



C-PRO MEGA

PROGRAMMABLE CONTROLLERS



HARDWARE MANUAL

CODE 114CPRMHWE01

Important

Please read these instructions carefully prior to installation and use, and follow all the precautions for installation and electrical connections; keep these instructions with the device for future consultation.

The device must be disposed of in accordance with local regulations pertaining to the collection of electrical and electronic appliances.



Sommario

Introduction	4
1 Components and Accessories network.....	8
1.1 Built-in version example.....	8
1.2 Sealed case version example.....	9
2 Technical features	10
2.1 Connections	10
2.2 C-PRO MEGA wiring layout.....	12
Jumpers and LEDs meanings	17
2.3 C-PRO MEGA Dimensions / Installations	20
3 C-PRO MEGA technical features	23
3.1 General features	23
3.2 Housing	23
3.2 General features	24
3.3 Electrical features	25
3.4 C-PRO MEGA built-in user interface.....	28
4 C-PRO EXP MEGA I/O expansion	30
4.1 C-PRO EXP MEGA wiring layout	31
5 C-PRO EXP MEGA Dimensions / Installations.....	34
6 Remote User interface.....	35
6.1 V-VIEW.....	35
6.1.1 V-VIEW User Interface.....	35
6.1.2 V-VIEW wiring layout	37
6.1.3 V-VIEW specifications	37
7 Accessories	39
7.1 C-PRO AL switching feeder.....	39
7.1.1 C-PRO AL wiring layout	40
8 Configuration of the supplied analogic outputs signal	42
8.1.1 Parameters configuration relative to the analog output	42
8.1.2 Closing the analogic output configuration procedure.....	43
9.1.1 Notes on the parameter of the controller relative to the CAN net configuration.....	45

Introduction

The **C-PRO MEGA** f programmable controllers family is the right solution for refrigeration, ventilation and air conditioning applications. Both in terms of controls, regulation and the user interface, the controller application software is fully programmable, in a simple and intuitive way, thanks to the use of the **UNI-PRO** development environment.

The C-PRO MEGA is available in a DIN rail version (see the pictures below). It is available also in “open” version only with plastic base for DIN rail mounting

By using the 8 relay outputs, it is possible to control various types of devices such as compressors, water circulation pumps, defrosting elements, condensation or evaporation fans, cycle inversion valves, alarm warning indicators etc.

The C-PRO MEGA is also equipped with 4 analog outputs 0,5-10 V, 0-20 mA or 4-20 mA.

The controller has 8 analog inputs :

- n° 2 for PTC probes / NTC probes / 0-5 V transducers / 0-10 V transducers / 0-20 mA transducers / 4-20 mA transducers
- n° 6 for NTC probes / 0-20 mA transducers / 4-20 mA transducers

C-PRO MEGA is also equipped with 10 low voltage digital input (12-24 Vac/dc) for normally open contact.

All the parameters may be set from the user interface.

The display is 4 x 20 font alphanumeric LCD; the keypad has 9 keys and 6 signal LED ; the sealed case and the open versions have neither display nor keypad and must be used in conjunction with a remote terminal.

The controllers have the following serial communication ports:

- n° 1 optoinsulated RS-485 (always mounted on the controller) with EVCO or MODBUS communication protocol
- n° 1 not optoinsulated LocalCAN (always mounted on the controller)
- n° 1 optoinsulated RS-485 or n° 1 RS-232 (on request, not available on built-in or open versions)
- n° 1 optoinsulated WideCAN (on request, available only on 128 KB memory version).

C-PRO MEGA has real time clock (always mounted on the controller).

With C-PRO EXP KILO, C-PRO EXP MEGA e C-PRO EXP GIGA, the I/O improvement is possible.

The following table shows the C-PRO MEGA main characteristics:

	Dimensions	Power supply	Analogic Inputs	Digital Inputs	Analogic outputs	Digital output	CAN ports	UART ports
C-PRO MEGA	14 DIN modules	12 VDC (main supply) + 12 VDC (secondary supply) or 24 VAC/DC	8	10	4	8	local CAN (standard) + wide CAN (optional)	RS-485 (standard) + RS-485 or RS-232 (both optional)

Attention :

With 12 Vdc + 12 Vdc power supply, the following ports and outputs are optoinsulated:

- the analogic output
- the RS-485 serial standard port
- the RS-485 serial (or RS-232) optional port
- the wide CAN port

In order to ensure the optoinsulation of these outputs, the controller must be supplied with two dc power sources preferably insulated from each other (electrically insulated).

With 24 VAC/DC power supply , the following ports and outputs are not optoinsulated:

- the analogic outputs
- the RS-485 standard port
- the RS-485 (or RS-232) optional port
- the Wide-CAN port.

Optional RS-485 (or RS-232) port , is not available on the built-in and the open versions.

Optional wide CAN, is available only on 128 KB memory version.

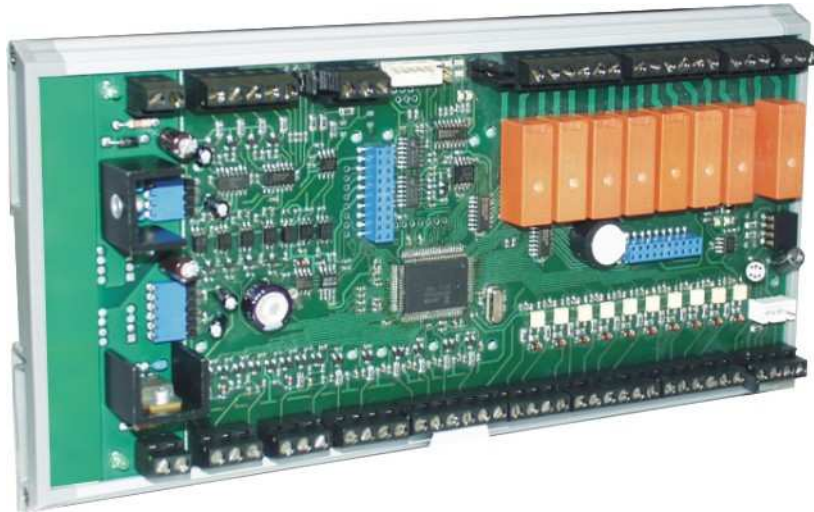
Optional wide CAN, is not available in the open version controllers.



C-PRO MEGA
built-in version



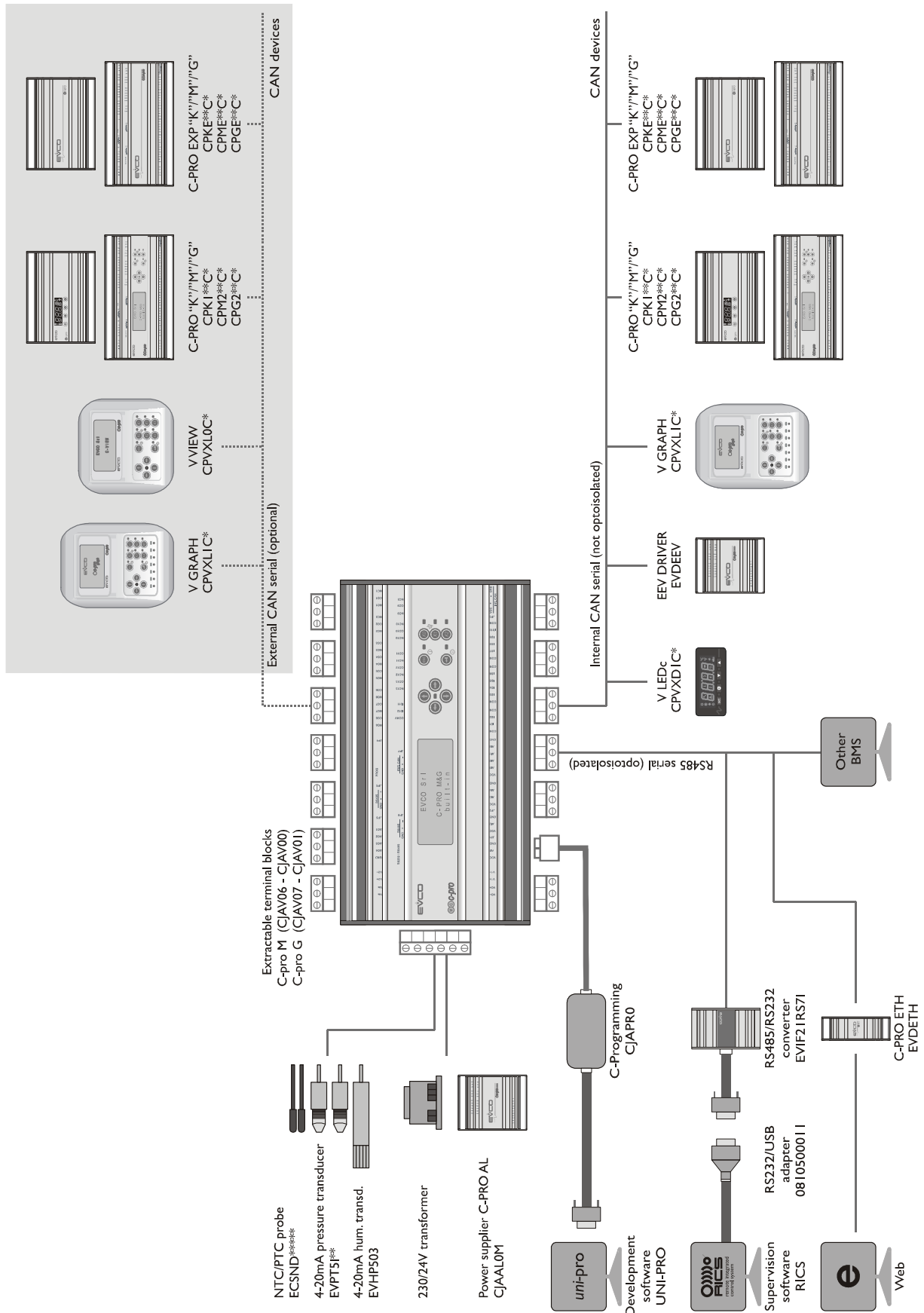
C-PRO MEGA
Sealed Case Version



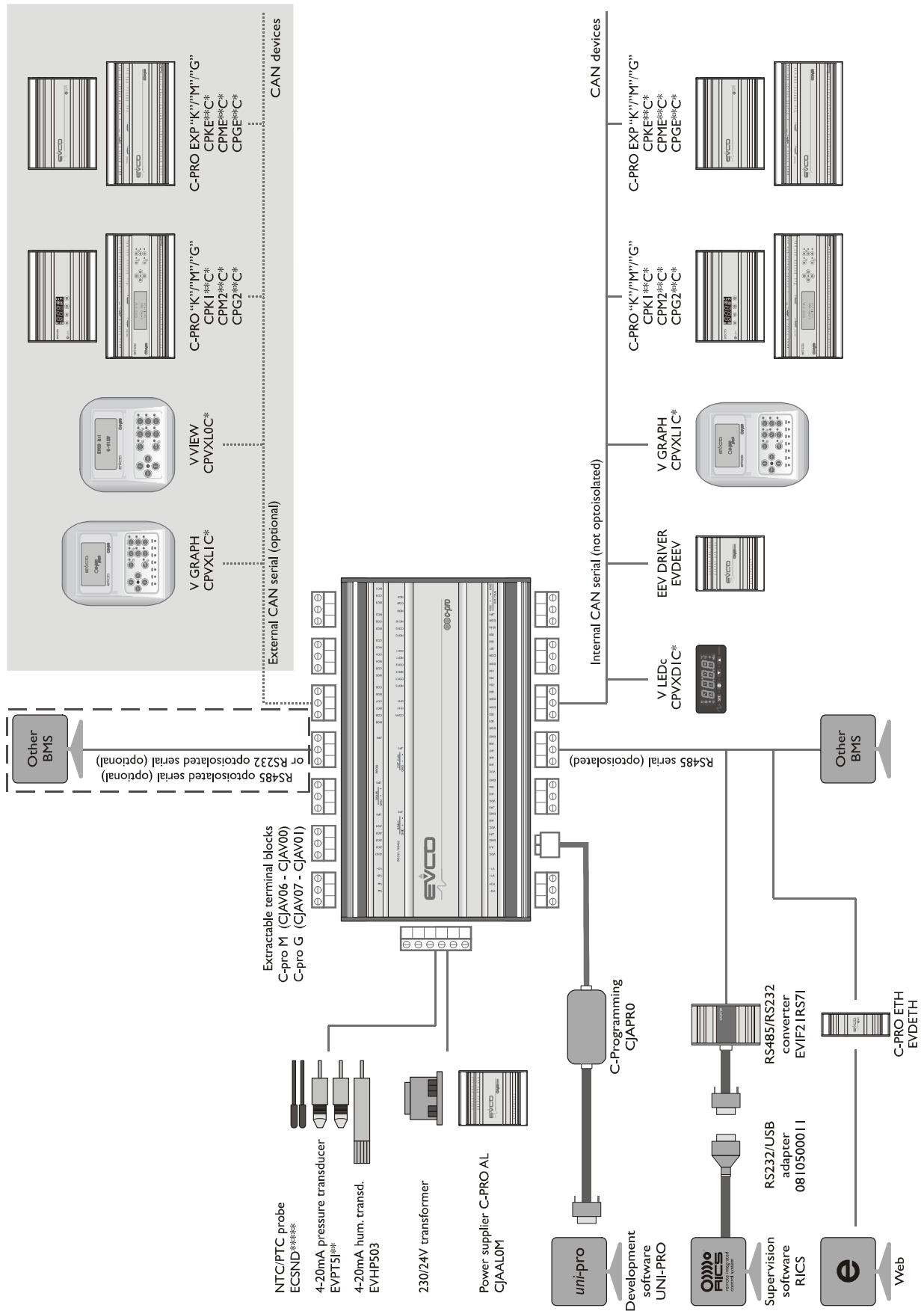
C-PRO MEGA
Open case version

1 Components and Accessories network

1.1 Built-in version example



1.2 Sealed case version example



2 Technical features

2.1 Connections

Power supply:

The C-pro MEGA family is available with two different version of power supply :

- i. No optoinsulated internal switching 24Vac/dc version
- ii. two separated inputs 12 Vdc + 12 Vdc version. With this version the following ports and outputs are optoinsulated:
 - the analogic output
 - the RS-485 serial standard port
 - the RS-485 (or RS-232) optional serial port
 - the Wide-CAN port

In order to ensure the optoinsulation of these outputs, the controller must be supplied with two dc power sources preferably electrically insulated one from each other, for example by using an EVCO power supplier “c-pro AL”. When the controller is powered with a 24 VAC/DC power supply, the over reported outputs and ports are not opto-insulated. The connection cables length must be 1 m, maximum.

Analogic input connections:

The C-PRO MEGA has two analogic inputs (“universal” named) suitable for the NTC, PTC, Voltage (0-10V, 0-5V), Current (0-20mA, 4-20mA) sensors. The choice is automatically made by means the UNI-PRO development system or parameters. A Jumper must be removed only for the 0-10V energized input (refer to the physical layout section and jumpers).

The C-Pro MEGA has six analogic inputs (“configurable” named) suitable for the NTC and Current sensors (0-20mA, 4-20mA). The choice is automatically made by means the UNI-PRO development system or parameters. Note that the six inputs are divided into three pairs; each pair must have the same input type.

The active probes may be fed using the VDC terminals (see physical layout) with a stabilized voltage of 12.5V (total maximum current $\leq 200\text{mA}$). The length of the analogic input connections cables must be 3 m, at the most.

Digital input connections :

The C-PRO MEGA has ten low-voltage optoinsulated digital inputs (12-24Vac/dc) . To benefit from the optoinsulation features, it's recommended to separate the digital input feed from the main power supply of the controller. If the C-PRO MEGA is fed using the C-PRO AL switching power supply, that can be used to feed the controller and the digital inputs.

The length of the digital input connections cables must be 3 m, at the most.

Digital output connections :

C-PRO MEGA has 8 digital outputs. There are no groupings of terminals, therefore each individual contact can be used for the declared specifications.

The length of the digital output connections cables must be 3 m, at the most.

Analogic output connections :

C-PRO MEGA has 4 optoinsulated analogic outputs (voltage or current). Both voltage and current selection are achieved by using Jumpers (see section wiring layout) and parameters.

The length of the analogic output connections cables must be 3 m, at the most.

User interface connections:

The connection between C-PRO MEGA and the remote user interface has to be done with 4 wire cable (better if it is two weaved couples).

The maximum length of the connection cables to the remote user interface depends of the CAN port baud rate .

Local CAN port:

- 10 m with 20.000 baud
- 5 m with 50.000 baud
- 2 m with 125.000 baud
- 1 m with 500.000 baud.

Wide CAN port:

- 1.000 m with 20.000 baud
- 500 m with 50.000 baud
- 250 m with 125.000 baud
- 50 m with 500.000 baud.

The LocalCAN port baud rate is settable by jumpers (see section wiring layout).

The WideCAN port baud rate is settable by parameter.

Connection with a remote expansion (or an other CAN controller) :

The connection between C-PRO MEGA and the remote expansion (or other CAN controller) has to be done with 4 wire cable (better if it is two weaved couples).

The maximum length of the connection cables to the remote controllers or expansions depend on the CAN port baud rate (see above section “User interface connections”)

C-PRO MEGA and the expansion (or other CAN controller) power supplies has to be electrically insulated one from the other.

Electrical wiring precautions

- do not work with electric or pneumatic screw-wrenches on the connectors of the controller
- if the device has been moved from a cold to a warm environment, humidity condensation may have formed inside; please, wait approximately one hour before to switching it on .
- ensure that the voltage, frequency and operational power of the device are compatible with the local power supply
- disconnect the power supply before proceeding with any kind of operation of maintenance
- do not use the device as a safety device
- for repairs and any information relating to the device, contact the Evco dealer network.

Cautions

Besides the maximum length of the connection cables, some other cautions have to be respected :

To avoid immunity problems, it is good practice to observe the following instructions:

- Avoid locations with antennas
- Do not wire probe inputs together with relay outputs; generally, avoid combining low and high voltage
- Avoid winding the wirings onto power components

To avoid safety problems, it is good practice to observe the following instructions:

- Avoid rooms with relative humidity >90%
- Avoid water
- Avoid corrosive environments
- Avoid explosive environments

Besides, ensure that the operating conditions correspond with the use limits indicated in the technical features.

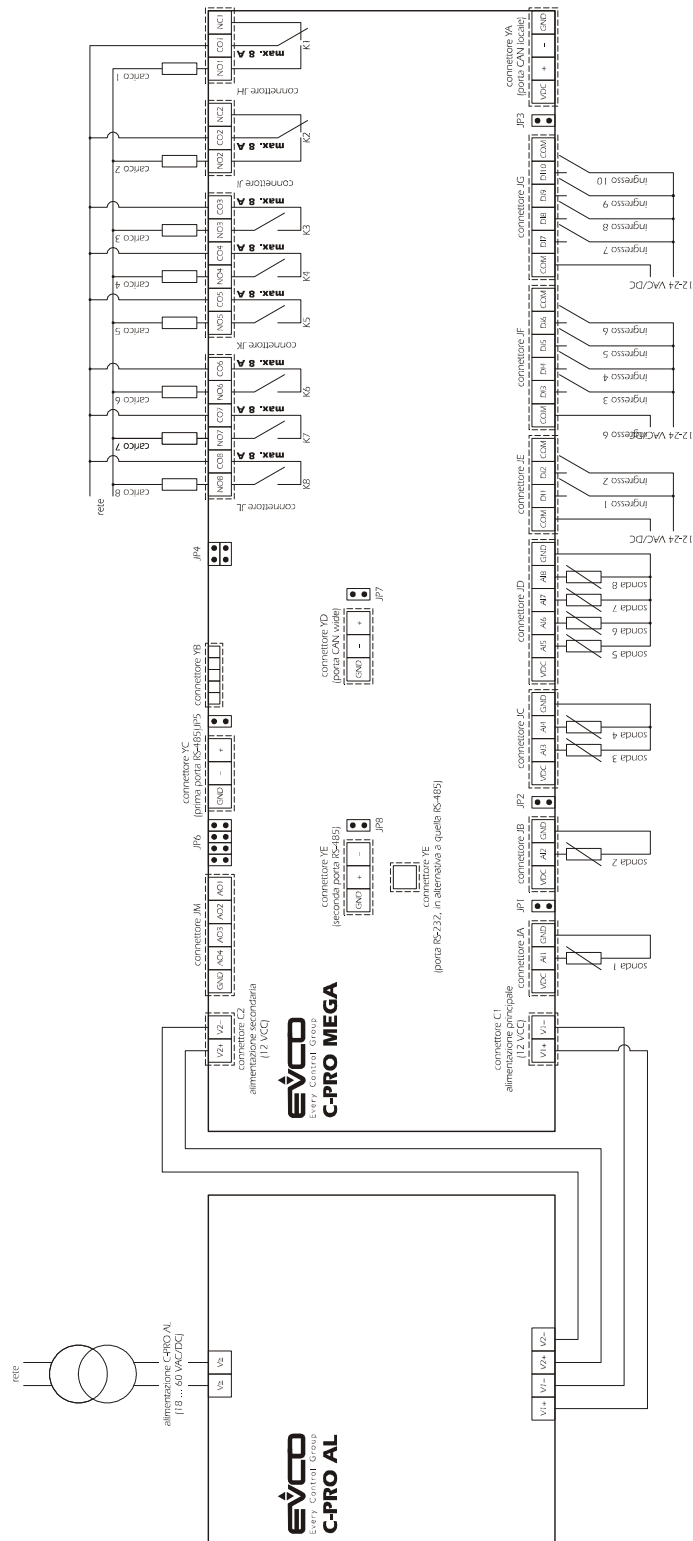
2.2 C-PRO MEGA wiring layout

C-PRO MEGA is available in two different version : the first with 12 VDC + 12 VDC e the second with 24 VAC/DC power supply.

The C-PRO MEGA 12 VDC + 12 VDC wiring layout connection is reported here below.

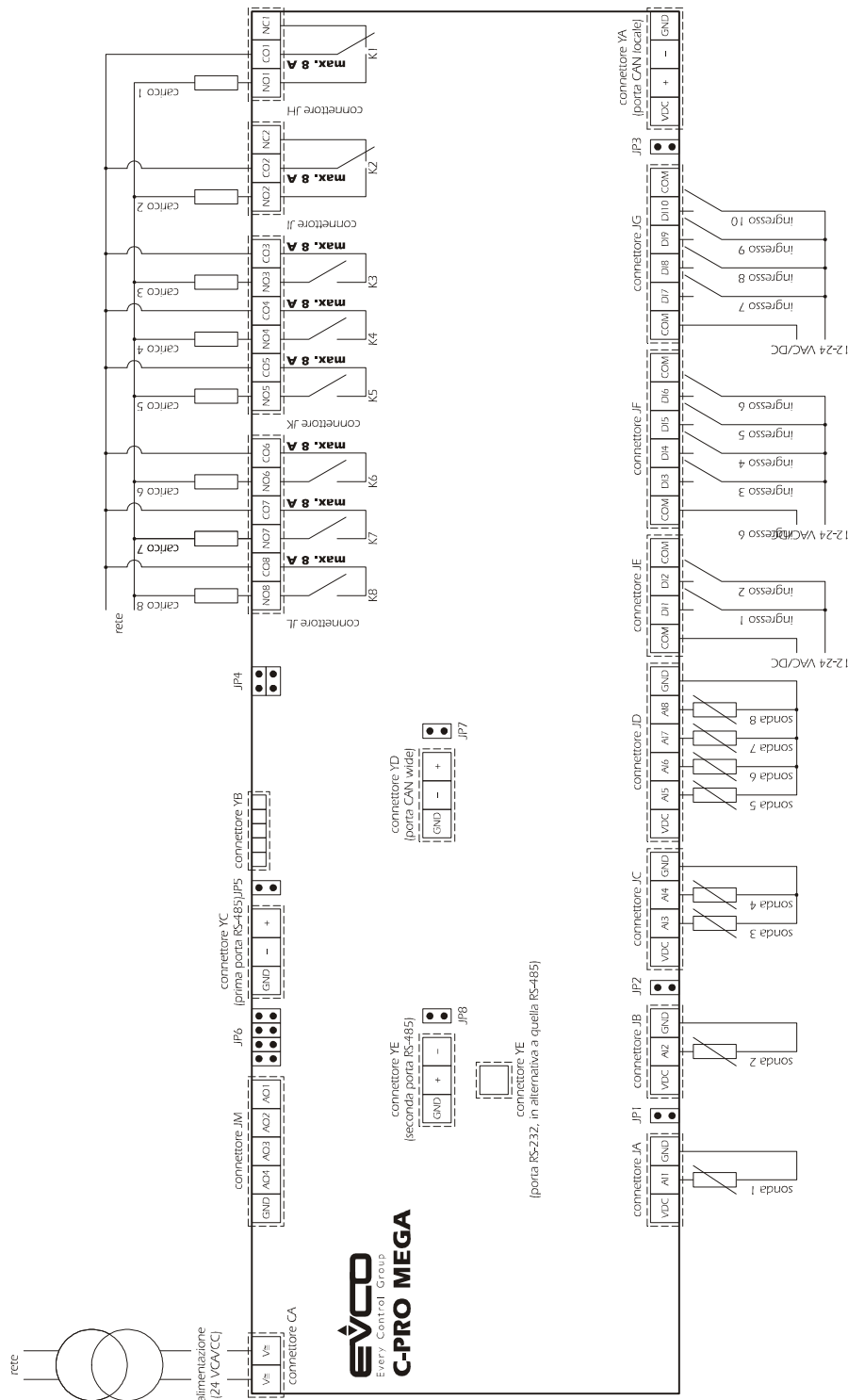
C-PRO AL power supplier adoption is recommended .

Please, refer to the section “power supply” of capter 3 regarding the utilisation optoinsulation.



Following it is reported the C-PRO MEGA 24 VAC/DC version wiring layout connection; C-PRO AL power supplier adoption is recommended

Please, refer to the section “power supply” of capter 3 regarding the utilisation optoinsulation.



The following table shows the available inputs and outputs on c-pro Mega :

Lower board 12 VDC + 12 VDC power supply version

Conn.	Letter code	Description
C1-1	VCC	main card power supply (+13Vdc)
C1-2	GND	Main power supply reference
JA-1	VDC	power supply for active sensors (*1)
JA-2	AI 1	universal analogic input 1 (NTC, PTC, 0..5V, 0..10V, 0..20 mA, 4..20 mA)
JA-3	GND	common terminal for analogic inputs
JB-1	VDC	power supply for active sensors (*1)
JB-2	AI 2	universal analogic input 2 (NTC, PTC, 0..5V, 0..10V, 0..20 mA, 4..20 mA)
JB-3	GND	common terminal for analogic inputs
JC-1	VDC	power supply for active sensors (*1)
JC-2	AI 3	analogic input 3, configurable (NTC, 0..20 mA, 4..20 mA)
JC-3	AI 4	analogic input 4, configurable (NTC, 0..20 mA, 4..20 mA)
JC-4	GND	common terminal for analogic inputs
JD-1	VDC	power supply for active sensors (*1)
JD-2	AI 5	Analogic input 5, configurable (NTC, 0..20 mA, 4..20 mA)
JD-3	AI 6	Analogic input 6, configurable (NTC, 0..20 mA, 4..20 mA)
JD-4	AI 7	Analogic input 7, configurable (NTC, 0..20 mA, 4..20 mA)
JD-5	AI 8	Analogic input 8, configurable (NTC, 0..20 mA, 4..20 mA)
JD-6	GND	common terminal for analogic inputs
JE-1	COM	common terminal for digital inputs
JE-2	DI 1	digital input no. 1 Vac/Vdc
JE-3	DI 2	digital input no. 2 Vac/Vdc
JE-4	COM	common terminal for digital inputs
JF-1	COM	common terminal for digital inputs
JF-2	DI 3	digital input no. 3 Vac/Vdc
JF-3	DI 4	digital input no. 4 Vac/Vdc
JF-4	DI 5	digital input no. 5 Vac/Vdc
JF-5	DI 6	digital input no. 6 Vac/Vdc
JF-6	COM	common terminal for digital inputs
JG-1	COM	common terminal for digital inputs
JG-2	DI 7	digital input no. 7 Vac/Vdc
JG-3	DI 8	digital input no. 8 Vac/Vdc
JG-4	DI 9	digital input no. 9 Vac/Vdc
JG-5	DI 10	digital input no. 10 Vac/Vdc
JG-6	COM	common terminal for digital inputs
YA-1	VDC	12 Vdc power supply output to a remote use interface
YA-2	CAN1+	CAN+ output to the Local-CAN
YA-3	CAN1-	CAN- output to the Local-CAN
YA-4	GND	GND power supply output to a remote use interface
JH-1	NC 1	normally closed contact relay no. 1
JH-2	COM 1	common relay no. 1
JH-3	NO 1	normally open contact relay no. 1
JI-1	NC 2	normally closed contact relay no. 2
JI-2	COM 2	common relay no. 2
JI-3	NO 2	normally open contact relay no. 2
JK-1	COM 3	common relay no. 3
JK-2	NO 3	normally open contact relay no. 3
JK-3	COM 4	common relay no. 4
JK-4	NO 4	normally open contact relay no. 4
JK-5	COM 5	common relay no. 5

Conn.	Letter code	Description
JK-6	NO 5	normally open contact relay no. 5
JL-1	COM 6	common relay no. 6
JL-2	NO 6	normally open contact relay no. 6
JL-3	COM 7	common relay no. 7
JL-4	NO 7	normally open contact relay no. 7
JL-5	COM 8	common relay no. 8
JL-6	NO 8	normally open contact relay no. 8
YB	PRG	JST connector for programming purposes
YC-1	RS485+	RS 485 + serial port connector
YC-2	RS485-	RS 485 - serial port connector
YC-3	GND*	GND serial port connector
JM-1	AO 1	Analogic output no. 1 (0,5..10 V / 4..20mA)
JM-2	AO 2	Analogic output no. 2 (0,5..10 V / 4..20mA)
JM-3	AO 3	Analogic output no. 3 (0,5..10 V / 4..20mA)
JM-4	AO 4	Analogic output no. 4 (0,5..10 V / 4..20mA)
JM-5	GND*	Common terminal for analogic outputs
C2-1	VCC*	secondary power supply for optoinsulated serial ports and analog outputs (15Vdc)
C2-2	GND*	Secondary power supply reference

*1: VDC=12,5V I_{max}=200mA (total for all VDC terminal)

Lower board 24 VAC/DC power supply version with built-in switching feeder

Conn.	Letter code	Description
CA-1	VCC	main card power supply (24Vac/dc)
CA-2	VCC	main card power supply (24Vac/dc)

Wide CAN Port (on request)

Conn.	Letter code	Description
YD-1	CAN0+	CAN + WideCAN port
YD-2	CAN0-	CAN - WideCAN port
YD-3	GND*	GND WideCAN port

Second RS-485 port (on request)

Conn.	Letter code	Description
YE-1	RS485-	RS 485 - serial port
YE-2	RS485+	RS 485 + serial port
YE-3	GND*	GND serial port

RS-232 Port (on request, alternative to second RS-485 port)



Conn.	Letter code	Description
YF-1	5Vdc	RS 232 9-pin connector -
YF-2	Tx	RS 232 9-pin connector – Transmitting data
YF-3	Rx	RS 232 9-pin connector – Receiving data
YF-4	DTR/DSR	RS 232 9-pin connector -
YF-5	GND	RS 232 9-pin connector -



C-PRO MEGA HARDWARE MANUAL



Conn.	Letter code	Description
YF-6	DTR/DSR	RS 232 9-pin connector -
YF-7	RTS	RS 232 9-pin connector -
YF-8	CTS	RS 232 9-pin connector -









Jumpers and LEDs meanings



The controller also has some configuration jumpers:









JMP1	Selection of analogic AI1 input	
	Jumper not inserted	0-10V input
	Jumper inserted	0-5V, 0-20mA, 4-20mA, NTC, PTC input

JMP2	Selection of analogic AI2 input	
	Jumper not inserted	0..10V input
	Jumper inserted	0-5V, 0-20mA, 4-20mA, NTC, PTC input

JMP3	CAN termination	
	Jumper not inserted	(120Ω) termination not inserted
	Jumper inserted	(120Ω) termination inserted

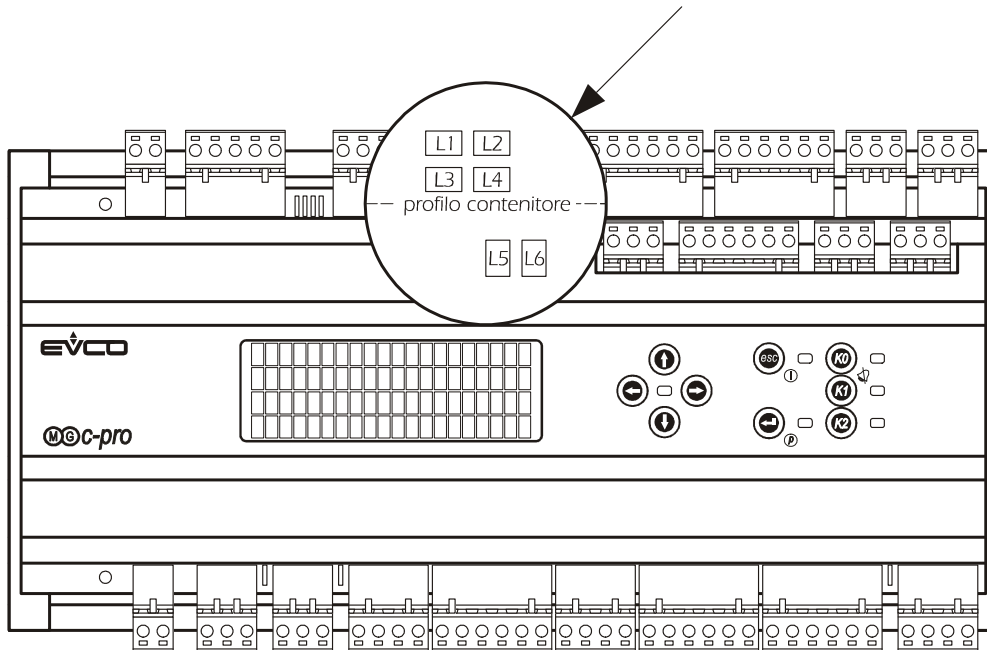
JMP4	Local CAN Baud Rate selection	
 A  B	Jumper A inserted Jumper B inserted	Baud rate = 20K
 A  B	Jumper A inserted Jumper B not inserted	Baud rate = 50K
 A  B	Jumper A not inserted Jumper B inserted	Baud rate = 125K
 A  B	Jumper A not inserted Jumper B not inserted	Baud rate = 500K

JMP5	RS-485 termination	
	Jumper not inserted	(120Ω) termination not inserted
	Jumper inserted	(120Ω) termination inserted

JMP6	Selection of Analogic Outputs	
 A  B  C  D	Jumper A inserted Jumper B inserted Jumper C inserted Jumper D inserted	AO1 Output as current AO2 Output as current AO3 Output as current AO4 Output as current
 A  B  C  D	Jumper A not inserted Jumper B not inserted Jumper C not inserted Jumper D not inserted	AO1 Output as voltage AO2 Output as voltage AO3 Output as voltage AO4 Output as voltage

Besides the jumpers setting, for the analogic output signals supplied configuration, the settlement of the controller parameters is also necessary (see the chapter 8 : output signals supplied configuration)

There are also some **LEDs** with diagnostic meaning (note: the L5, L6 LEDs are located inside of the controller case)



LED L1	Local CAN communication status
On blinking rapidly	OK
On blinking slowly	Warning
On continuously	Bus Error
Off	Bus OFF

Led L2	Local CAN communication status
On blinking rapidly	OK
On blinking slowly	Warning
On continuously	Bus Error
Off	Bus OFF

Led L3	Real Time Clock status
On blinking rapidly	-
On blinking slowly	Low_Voltage detected
On continuously	Read_Error
Off	OK

Led L4	EEPROM memory status
On blinking rapidly	CRC_Error
On blinking slowly	Write_Error
On continuously	Read_Error
Off	OK

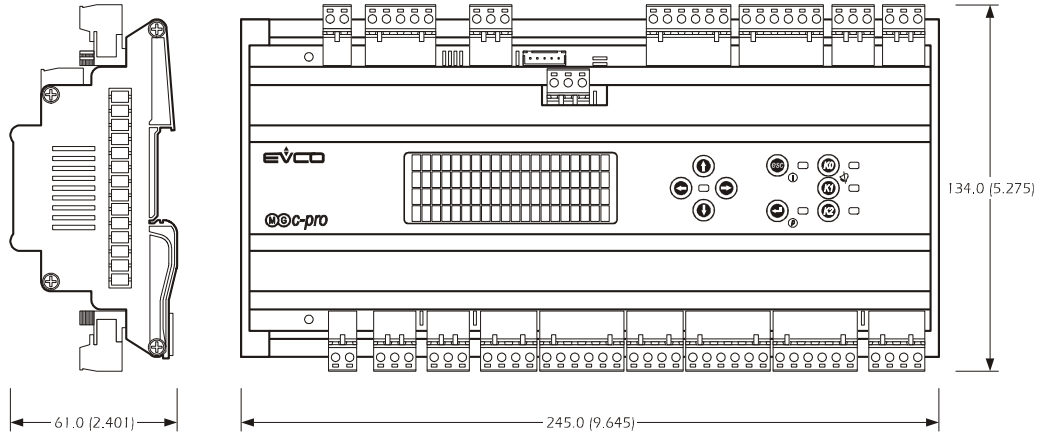
LED L5	Interrupt
It indicates the interrupt operating status of the controller: when blinking at 1 Hz, that indicates internal controller times are properly working	

LED L6	Operating status of main
It indicates the operating status of the controller's main program (main): when blinking, it indicates the controller program is properly working. The flashing period indicates the execution time of the main cycle.	

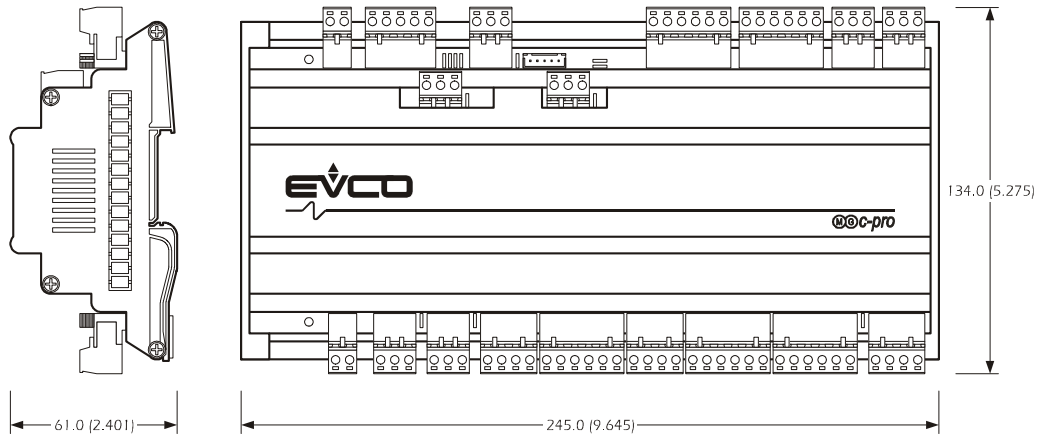
2.3 C-PRO MEGA Dimensions / Installations

C-PRO GIGA dimensions are reported here below; all dimensions are to be meant in millimeters (inc).

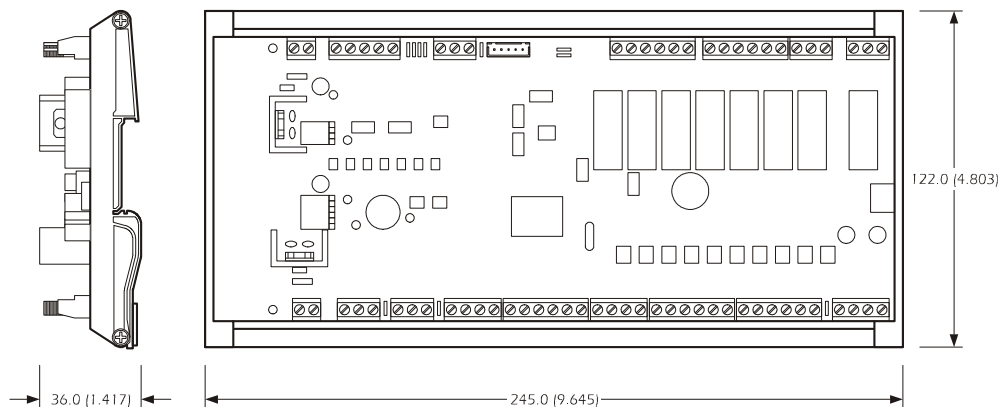
Built-in version



Sealed version



Open version

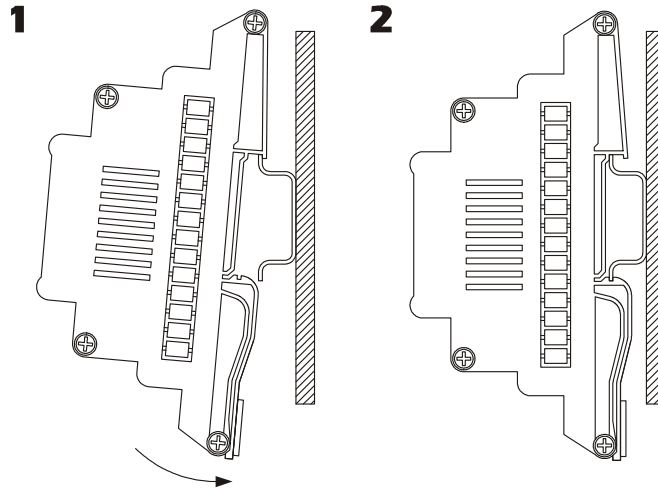


Cautions for the installation:

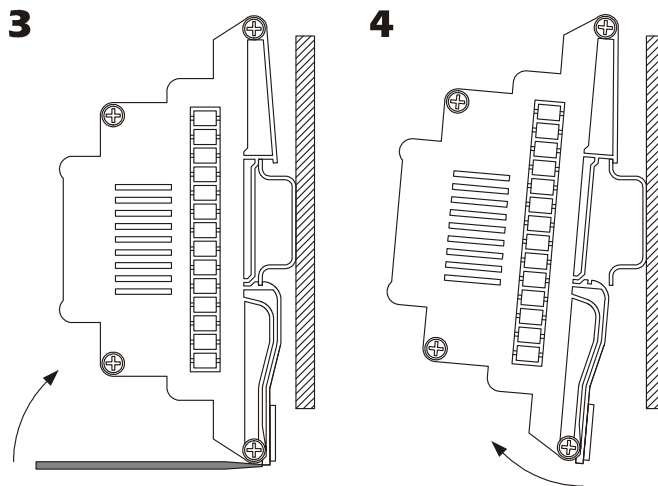
- ensure that the operating conditions (operating temperature, humidity, etc.) are within the limits indicated in the technical data sheets
- do not install the device near to, any heat sources (heating elements, hot air conduits, etc.), equipment containing powerful magnets (large diffusers, etc.), areas affected by direct sunlight, rain, humidity, excessive dust, mechanical vibration or shock

- in compliance with safety regulations, the device must be correctly installed, and protected against any contact with electrical parts; all safety devices must be safely fixed in order to be removed only by means of proper tools.

To install the C-PRO MEGA, proceed as indicated in figures 1 and 2.



To remove the C-PRO MEGA, use a screw driver and proceed as indicated in figures 3 and 4.



3 C-PRO MEGA technical features

3.1 General features

Safety reference standards	EN 60730-1
Purpose of the device	Programmable controller for refrigeration, ventilation and air conditioning applications
Electronic control device	To be integrated in equipment
Connections	Plug-in terminal block 5mm pitch for conductors up to 2.5 mm ² (built-in and sealed case versions) Fixed screw terminals for conductors up to 2.5 mm ² (open case versions only)
Storage temperature limits	-20T70 °C (@RH<90% non-condensing)
Ambient temperature limits	-10T60 °C 0T50 °C for version with integrated LCD (@RH<90% non-condensing)
Electrical shock protection classification	An integrated control device puts the classification on according to the equipment it is integrated with
Type of disconnection	Low interruption (relay contacts)
PTI of insulation materials used	>250
Installation	35-mm DIN Guide conforming to EN 50022
Type of action	1C
Pollution conditions	Normal
Software class	A

3.2 Housing

Installation	35-mm DIN Guide conforming to EN 50022
Housing	Conforms to DIN 43880
Material	PVC UL 94 V0 Grey color
Resistance to fire rating	D
Number of DIN modules	14
Protection level (front only)	IP 40 ; IP 00 open case version only

3.2 General features

		C-PRO MEGA open	C-PRO MEGA sealed (1)	C-PRO MEGA sealed (2)	C-PRO MEGA built-in
CPU	Microprocessor	16 bit	16 bit	16 bit	16 bit
	Oscillator frequency	16 MHz	16 MHz	16 MHz	16 MHz
	Flash program memory	256K	128K	256K	256K
	RAM data storage memory	8K	6K	8K	8K
	A/D converter	8 channels 10bit	8 channels 10bit	8 channels 10bit	8 channels 10bit
WideCAN communication bus (optional)	Number	0	1	0	0
	type		CAN V2.0B Optoisolated		
	Physical layer		2 wires + common wire (ISO 11898)		
	Baud rate (max. length = 1000 m)		20K		
	Baud rate (max. length = 400 m)		50K		
	Baud rate (max. length = 250 m)		125K		
	Baud rate (max. length = 50 m)		500K		
	Connector		Disconnectable screw terminals		
<i>Note: baud rate can be selected by parameter</i> <i>Note: The physical level of the CAN consists of a cable with twisted pair (both shielded and not shielded). The terminator's impedance is 120Ω</i>					
RS485 serial communication (UART2) (optional, alternative to RS232)	Number	0	1	1	0
	type		RS485, optoisolated	RS485, optoisolated	
	Physical layer		2 wires + common	2 wires + common	
	Baud rate (max. length 1000 m)		1200 - 19200	1200 - 19200	
	Connector		Disconnectable screw terminals	Disconnectable screw terminals	
<i>Note: baud rate can be selected by parameter</i> <i>Note: The physical level of the CAN consists of a cable with twisted pair (both shielded and not shielded). The terminator's impedance is 120Ω</i>					
RS232 serial communication (UART2) (optional, alternative to RS232)	Number	0	1	1	0
	type		RS232 optoisolated	RS232 optoisolated	
	Physical layer		Tx,Rx + 2 signal for modem control + common	Tx,Rx + 2 signal for modem control + common	
	Baud rate (max. length 1000 m)		1200 - 19200	1200 - 19200	
	Connector		Sub-D 9 pin male	Sub-D 9 pin male	

128 KB instead of 256 KB program memory built-in with WideCAN serial output version of the controller is available on request.

3.3 Electrical features

Internal Switching Power supply	Main Input Note: in this case the I/O and the serial ports of the controller are not insulated	24Vac +/- 15%, 20-60Vdc, max 1A
External Power supply (double inputs)	Main Input	13Vdc, 0.6A (both inputs) +0.2A if a user interface has to be fed +0.6A if an expansion board has to be feed
	Secondary input Note: in this case the I/O and the serial port of the controller are insulated	15Vdc, 0.15A
EEPROM	Parameter and event log memory	4 Kbyte
Analogic Inputs NTC or Current inputs are configurable through UNI -PRO	Number	6
	NTC measurement range (10K ohm $\pm 1\%$ @ 25°C)	-40°C - 100°C
	NTC measurement accuracy:	$\pm 0.8^\circ\text{C}$
	NTC measurement resolution	0.1°C
	Current measurement range	0 - 20 mA
	Current measurement accuracy	± 0.08 mA
	Current measurement resolution	0.01 mA
	Input resistance	200 Ohm
	<i>Note: by feeding active probes, 12.5Vdc terminals are available (@I maximum sum total $\leq 200\text{mA}$)</i>	
Analogic Inputs NTC, PTC, Voltage or Current inputs are configurable through UNI-PRO	Number	2
	NTC measurement range	-40°C - 100°C
	NTC measurement accuracy:	$\pm 0.8^\circ\text{C}$
	NTC measurement resolution	0.1°C
	PTC measurement range	-50°C - 150°C
	PTC measurement accuracy	$\pm 1^\circ\text{C}$
	PTC measurement resolution	0.1°C
	Current measurement range	0 - 20 mA
	Current measurement accuracy	± 0.08 mA
	Current measurement resolution	0.01 mA
	Input resistance	200 Ohm
	Voltage measurement range	0 - 10 V / 0 - 5 V
	Voltage measurement accuracy	± 20 mV
	Voltage measurement resolution	0.001 V
	<i>Note :</i> 1) Before applying 10V at the input check that the Jumper has been removed; 2) The Jumper must be removed only for the 0 - 10 V input 3) To feed active probes, 12.5Vdc terminals are available (@I maximum sum total $\leq 200\text{mA}$)	
Low voltage Digital Inputs	Number	10
	type	Optoinsulated
	Voltage range	12 - 24 Vac/dc
	Detection time from OFF to ON	100 ms
	Detection time from ON to OFF	100 ms

<i>Note: The commons (COM) terminals are connected together</i>		
Analog outputs	Number	4
	type	voltage or current (selectable by dip-switch), optoinsulated
	Jumper inserted	Current
	Current range	0 - 20 mA
	Current output accuracy	±1 mA
	Current output resolution	0.05 mA
	Maximum load of current output	50 - 250Ω
	Current output settling time	1 sec
	Jumper not inserted	Voltage
	Voltage range	0,5 - 10 V
	Voltage output accuracy	±200 mV (without load)
	Voltage output resolution	10 mV
	Maximum load of voltage output	200Ω
	Voltage output settling time	1 sec
	<i>Note:</i> 1) not protected output against permanent short circuit 2) $((Zl/(Zo+Zl))$ use load with impedance $Zl > 1K\Omega$	
Digital outputs	Number	8
	type	electromechanical relays
	With NO contacts	6
	With SPDT contacts	2
	Contact ratings	2000VA 250Vac, 8A cosθ=1 6(4) accordino to EN60730-1
	Contact life cycle	> 100.000
	<i>Note:</i> 1)The commons (COM) terminals are not connected together 2) Primary insulation is guaranteed between the relays	
Internal CAN communication bus	Number	1
	type	CAN V2.0B no optoinsulated
	Physical layer	2 wires + common wire (ISO 11898)
	Baud rate (max. length = 10 m)	20K
	Baud rate (max. length = 5 m)	50K
	Baud rate (max. length = 2 m)	125K
	Baud rate (max. length = 1 m)	500K
	Connector	Disconnectable screw terminals

	<p><i>Note:</i></p> <ol style="list-style-type: none"> 1) <i>baud rate selectable by two jumpers</i> 2) <i>The CAN connection consists of a cable with twisted pair (both shielded and not shielded). The first and the last elements of the system must have the bus terminating resistor connected (impedance is 120Ω). A second twisted pair is used for the feed and the ground</i>
--	---

RS485 serial communication (UART1)	Number	1
	type	RS485, optoinsulated
	Physical layer	2 wires + common wire
	Baud rate (max. length 1000 m)	1200 - 19200
	Connector	Disconnectable screw terminals
	type	RS232, optoinsulated
	Physical layer	Tx, Rx + 2 signals for modem control + common wire
	Baud rate (max. length 3 m)	1200 - 19200
	Connector	Disconnectable screw terminals
	<p><i>Note:</i></p> <ol style="list-style-type: none"> 1) <i>baud rate is selectable by parameters</i> 2) <i>The CAN connection consists of a cable with twisted pair (both shielded and not shielded). The first and the last elements of the system must have the bus terminating resistor connected (impedance is 120Ω). A second twisted pair is used for the feed and the ground</i> 	
RTC (Real Time Clock)	Number	1
	Backup type	Supercap
	RTC data retention time in the event of a power failure	3 days
Buzzer	Number	1
Signaling LEDs	Number	6

The open case version of the controller is available with the fixed screw terminals only.

3.4 C-PRO MEGA built-in user interface








The C-PRO MEGA built-in versions has a 4x20 alphanumerical backlit LCD display and a keyboard with 9 buttons and 6 LEDs. Some buttons and LEDs are predefined; this means that their function has been set by the firmware. Other buttons and LEDs are programmable; this means that they may be used freely within the UNI-PRO development system.









C-PRO MEGA
Built-in version

The following table shows the functions of the keyboard:

Buttons	MAIN FUNCTION	SECONDARY FUNCTION
	Predefined UP	Programmable
	Predefined DOWN	Programmable
	Predefined LEFT	Programmable
	Predefined RIGHT	Programmable
	Predefined ESC	Stand-By command
	Predefined ENTER	1st level programming command
	Programmable	Alarm-off/Detection of alarms
	Programmable	

	Programmable	
 + 		Controller parameter configuration command
 + 		2nd level programming command
 + 		3rd level programming command

The following table shows the LEDs' functions:

			LED	FUNCTION
<div>  LM  LS  L0  L1  LP  L2 </div>			LM	Predefined (blinks during controller parameters configuration)
			LS	Programmable
			LP	Programmable
			L0	Programmable
			L1	Programmable
			L2	Programmable

4 C-PRO EXP MEGA I/O expansion

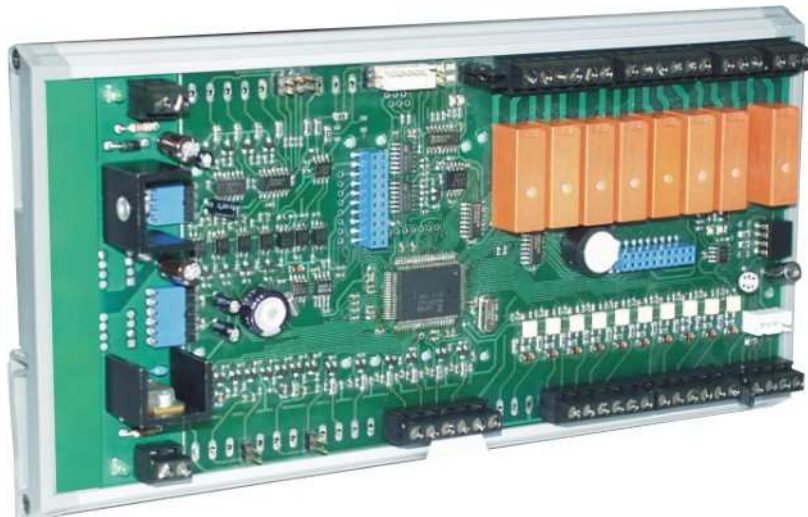
C-PRO EXP MEGA I/O expansion allows to expand the I/O of the controller.

The expansion has the following inputs and outputs:

- 4 analogic inputs for NTC / 0-20 mA / 4-20 mA , probes
- 8 low voltage digital inputs (12-24 VAC/DC)
- 8 digital outputs (relays) :
 - 6 with 8 A res. @ 250 VAC (4 N.O./N.C. + 2 N.O.)
 - 2 with 5 A res. @ 250 VAC (2 N.O.).



C-PRO EXP MEGA
Sealed case version



C-PRO EXP MEGA
Open case version

Lower board 12 VDC + 12 VDC power supply version

Conn.	Letter code	Description
C1-1	VCC	main card power supply (+13Vdc)
C1-2	GND	Main power supply reference
JD-1	VDC	power supply for active sensors (*1)
JD-2	AI 5	analogic input 5, configurable (NTC, 0..20 mA, 4..20 mA)
JD-3	AI 6	analogic input 6, configurable (NTC, 0..20 mA, 4..20 mA)
JD-4	AI 7	analogic input 7, configurable (NTC, 0..20 mA, 4..20 mA)
JD-5	AI 8	analogic input 8, configurable (NTC, 0..20 mA, 4..20 mA)
JD-6	GND	common terminal for analogic inputs
JF-1	COM	common terminal for digital inputs
JF-2	DI 3	digital input no. 3 Vac/Vdc
JF-3	DI 4	digital input no. 4 Vac/Vdc
JF-4	DI 5	digital input no. 5 Vac/Vdc
JF-5	DI 6	digital input no. 6 Vac/Vdc
JF-6	COM	common terminal for digital inputs
JG-1	COM	common terminal for digital inputs
JG-2	DI 7	digital input no. 7 Vac/Vdc
JG-3	DI 8	digital input no. 8 Vac/Vdc
JG-4	DI 9	digital input no. 9 Vac/Vdc
JG-5	DI 10	digital input no. 10 Vac/Vdc
JG-6	COM	common terminal for digital inputs
YA-1	VDC	connector to power a remote terminal at 12 Vdc
YA-2	CAN1+	CAN + connector Local CAN port
YA-3	CAN1-	CAN - connector Local CAN port
YA-4	GND	GND connector Local CAN port
JH-1	NC 1	normally closed contact relay no. 1
JH-2	COM 1	common relay no. 1
JH-3	NO 1	normally open contact relay no. 1
JI-1	NC 2	normally closed contact relay no. 2
JI-2	COM 2	common relay no. 2
JI-3	NO 2	normally open contact relay no. 2
JK-1	COM 3	common for relay no. 3
JK-2	NO 3	normally open contact relay no. 3
JK-3	COM 4	common for relay no. 4
JK-4	NO 4	normally open contact relay no. 4
JK-5	COM 5	common for relay no. 5
JK-6	NO 5	normally open contact relay no. 5
JL-1	COM 6	common relay no. 6
JL-2	NO 6	normally open contact relay no. 6
JL-3	COM 7	common relay no. 7
JL-4	NO 7	normally open contact relay no. 7
JL-5	COM 8	common for relay no. 8
JL-6	NO 8	normally open contact relay no. 8
YB	PRG	JST connector for programming purposes
C2-1	VCC	Not utilized
C2-2	GND	Not utilized



*1: VDC=12,5V I_{max}=200mA (as current sum of all VDC terminals)









Lower board 24 VAC/DC power supply version with built-in switching feeder

Conn.	Letter code	Description
CA-1	VCC	main card power supply (24Vac/dc)
CA-2	VCC	main card power supply (24Vac/dc)

Jumper and LED meaning

In the controller some jumpers configuration are mounted:

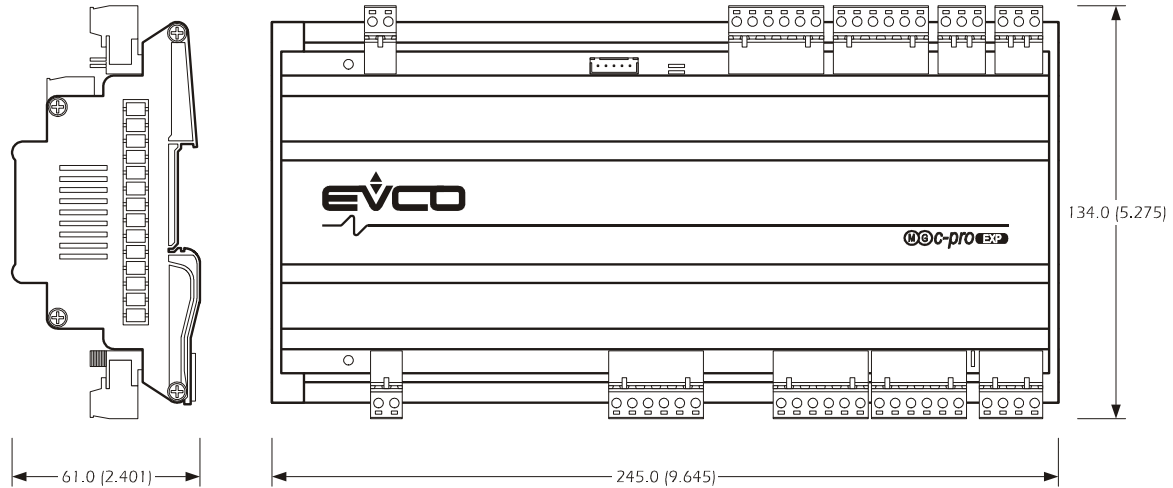
JMP3	CAN termination	
	Jumper not inserted	(120Ω) termination not inserted
	Jumper inserted	(120Ω) termination inserted

JMP4	Internal serial CAN Baud Rate selection	
 A  B	Jumper A inserted Jumper B inserted	Baud rate = 20K
 A  B	Jumper A inserted Jumper B not inserted	Baud rate = 50K
 A  B	Jumper A not inserted Jumper B inserted	Baud rate = 125K
 A  B	Jumper A not inserted Jumper B not inserted	Baud rate = 500K

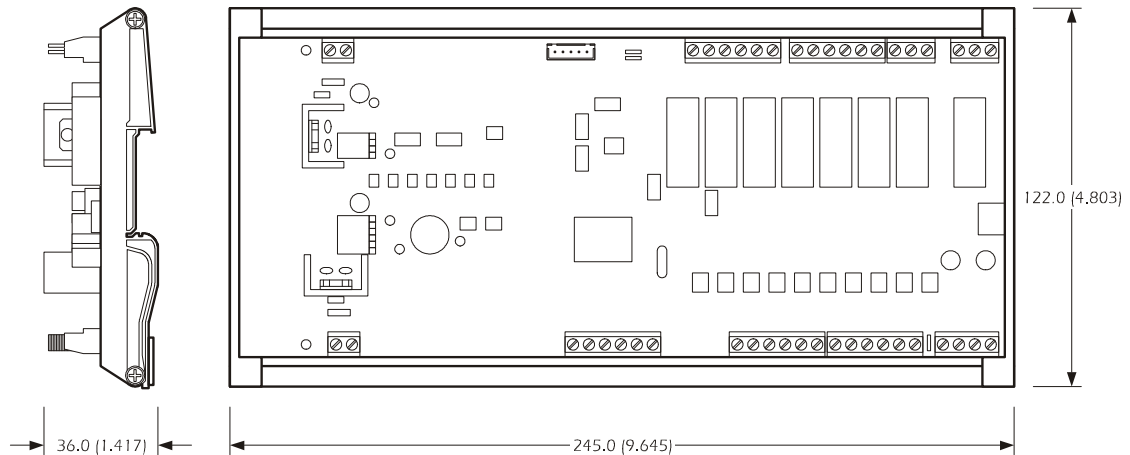
5. C-PRO EXP MEGA Dimensions / Installations

The C-PRO EXP MEGA dimensions are reported here below; all dimensions are in millimeters (inc).

Sealed case version



Open case version



The open case version is available with fixed screw terminals only.

6. Remote User interface

The user interfaces allow to install a display and keyboard remotely far from the controller .

“V-VIEW” user interface (with a alphanumeric 4 x 20 characters LCD display) can be connected to one of the CAN port of the C-PRO MEGA controller. On request a graphic 240 x 128 pixel LCD display (V-GRAPH) user interface is also available .

6.1 V-VIEW

The visualized text on the LCD display, the LEDs and key functions of the user interface are realized with UNI-PRO software development system and use a “browser” technology to load the C-PRO MEGA pages and to refresh the visualized variable value. The user interface is directly interfaced with the controller without downloading any software.

The typical implemental functionality are :



















- intuitive navigation with “ browser style”
- text and icon combination
- tables utilization with “scroll” possibilities.

6.1.1.V-VIEW User Interface











V-VIEW

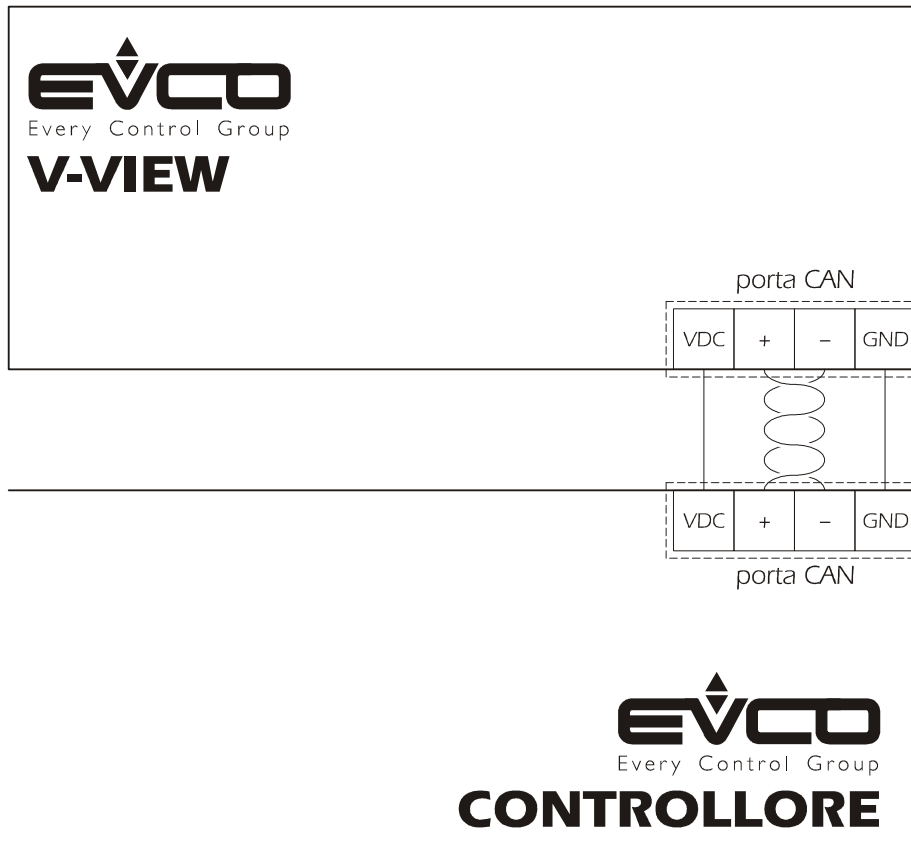
The following table summarizes the keyboard button meaning:

BUTTONS	MAIN FUNCTION	SECONDARY FUNCTION
	Predefined as UP	
	Predefined as DOWN	
	Predefined as LEFT	
	Predefined as RIGHT	
	Predefined as ESC	Stand-By command
	Predefined as ENTER	1° programming level command
	Programmable	Alarm reset / identification
	Programmable	
	Programmable	
	Programmable	
	Programmable	
	Programmable	
 + 		Controller configuration parameters command
 + 		2° programming level command
 + 		3° programming level command

The following table summarizes the meaning of the LEDs on front panel :

 LM  LS  L0  L1  L2  L3  L4  L5	LED	FUNCTION
	LM	Predefined (blinking during the parameters configuration of the controller)
	LS	Programmable
	LP	Programmable
	L0	Programmable
	L1	Programmable
	L2	Programmable
	L3	Programmable
	L4	Programmable
	L5	Programmable

6.1.2 V-VIEW wiring layout



6.1.3. V-VIEW specifications

General specifications

Safety standards references	EN 60730-1
Purpose of the device	To be integrated in equipment
Electronic control device connections	Plug-in terminal block 5mm pitch for conductors up to 2.5 mm ²
Storage temperature limits	-20T70 °C (@RH<90% non-condensing)
Ambuent temperature limits	-10T60 °C 0T50 °C for version with integrated LCD (@RH<90% non-condensing)
Electrical shock protection classification	An integrated control device takes up the classification of the equipment which it is integrated with
PTI of insulation materials used	>250

Housing

Installation	Pannel mounting
Housing	160 x 160 mm

Electrical specifications

Power supply	Main (input)	12Vdc, 0.2A
CPU	Microprocessor	16 bit
	Oscillator frequency	16 MHz
EEPROM	Memory for parameters	256 byte
	Number	1

C-PRO MEGA HARDWARE MANUAL

Serial CAN Communication	Type	CAN V2.0B not optoisolated
	Physical Layer	2 wires + common, ISO 11898 standard
	Baud rate (L max. = 10 m)	20K
	Baud rate (L max. = 5 m)	50K
	Baud rate (L max. = 2 m)	125K
	Baud rate (L max. = 1 m)	500K
	Connector	Sconnectable terminals
	<i>Note: baud rate can be selected by parameter</i> <i>Note: The physical level of the CAN consists of a cable with twisted pair (both shielded and not shielded). The terminator's impedance is 120Ω. A second cable with twisted pair is used for feeding and common (ground)</i>	
Buzzer	Number	1
LCD Display	4 x 20 alphanumeric backlight	1
Keyboard	Buttons	12
	Led	9

7 Accessories

7.1 C-PRO AL switching feeder

C-PRO AL is a two output switching feeder able to provide the power supply to C-PRO MEGA programmable controllers. The range of the C-PRO AL input voltage can be between 18 and 60 Vac/dc , while the output voltage of feeder's output is 13 Vdc (1,5 A) and 15 Vdc (0,15 A). C-PRO AL is available in 6 DIN modules housing dimensions for DIN rail mounting installation.



C-PRO AL

[illegible]

In the previous page, example of connection of C-PRO AL with C-PRO MEGA.

With the same secondary of the transformer, is possible to feed both C-PRO AL and the C-PRO MEGA low voltage digital input (they work with 12-24 VAC/DC).

It is preferable :

- To connect the possible remote user interface to Local CAN (not optoinsulated) port (providing the remote user interface with the necessary 12 Vdc power supply)
- To connect the possible expansion to the Wide CAN (optoinsulated) port.

The controller and C-PRO EXP Mega power supplies have to be electrically insulated one from the other.

8 Configuration of the supplied analogic outputs signal

C-PRO MEGA has four analogic outputs.

Each analogic output can be configured to supply one of the following signal :

- 0,5-10 V (called “voltage”)
- 0-20 mA (called “current”)
- 4-20 mA (called “current”).











To configurate the signal supplied by the analogic output it is necessary :




- positioning the appropriate JMP6 jumper in the selected position (see chapter “C-PRO MEGA wiring layout, jumper and LED meaning ; the configuration jumper is JMP6)
- confirming the choice selected with the “controller parameters” relative to the analogic outputs as shown on the following paragraph .

8.1.1 Parameters configuration relative to the analog output

By logging on the controller parameters’ configuration procedure relative to the analogic outputs act in the following way :


Both for the remote or built-in user interface :

1. Ensure that the controller and the user interface are both switched on and any utilization be connected with the analogic outputs
2. Keep both  and  buttons pressed together for two seconds : firsts voice available will be visualized.
3. Press and release  button to select “Parameters”.
4. Press and release  button : “Input Password” will be visualized.
5. Press and release  button: the cursor blinks.
6. Press and release  button to set “ -19”.
7. Press and release  button: firsts available voice will be visualized.
8. Press and release  button: further available voice will be visualized.
9. Press and release  button to select one of the voice “Type AO1 ... AO4”.
10. Press and release  button: the cursor blinks.

11. Press and release  or  button to select the wanted value (0-20 mA or 4-20 mA or 0-10 V).
12. Press and release  button to confirm the selected choice.
13. Repeat the selection for each analogic output “Type AO1 ... AO4”.
14. Switch – off the controller

For a quick closing procedure:

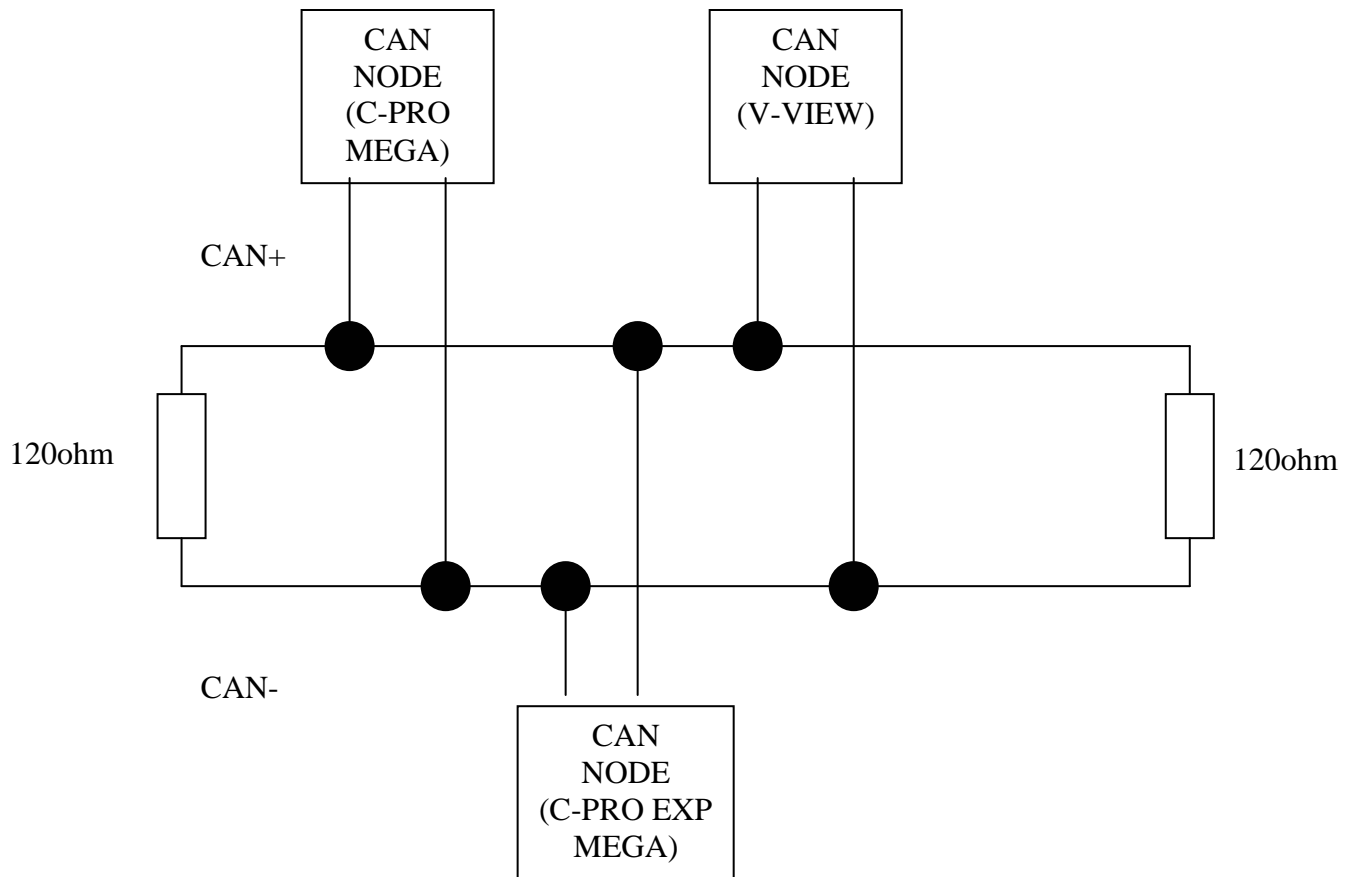
8.1.2 Closing the analogic output configuration procedure

1. Press and release repeatedly  button.

9 CAN Connection

C-PRO MEGA can be connected to other controllers, to expansion modules and to one or more user interfaces using either local or wide CAN serial port. The CAN bus uses the ISO 11898 standard, a balanced two-wire communication very similar to the RS 485 standard.

Resistors with a recommended rating of 120-124 ohm have to be fitted at each end of the bus.



If connection is established through the Local CAN bus, it is possible to power a user interface using the 4-terminal connector, according to the following table:

C-PRO MEGA	V-VIEW User Interface
YA 1 (VDC)	PA 1 (VDC)
YA 2 (CAN+)	PA 2 (CAN+)
YA 3 (CAN-)	PA 3 (CAN-)
YA 4 (GND)	PA 4 (GND)



The maximum number of expansions and user terminals is 32.

The maximum number of controllers for the user terminal V-VIEW is 2.






9.1.1. Notes on the parameter of the controller relative to the CAN net configuration

To log on the controller parameters configuration procedure relative to the analogic output act in the following way :

Both for the remote or built-in user interface :

1. Ensure that the controller and the user interface are both switched on and no utilization is connected with the analogic output
2. Keep pressed at the same time  and  buttons for two seconds : the first available voice will be visualized (the voices are relative to the controller; for the voices relative to the user interface repeat the selection from “reset”).





To select the controller parameters relative to the CAN network configuration:

1. Press and release  button to select “Network” voice.
2. Press and release  button: if the controller is visualizing the net parameters, the voice “Input Password” will be visualized: in this case see the following 3. and 4. (in opposite case see directly point 5.).
3. Press and release  button: the cursor blinking.
4. Press and release  button to set “ -19”.
5. Press and release  button: the first voice available will be visualized; if it is visualizing the net parameters relative to the controller, the question asked will be which communication port have to be referred (Local CAN, Wide CAN, UART1 o UART2).


To select a parameter:

1. Press and release  button

To modify a parameter:

1. Press and release  button: the cursor blinking.
2. Press and release  or  buttons to select the value
3. Press and release  button to confirm the selection done.
4. Switch – off the controller.

For a quick closing procedure :

1. Press and release repeatedly  button

The main parameters of the CAN net are the following :

- “My Node” (represents the data sender ID).
- “Network Node” (represents the receiver ID)
- Baud rate (represent the data transmissions speed; initially it can be useful to let this value set at “Auto”; in this way the device will try to connect a few time with different speed); Local CAN port baud rate can be set with “JMP4” jumper.

Predefined value :

- the parameter My Node for a controller is set at 1
- the parameter My Node for an expansion is set at 2
- the parameter My Node for a user interface is set at 99.

Every device in the network represents a knot (the maximum knot numbers are 32); each knot has an ID (the Id range is from 1 to 127).

Every device in the network has to be set as regards the network components through “Network Node” parameters.

Example:

If a controller, an expansion and a user interface are installed, set the following value on the controller in the following way :

1. Assign at “Network Node 1” the address “2” (expansion).
2. Assign at “Network Node 2” the address “99” (user interface).

Repeat the same operations for the expansion and the user interface.

ATTENTION: the parameters as regards the net could be overwritten by the application software.

C-PRO MEGA HARDWARE MANUAL

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