Simple Network Management Protocol) is an international standard protocol for managing devices on IP networks. It uses the UDP protocol on ports 161 and 162; it allows to simplify the configuration, management and supervision (monitoring) of devices connected in a network.

The SNMP protocol has three fundamental components:

- **MANAGER**: is the management system (e.g., supervisory system or PC);
- **AGENT**: is the device that responds to SNMP queries (e.g., MECC ALTE controller);
- **MIB** (Management Information Base): is a fixed file used to provide the **MANAGER** with instructions to collect the information contained in the **AGENT**.

It is a request-response protocol; the **MANAGER** queries the **AGENT** by sending the request messages (GetRequest, SetRequest, GetNextRequest and GetBulkRequest) and the **AGENT** will reply with Response. Furthermore, when an "event" occurs, the **AGENT** sends spontaneous information through TRAP messages to a specified **MANAGER**.

The protocol provides the definition of the "Community String" to regulate the access to the data of the **AGENT** in reading and writing. Those currently used in the controller are:

- Read Community String: "public"
- Write Community String: "private".

Currently the controller supports the versions v1 and V2c of the SNMP protocol.

The parameters used in the configuration are available in the menu 1-Ethernet:

Parameter	DANCE Ver.	Name	Default
P.0524	03.13	Enable SNMP?	No
P.0525	03.13	SNMP Manager address	0.0.0.0
P.0526	03.13	SNMP Notification port (TRAP)	162
P.0527	03.13	SNMP Notification events (TRAP)	0

The parameter P.0527 configures in which cases the controller must spontaneously send notification events (TRAP) to the SNMP **MANAGER**:

Bit	Value (hex)	Description
0	0001	For alarms, warnings and deactivations
1	0002	For events and alarms from DANCE
2	0004	For mains status
3	-	-
4	0010	For engine status

9.7.1 MIB table

The definition of the device data are contained in the MIB table.

MIB table (MIB=management information base) is a descriptor file. It contains information on data that can be managed via the SNMP protocol (SNMP= Simple Network Management Protocol).

NOTE: the MIB file (MECC ALTE_DANCE_v2B.mib) is available on MECC ALTE web site

The path starts with the following OID :

OID Dance path:

**mib-root.iso.org.dod.internet.private.enterprises.Mecc Alte.dance
1.1.3.6.1.4.1.54209.217**

"public" is the community name to read data from DANCE via SNMP

“private” is the community name to write data from DANCE via SNMP
It is used to set Trap Address, TrapPort or Trap Event parameters through “danceConfigWrTable”

9.7.2 Examples with SNMP protocol

Here are some examples using the Snmpget and SnmpWalk applications.

The command line read data using SnmpGet is:

```
snmpget -r:10.42.85.130 -c:"public" -o:1.3.6.1.4.1.54209.217.1.11.1.101
```

Example of Dance answer (Dance 1 mains voltage L1-L2):

```
OID=.1.3.6.1.4.1.54209.217.1.11.1.101  
Type=Integer  
Value=4434
```

The command line read data using SnmpWalk is:

```
snmpwalk -r:10.42.85.130 -c:"public" -os:1.3.6.1.4.1.54209.217.1.11.1
```

Example of Dance answer:

```
OID=.1.3.6.1.4.1.54209.217.1.11.1.101, Type=Integer, Value=4434  
OID=.1.3.6.1.4.1.54209.217.1.11.1.102, Type=Integer, Value=4456  
OID=.1.3.6.1.4.1.54209.217.1.11.1.103, Type=Integer, Value=4471  
OID=.1.3.6.1.4.1.54209.217.1.12.0, Type=Counter32, Value=0  
OID=.1.3.6.1.4.1.54209.217.1.12.1.120, Type=Integer, Value=484  
OID=.1.3.6.1.4.1.54209.217.1.12.1.121, Type=Integer, Value=3957  
OID=.1.3.6.1.4.1.54209.217.1.12.1.122, Type=Integer, Value=3993  
OID=.1.3.6.1.4.1.54209.217.1.12.1.123, Type=Integer, Value=4016  
OID=.1.3.6.1.4.1.54209.217.1.12.1.124, Type=Integer, Value=0  
OID=.1.3.6.1.4.1.54209.217.1.12.1.125, Type=Integer, Value=0  
OID=.1.3.6.1.4.1.54209.217.1.12.1.126, Type=Integer, Value=0  
OID=.1.3.6.1.4.1.54209.217.1.12.1.131, Type=Integer, Value=9002595  
OID=.1.3.6.1.4.1.54209.217.1.12.1.132, Type=Integer, Value=633358  
OID=.1.3.6.1.4.1.54209.217.1.13.0, Type=Counter32, Value=0  
OID=.1.3.6.1.4.1.54209.217.1.13.1.141, Type=Integer, Value=7423  
OID=.1.3.6.1.4.1.54209.217.1.13.1.142, Type=Integer, Value=7473  
OID=.1.3.6.1.4.1.54209.217.1.13.1.143, Type=Integer, Value=7412  
OID=.1.3.6.1.4.1.54209.217.1.13.1.201, Type=Integer, Value=5140  
OID=.1.3.6.1.4.1.54209.217.1.13.1.202, Type=Integer, Value=-22  
OID=.1.3.6.1.4.1.54209.217.1.13.1.203, Type=Integer, Value=5148  
OID=.1.3.6.1.4.1.54209.217.1.13.1.214, Type=Integer, Value=100  
OID=.1.3.6.1.4.1.54209.217.1.14.0, Type=Counter32, Value=0  
OID=.1.3.6.1.4.1.54209.217.1.14.1.302, Type=Integer, Value=8832  
OID=.1.3.6.1.4.1.54209.217.1.14.1.312, Type=Integer, Value=100  
OID=.1.3.6.1.4.1.54209.217.1.14.1.321, Type=Integer, Value=88  
OID=.1.3.6.1.4.1.54209.217.1.14.1.324, Type=Integer, Value=4879917  
OID=.1.3.6.1.4.1.54209.217.1.14.1.326, Type=Integer, Value=-1  
OID=.1.3.6.1.4.1.54209.217.1.14.1.332, Type=Integer, Value=0  
OID=.1.3.6.1.4.1.54209.217.1.14.1.4501, Type=Integer, Value=1266  
OID=.1.3.6.1.4.1.54209.217.1.14.1.4503, Type=Integer, Value=9002595  
OID=.1.3.6.1.4.1.54209.217.1.15.0, Type=Counter32, Value=0
```

10. Web server

Dance is equipped with a Web server able to provide data of the connected device.

In order to use the Web page, controller type and IP address must be set.

Dance cyclically queries the controller and provides information on its status, data and alarms in real time.

Web server port can be configured. Default value is 80.

10.1 Web pages

Dance Web pages can be shown in a browser.

Write the IP address or, if a DNS server is available, the Dance name (P.801 Plant Name) in the address bar.

The page automatically refreshes every 2 seconds.

Every valid query from a Web page is signaled with LED3 temporary blinking.

Web page example:

Generator measurements web page

SICES
Empowering your control

DA.N.C.E.
Gateway Modbus TCP

Name : DANCE 3
 IP Addr : 192.168.0.12
 MAC Addr : 00 1B C5 09 C0 52

GENSET DA.N.C.E.

Mains Voltages			Status		Engine Measures		
L1-L2	441	V	Engine Status	Stopped	Battery	12.4	Vdc
L2-L3	443	V	Controller Mode	AUTO	Fuel Level	----	%
L3-L1	445	V	Inhibition	N	Oil Pressure	8.8	Bar
					Coolant Temperature	EEE	°C

GENERATOR MEASURES

Generator Voltages			Generator Currents			Generator Total Powers		
L1-L2	397	V	L1	591.3	A	Active Power	468.9	kW
L2-L3	401	V	L2	593.5	A	Reactive Power	21.4	kVar
L3-L1	399	V	L3	585.4	A	Apparent Power	471.0	kVA

Generator Frequency		Power Factor		Load Type	
49.7	Hz	1.00		i	

N. active alarms : 1
W0039 SERVICE REQUIRED

This is the main page. It contains the main data and active alarms read from the connected controller. It is not possible to send commands through this page.

Device web page

SICES
Empowering your control

DA.N.C.E.
Gateway Modbus TCP

Name : DANCE 3
IP Addr : 192.168.0.12
MAC Addr : 00 1B C5 09 C0 52

GENSET DA.N.C.E. Network Connections TCP Stats

Device Info			
FW Cod.	217	FW Rev.	3.13
MAC	00 1B C5 09 C0 52	ID Dance	00 00 1A 86 5C 76
Indirizzo IP	192.168.0.12	Subnet Mask	255.255.255.0
Router Address	192.168.0.254	DNS Address	0.0.0.0
Date	07/10/2022	Time	09:17:38
Device time h	16217	Hours to maint.	0
Power On time	46g 01h 08m 08s	Battery Volt.	10.9

Switch SW302

1	2	3	4
OFF	OFF	OFF	OFF

Button P301

Released

Digital Inputs

1	2	3	4	5	6	7	8
0	0	0	0	0	0	0	0

Digital Output Control

OUT 1 On Off

OUT 2 On Off

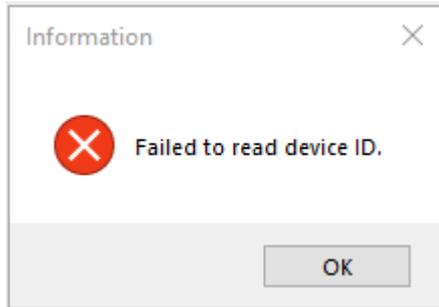
Comanda Reimposta

From here you can see information about the DANCE device (version, ID, power supply voltage), the Ethernet connection (MAC address, IP address).

The status of the digital inputs is displayed and it is possible to drive the 2 relay outputs from this page.

11. Troubleshooting

I can't connect to Dance through USB



1. Is the device powered? (LED POWER)
2. Has USB driver been installed? See paragraph dedicated to USB port.
3. Check that the serial port is recognised by the PC (Computer Management → Device Management → (COM e LPT) ports)
4. Have you selected the COM port associated to the USB port (BoardPrg → Communication resources → COMxx)?
5. Dance Modbus address is 255.

BoardPrg shows an error when I start a connection

the connected device is not supported. EB02502170212

1. BoardPrg may not be updated to the latest version.
Install BoardPrg again or update it selecting "Check updates on Mecc Alte Website".
2. Check that DANCE.brd is in the directory C:\ProgramData\Mecc Alte\BoardPrg\Brd.

The connection to the controller doesn't work.

6. Is the device powered? (LED POWER)
7. Is LED1 on? LED1 shows whether the communication with the devices connected through serial is active or not.
8. Is the device connected through RS232 or RS485? Check that the correct master port has been selected (par.0150 Master Serial Port).
9. Check the communication parameters (Baud, configurations, Modbus addresses)
10. At first, try to connect to Dance using Modbus address 255. With BoardPrg, select the communication resource ETHERNET-TCP, Dance IP address and Modbus address 255. if the connection works, the problem is in the serial communication (between Dance and controller).

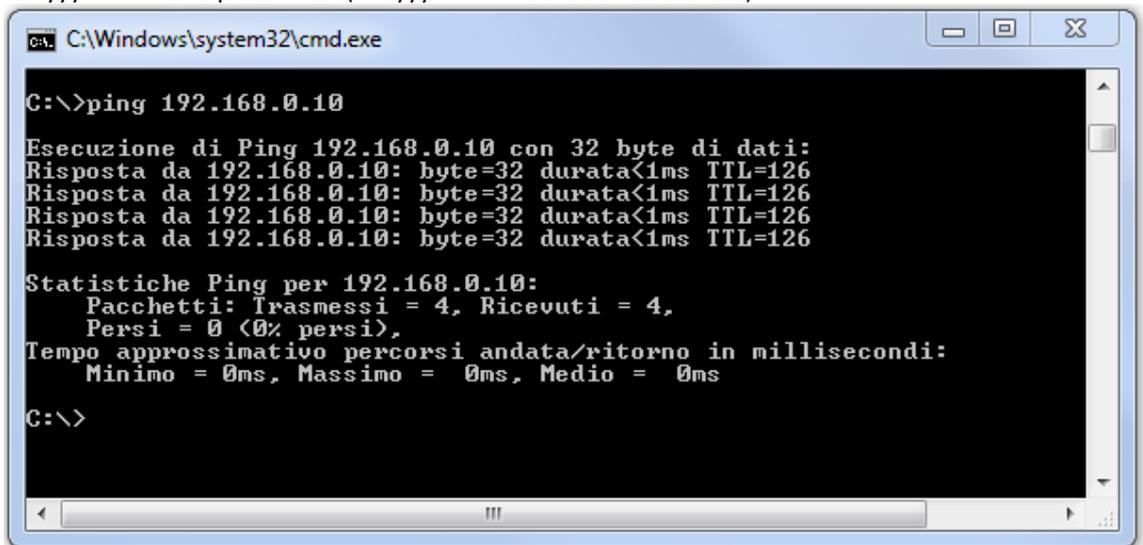
I don't know device IP address

1. Is the device powered? (LED POWER)
2. If it hasn't been configured yet, default IP address is 192.168.0.1, while default subnet mask is 255.255.255.0
3. In order to check the IP address, connect with BoardPrg through RS or USB and read the configuration.
4. If a DHCP is active, the assigned IP address can be read through Modbus registers connecting through USB or RS (Input Register 11).

How to check if Dance device works in the network

1. The green LED on the Ethernet connector must be on or blinking. If it's off, network cable is not physically connected.
2. Ping through a PC connected to the network (using the IP address or the device name if a DNS server is active).

How to ping: click on the start menu, select " The command prompt will appear. Type the command PING xxx.yyy.zzz.kkk and press Enter (xxx.yyy.zzz.kkk is the device address).



```
C:\Windows\system32\cmd.exe

C:\>ping 192.168.0.10

Esecuzione di Ping 192.168.0.10 con 32 byte di dati:
Risposta da 192.168.0.10: byte=32 durata<1ms TTL=126

Statistiche Ping per 192.168.0.10:
    Pacchetti: Trasmessi = 4, Ricevuti = 4,
    Persi = 0 (0% persi),
    Tempo approssimativo percorsi andata/ritorno in millisecondi:
    Minimo = 0ms, Massimo = 0ms, Medio = 0ms

C:\>
```

3. From a Web browser (Internet Explorer, Mozilla Firefox, Chrome, or other) type the IP address of the device (or its name if DNS server is active) and check whether the Web page appears or not.
4. Check that the max. connection length hasn't been exceeded (100mt).
5. PC and Dance must be configured in the same subnet, or a network gateway (configured in Dance) must be active.

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