



c-pro 3

PROGRAMMABLE CONTROLLERS



ENGLISH

HARDWARE MANUAL ver. 2.0

CODE 114CP3E204

Important

Important

Read this document carefully before the installation and before the use and follow all the additional information for the installation and for the electrical connection; keep this document close to the devices for future consultations.

The following symbols support the reading of the document:



it indicates a suggestion



it indicates an additional information to be followed.

The devices must be disposed according to the local legislation about the collection for electrical and electronic equipment.



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INTRODUCTION

1.1. Introduction

c-pro 3 is a family of programmable controllers.

The family consists of:

- programmable controllers (**c-pro 3 hecto**, **c-pro 3 hecto+**, **c-pro 3 mega** and **c-pro 3 NODE mega**)
- I / O expansions (**c-pro 3 EXP hecto** and **c-pro 3 EXP hecto+**).

c-pro 3 hecto is available in blind version and can be used for example with an user interface such as **Vgraph**, **Vtouch** or **Vroom**.

The controllers have got:

- real time clock
- 3 analog inputs configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers
- 5 non optoisolated free of voltage digital inputs
- 3 analog outputs of which 1 non optoisolated PWM output and 2 non optoisolated outputs configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal
- 6 digital outputs (electromechanical relays) of which five 5 res. A @ 250 VAC SPST outputs and one 8 res. A @ 250 VAC SPDT output
- 3 non optoisolated communication ports of which 1 CAN port with CANbus communication protocol, 1 RS-485 port with Modbus master / slave communication protocol (configurable via application software) and 1 programming and debugging port.

Through the I / O expansion **c-pro 3 EXP hecto** or **c-pro 3 EXP hecto+** it is possible to increase the number of inputs and outputs.

c-pro 3 hecto+ is available in the following versions:

- with 128 x 64 pixel single colour LCD graphic display (black with rearlighting through white LEDs) and with a 6 buttons (with preset functions) keyboard made of silicone rubber integrated in the controller, hereinafter also called "built-in versions"
- blind (can be used for example with an user interface such as **Vgraph**, **Vtouch** or **Vroom**), hereinafter also called "blind versions".

The controllers have got:

- real time clock
- alarm buzzer (not available in the blind versions)
- 4 analog inputs of which 3 configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers and 1 for NTC probes
- 5 optoisolated digital inputs at 24 VAC / DC
- 3 analog outputs of which 1 non optoisolated PWM output and 2 non optoisolated outputs configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal
- 6 digital outputs (electromechanical relays) of which five 3 res. A @ 250 VAC SPST outputs and one 5 res. A @ 250 VAC SPDT output
- 3 non optoisolated communication ports of which 1 CAN port with CANbus communication protocol, 1 RS-485 port with Modbus master / slave communication protocol (configurable via application software) and 1 programming and debugging port.

Through the I / O expansion **c-pro 3 EXP hecto** or **c-pro 3 EXP hecto+** it is possible to increase the number of inputs and outputs.

c-pro 3 mega and **c-pro 3 NODE mega** are available in the following versions:

- with 122 x 32 pixel single colour LCD graphic display (black with rearlighting through white LEDs) and with a 6 buttons (with preset functions) keyboard made of silicone rubber integrated in the controller, hereinafter also called "built-in versions"
- blind (can be used for example with an user interface such as **Vgraph**, **Vtouch** or **Vroom**), hereinafter also called "blind versions".

The controllers have got:

- real time clock
- alarm buzzer (not available in the blind versions)

- 5 analog inputs configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers
- 7 optoisolated digital inputs at 24 VAC / DC
- 3 analog outputs of which 1 non optoisolated PWM output and 2 non optoisolated outputs configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal
- 8 digital outputs (electromechanical relays) of which three 5 res. A @ 250 VAC SPST outputs, four 8 res. A @ 250 VAC SPST outputs and one 8 res. A @ 250 VAC SPDT output
- 4 non optoisolated communication ports of which 1 CAN port with CANbus communication protocol, 1 RS-485 port with Modbus slave communication protocol, 1 RS-485 port with Modbus master / slave communication protocol (configurable via application software) and 1 programming and debugging port
- 1 non optoisolated communication port for gateway **c-pro 3 plug-in** (available in **c-pro 3 NODE mega** only).

Through the I / O expansion **c-pro 3 EXP hecto** or **c-pro 3 EXP hecto+** it is possible to increase the number of inputs and outputs.

c-pro 3 EXP hecto is available in blind version and can be used for example with a programmable controller such as **c-pro 3 hecto**, **c-pro 3 hecto+**, **c-pro 3 mega** or **c-pro 3 NODE mega**.

The expansion has got:

- 3 analog inputs configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers
- 5 non optoisolated free of voltage digital inputs
- 3 analog outputs of which 1 non optoisolated PWM output and 2 non optoisolated outputs configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal
- 6 digital outputs (electromechanical relays) of which five 5 res. A @ 250 VAC SPST outputs and one 8 res. A @ 250 VAC SPDT output
- 2 non optoisolated communication ports of which 1 CAN port with CANbus communication protocol and 1 port to update the firmware of the instrument.

c-pro 3 EXP hecto+ is available in blind version and can be used for example with a programmable controller such as **c-pro 3 hecto**, **c-pro 3 hecto+**, **c-pro 3 mega** or **c-pro 3 NODE mega**.

The expansion has got:

- 4 analog inputs of which 3 configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers and 1 for NTC probes
- 5 optoisolated digital inputs at 24 VAC / DC
- 3 analog outputs of which 1 non optoisolated PWM output and 2 non optoisolated outputs configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal
- 6 digital outputs (electromechanical relays) of which five 3 res. A @ 250 VAC SPST outputs and one 5 res. A @ 250 VAC SPDT output
- 2 non optoisolated communication ports of which 1 CAN port with CANbus communication protocol and 1 port to update the firmware of the instrument.

Through the development environment UNI-PRO 3 (to order separately) it is possible to realize the application software and through the programming kit EVIF20TUXI (to order separately) it is possible to program the controllers.

The devices look in case 4 DIN modules (**c-pro 3 hecto**, **c-pro 3 hecto+**, **c-pro 3 EXP hecto** and **c-pro 3 EXP hecto+**), 10 DIN modules (**c-pro 3 mega**) or 14 DIN modules (**c-pro 3 NODE mega**).

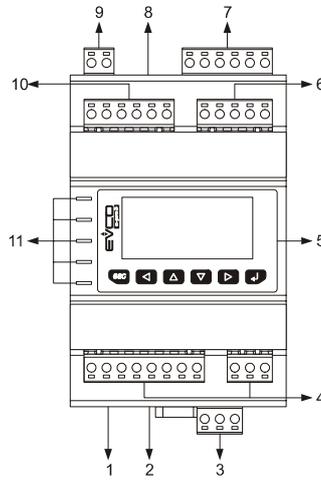
Installation is in electrical panel, on DIN rail.

Through the programming key EVKEY 10 (to order separately) it is also possible to make the upload and the download of the configuration parameters.

2. DESCRIPTION

2.1. Description c-pro 3 hecto and c-pro 3 hecto+

The following drawing shows the aspect of *c-pro 3 hecto* and of *c-pro 3 hecto+*.

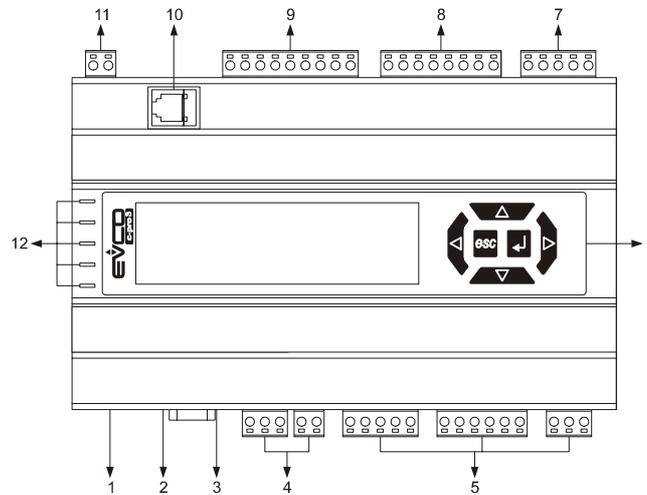


The following table shows the meaning of the parts of the controller.

| Part | Meaning |
|------|---|
| 1 | RS-485 port with Modbus master / slave communication protocol |
| 2 | micro-switch to: <ul style="list-style-type: none"> - plug in the termination of the RS-485 port - polarize the network of the RS-485 port - plug in the termination of the CAN port |
| 3 | CAN port |
| 4 | digital outputs |
| 5 | display and keyboard (available in <i>c-pro 3 hecto+</i> only, not available in the blind versions) |
| 6 | analog outputs in <i>c-pro 3 hecto</i> , analog inputs and analog outputs in <i>c-pro 3 hecto+</i> |
| 7 | analog inputs |
| 8 | programming and debugging port |
| 9 | power supply |
| 10 | digital inputs |
| 11 | signalling LEDs |

2.2. Description c-pro 3 mega

The following drawing shows the aspect of *c-pro 3 mega*.

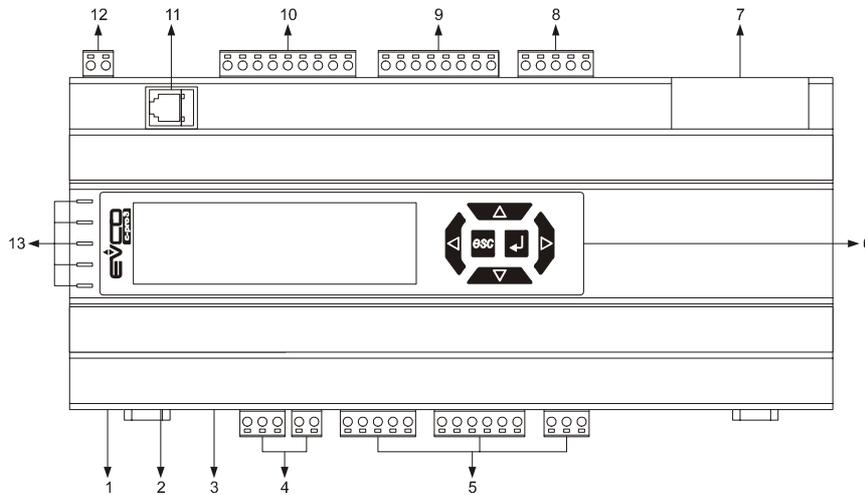


The following table shows the meaning of the parts of the controller.

| Part | Meaning |
|------|--|
| 1 | RS-485 port with Modbus slave communication protocol (hereinafter also called first RS-485 port) |
| 2 | RS-485 port with Modbus master / slave communication protocol (hereinafter also called second RS-485 port) |
| 3 | micro-switch to: <ul style="list-style-type: none"> - plug in the terminations of the RS-485 ports - polarize the network of the second RS-485 port - plug in the termination of the CAN port |
| 4 | CAN port |
| 5 | digital outputs |
| 6 | display and keyboard (not available in the blind versions) |
| 7 | analog outputs |
| 8 | digital inputs |
| 9 | analog inputs |
| 10 | programming and debugging port |
| 11 | power supply |
| 12 | signalling LEDs |

2.3. Description *c-pro 3 NODE mega*

The following drawing shows the aspect of *c-pro 3 NODE mega*.

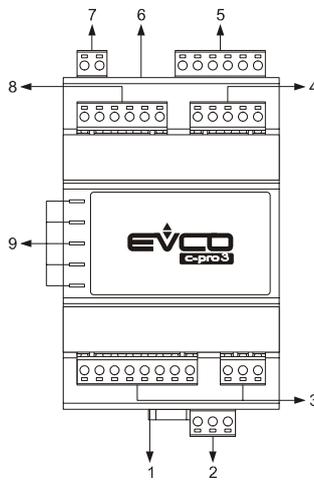


The following table shows the meaning of the parts of the controller.

| Part | Meaning |
|------|--|
| 1 | RS-485 port with Modbus slave communication protocol (hereinafter also called first RS-485 port) |
| 2 | RS-485 port with Modbus master / slave communication protocol (hereinafter also called second RS-485 port) |
| 3 | micro-switch to: <ul style="list-style-type: none"> - plug in the terminations of the RS-485 ports - polarize the network of the second RS-485 port - plug in the termination of the CAN port |
| 4 | CAN port |
| 5 | digital outputs |
| 6 | display and keyboard (not available in the blind versions) |
| 7 | slot for gateway <i>c-pro 3 plug-in</i> |
| 8 | analog outputs |
| 9 | digital inputs |
| 10 | analog inputs |
| 11 | programming and debugging port |
| 12 | power supply |
| 13 | signalling LEDs |

2.4. Description *c-pro 3 EXP hecto* and *c-pro 3 EXP hecto+*

The following drawing shows the aspect of *c-pro 3 EXP hecto* and of *c-pro 3 EXP hecto+*.



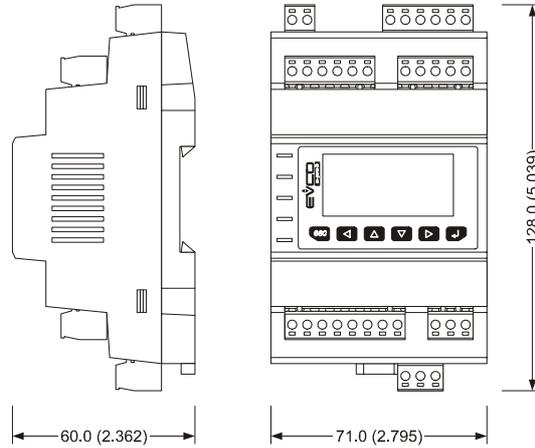
The following table shows the meaning of the parts of the expansion.

| Part | Meaning |
|------|--|
| 1 | micro-switch to plug in the termination of the CAN port |
| 2 | CAN port |
| 3 | digital outputs |
| 4 | analog outputs in <i>c-pro 3 EXP hecto</i> , analog inputs and analog outputs in <i>c-pro 3 EXP hecto+</i> |
| 5 | analog inputs |
| 6 | port to update the firmware of the expansion |
| 7 | power supply |
| 8 | digital inputs |
| 9 | signalling LEDs |

3. SIZE AND INSTALLATION

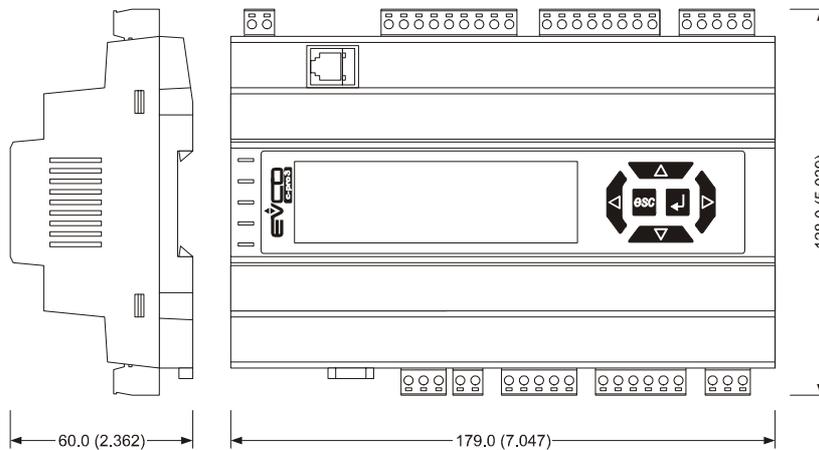
3.1. Size *c-pro 3 hecto*, *c-pro 3 hecto+*, *c-pro 3 EXP hecto* and *c-pro 3 EXP hecto+*

4 DIN modules; size in mm (in).



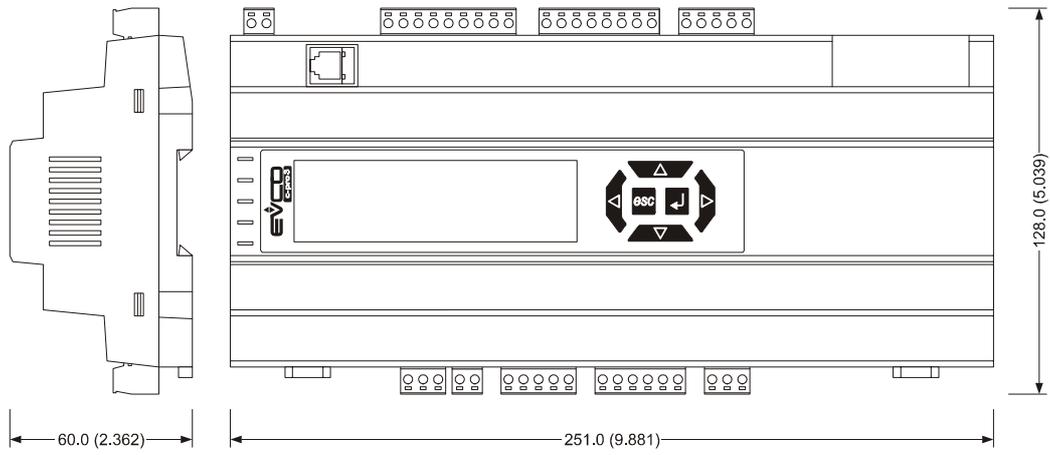
3.2. Size *c-pro 3 mega*

10 DIN modules; size in mm (in).



3.3. Size c-pro 3 NODE mega

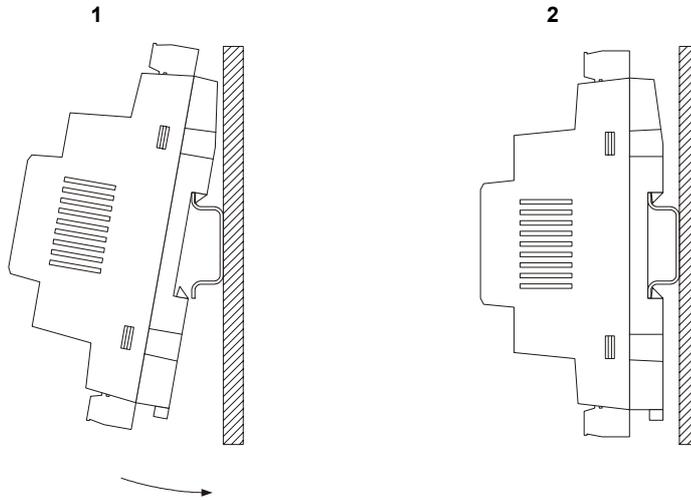
14 DIN modules; size in mm (in).



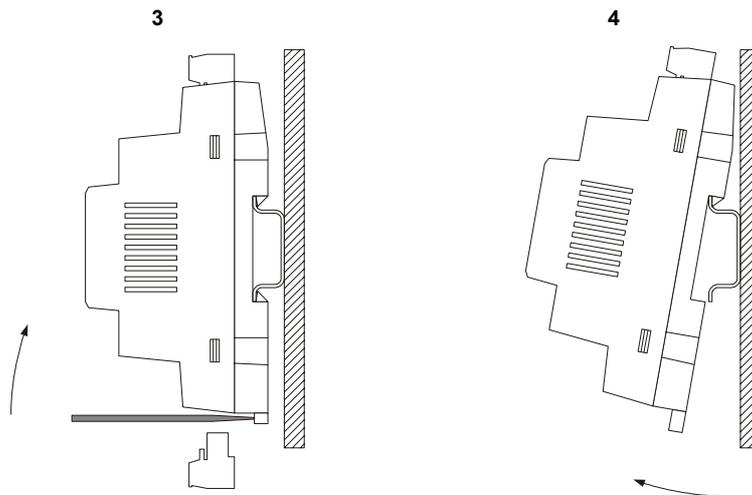
3.4. Installation

On DIN rail 35.0 x 7.5 mm (1.377 x 0.295 in) or 35.0 x 15.0 mm (1.377 x 0.590 in).

To install the devices operate as shown in the following drawing.



To remove the devices remove possible extractable screw terminal blocks plugged at the bottom first, then operate on the DIN rail clips with a screwdriver as shown in the following drawing.



To install the devices again press the DIN rail clips to the end first.

3.5. Additional information for installation

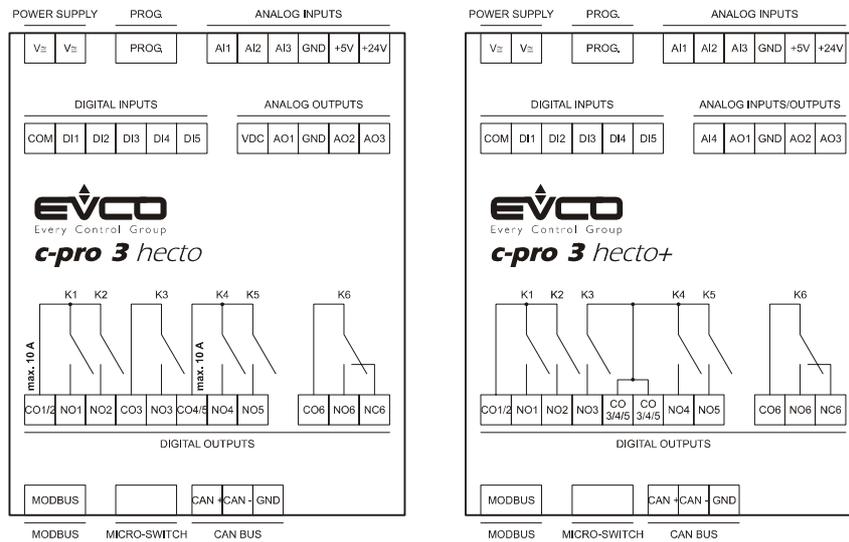
- working conditions (working temperature, humidity, etc.) must be between the limits indicated in the technical data
- do not install the devices close to heating sources (heaters, hot air ducts, etc.), equipments provided with big magnetos (big speakers, etc.), locations subject to direct sunlight, rain, humidity, dust, mechanical vibrations or bumps
- according to the safety legislation, the protection against electrical parts must be ensured by a correct installation of the devices; the parts that ensure the protection must be installed so that you can not remove them if not by using a tool.

4. ELECTRICAL CONNECTION

4.1. Electrical connection c-pro 3 hecto and c-pro 3 hecto+

4.1.1. Meaning of the connectors of c-pro 3 hecto and of c-pro 3 hecto+

The following drawing shows the connectors of c-pro 3 hecto and of c-pro 3 hecto.

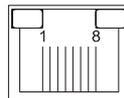


The following tables show the meaning of the connectors.

MODBUS

RS-485 port with Modbus master / slave communication protocol (configurable via application software).

The following drawing shows the aspect of the RS-485 port.



The following table shows the meaning of the pins of the RS-485 port.

| Pin | Meaning |
|-----|--|
| 1 | common |
| 2 | not connected |
| 3 | not connected |
| 4 | D0 = B - (terminal 0 of the transceiver) |
| 5 | D1 = A + (terminal 1 of the transceiver) |
| 6 | not connected |
| 7 | not connected |

8 | not connected



The maximum length of the connecting cables of the RS-485 port is 1,000 m (3,280 ft); also look at the *Modbus specifications and implementation guides manual* (the document is available on the internet site www.modbus.org).

Connect the RS-485 port using a twisted pair.

The following table shows the *function codes* supported by the controller.

| Function code | Meaning |
|---------------|-------------------------------|
| FC 01 | read coils |
| FC 02 | read discrete inputs |
| FC 03 | read multiple registers |
| FC 04 | read input registers |
| FC 05 | write single coil |
| FC 06 | write single register |
| FC 08 | diagnostic |
| FC 15 | write multiple coils |
| FC 16 | write multiple registers |
| FC 23 | read write multiple registers |

For the settings about the RS-485 port look at chapter 6 “CONFIGURATION”.

MICRO-SWITCH

Micro-switch to:

- plug in the termination of the RS-485 port (120 Ω, 0.25 W); position micro-switch 1 on position ON to plug in the termination of the RS-485 port (plug in the termination of the first and of the last element of the network)



- polarize the network of the RS-485 port (560 Ω, 0.25 W); position micro-switches 2 and 3 on position ON to polarize the network of the RS-485 port (the network must be polarized by an element of the network same).



- plug in the termination of the CAN port (120 Ω, 0.5 W); position micro-switch 4 on position ON to plug in the termination of the CAN port (plug in the termination of the first and of the last element of the network).



CAN BUS

CAN port.

| Terminal | Meaning |
|----------|----------|
| CAN + | signal + |
| CAN - | signal - |
| GND | ground |

The maximum number of devices that can make a CAN network (32) depends on the bus load; the bus load depends on the baud rate of the CANbus communication and on the kind of device in the network.



For example: a CAN network can be made of a programmable controller, of four I / O expansions and of four user interfaces with baud rate 500,000 baud.



The maximum length of the connecting cables of the CAN port depends on the baud rate of the CANbus communication, as follows:

- 1,000 m (3,280 ft) with baud rate 20,000 baud
- 500 m (1,640 ft) with baud rate 50,000 baud
- 250 m (820 ft) with baud rate 125,000 baud
- 50 m (164 ft) with baud rate 500,000 baud.

Connect the CAN port using a twisted pair.

For the settings about the CAN port look at chapter 6 “CONFIGURATION”.

DIGITAL OUTPUTS

In c-pro 3 hecto.

Digital outputs 1, 2, 3, 4 and 5 (electromechanical relays).

| Terminal | Meaning |
|----------|--|
| CO1/2 | common digital outputs 1 and 2 |
| NO1 | normally open contact digital output 1 |

| | |
|-------|--|
| NO2 | normally open contact digital output 2 |
| CO3 | common digital output 3 |
| NO3 | normally open contact digital output 3 |
| CO4/5 | common digital outputs 4 and 5 |
| NO4 | normally open contact digital output 4 |
| NO5 | normally open contact digital output 5 |

Digital output 6 (electromechanical relay).

| Terminal | Meaning |
|----------|--|
| CO6 | common digital output 6 |
| NO6 | normally open contact digital output 6 |
| NC6 | normally closed contact digital output 6 |



The maximum length of the connecting cables of the digital *hecto+* cuts is 100 m (328 ft).

The maximum current allowed on the loads is 10 A.

DIGITAL OUTPUTS

In *c-pro 3 hecto+*.

Digital outputs 1, 2, 3, 4 and 5 (electromechanical relays).

| Terminal | Meaning |
|----------|--|
| CO1/2 | common digital outputs 1 and 2 |
| NO1 | normally open contact digital output 1 |
| NO2 | normally open contact digital output 2 |
| NO3 | normally open contact digital output 3 |
| CO3/4/5 | common digital outputs 3, 4 and 5 |
| CO3/4/5 | common digital outputs 3, 4 and 5 |
| NO4 | normally open contact digital output 4 |
| NO5 | normally open contact digital output 5 |

Digital output 6 (electromechanical relay).

| Terminal | Meaning |
|----------|--|
| CO6 | common digital output 6 |
| NO6 | normally open contact digital output 6 |
| NC6 | normally closed contact digital output 6 |



The maximum length of the connecting cables of the digital outputs is 100 m (328 ft).

ANALOG OUTPUTS (in c-pro 3 hecto only)

Analog outputs.

| Terminal | Meaning |
|----------|--|
| VDC | power supply driving analog output 1 (24 VDC, 50 mA max.) |
| AO1 | analog output 1 (PWM signal) |
| GND | ground |
| AO2 | analog output 2 (configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal) |
| AO3 | analog output 3 (configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal) |



The maximum length of the connecting cables of the PWM analog output is 1 m (3.280 ft); the one of the connecting cables of the 0-20 mA / 4-20 mA / 0-10 V analog outputs is instead of 30 m (98 ft).

For the settings about the analog outputs look at chapter 6 "CONFIGURATION".

The analog output 1 is usable on condition that the controller is powered in alternate current and the phase powering the controller is the same powering the user driven by the output.

ANALOG INPUTS/OUTPUTS (in c-pro 3 hecto+ only)

Analog inputs and analog outputs.

| Terminal | Meaning |
|----------|--|
| AI4 | analog input 4 (NTC probes) |
| AO1 | analog output 1 (PWM signal) |
| GND | ground |
| AO2 | analog output 2 (configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal) |
| AO3 | analog output 3 (configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal) |



The maximum length of the connecting cables of the PWM analog output is 1 m (3.280 ft); the one of the connecting cables of the 0-20 mA / 4-20 mA / 0-10 V analog outputs is instead of 30 m (98 ft).

For the settings about the analog outputs look at chapter 6 "CONFIGURATION".

The analog output 1 is usable on condition that the controller is powered in alternate current and the phase powering the controller is the same powering the user driven by the output.

The analog output 1 and the analog output 2 are not independent each other but they work in the same way.

DIGITAL INPUTS

Free of voltage digital inputs.

| Terminal | Meaning |
|----------|-----------------------|
| COM | common digital inputs |
| DI1 | digital input 1 |
| DI2 | digital input 2 |
| DI3 | digital input 3 |
| DI4 | digital input 4 |
| DI5 | digital input 5 |



The maximum length of the connecting cables of the digital inputs is 100 m (328 ft).

ANALOG INPUTS

Analog inputs.

Each analog input is configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers.

| Terminal | Meaning |
|----------|---|
| AI1 | analog input 1 |
| AI2 | analog input 2 |
| AI3 | analog input 3 |
| GND | ground |
| +5V | power supply 0-5 V ratiometric transducers (5 VDC, 40 mA max.) |
| +24V | power supply 0-20 mA / 4-20 mA / 0-10 V transducers (24 VDC, 120 mA max.) |



The maximum length of the connecting cables of the analog inputs and the one of the power supply of the transducers is 100 m (328 ft).

The controller incorporates a restorable thermal protection of the power supplies against the short circuit and the overload.

For the settings about the analog inputs look at chapter 6 "CONFIGURATION".

PROG

Programming and debugging port.

POWER SUPPLY

Power supply.

| Terminal | Meaning |
|----------|---|
| V≡ | power supply controller (24 VAC / 20... 40 VDC) |
| V≡ | power supply controller (24 VAC / 20... 40 VDC) |



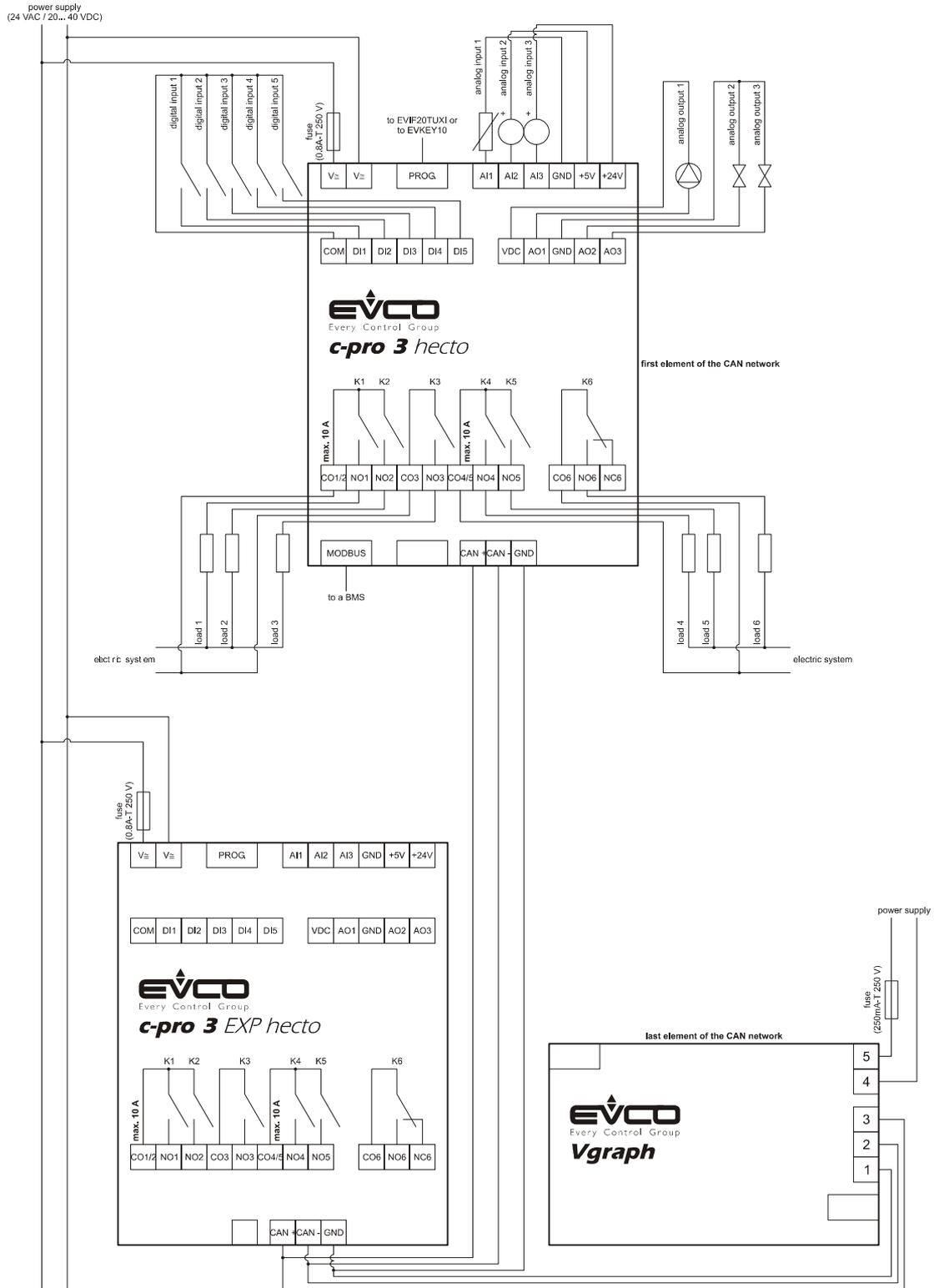
The maximum length of the connecting cables of the power supply of the controller is 30 m (98 ft).

Protect the power supply with a fuse rated 0.8A-T 250 V.

If the controller is powered in direct current, one will not have to respect the polarity of the power supply voltage.

4.1.2. Example of electrical connection of c-pro 3 hecto

The following shows an example of electrical connection of c-pro 3 hecto.

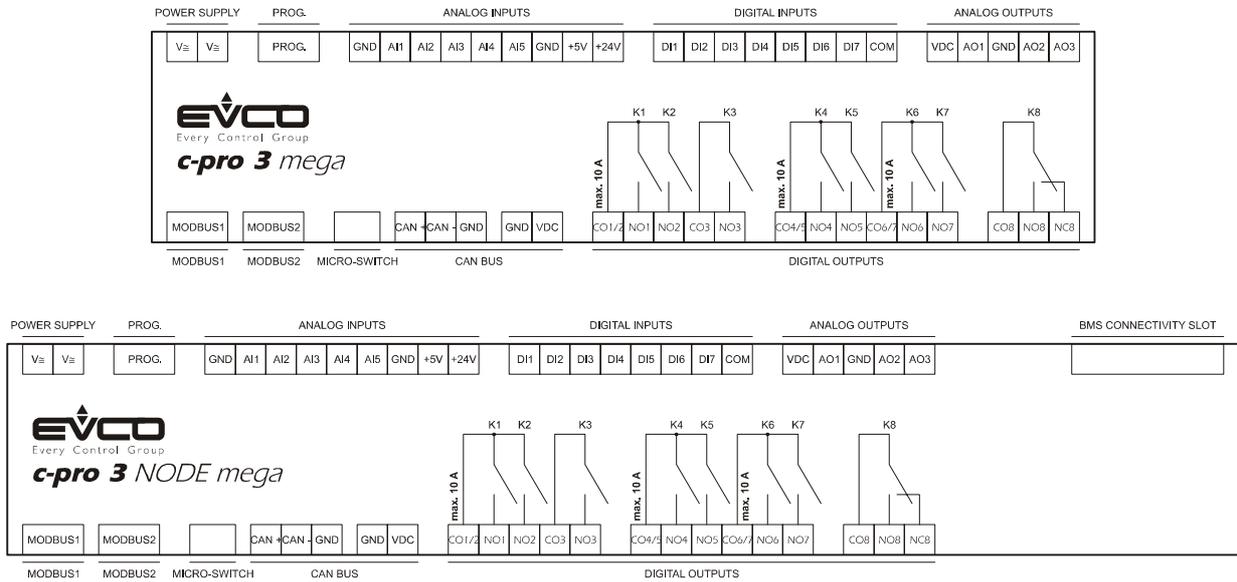


To reduce the reflections on the signal transmitted through the cables connecting the devices each other, plug in the termination of the CAN port of the first and of the last element of the network.

4.2. Electrical connection c-pro 3 mega and c-pro 3 NODE mega

4.2.1. Meaning of the connectors of c-pro 3 mega and of c-pro 3 NODE mega

The following drawing shows the connectors of *c-pro 3 mega* and of *c-pro 3 NODE mega*.

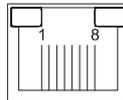


The following tables show the meaning of the connectors.

MODBUS1

RS-485 port with Modbus slave communication protocol.

The following drawing shows the aspect of the RS-485 port.



The following table shows the meaning of the pins of the RS-485 port.

| Pin | Meaning |
|-----|---|
| 1 | common |
| 2 | not connected |
| 3 | not connected |
| 4 | D0 = B = - (terminal 0 of the transceiver) |
| 5 | D1 = A = + (terminale 1 of the transceiver) |
| 6 | not connected |
| 7 | not connected |

8 | not connected



The maximum length of the connecting cables of the RS-485 port is 1,000 m (3,280 ft); also look at the *Modbus specifications and implementation guides manual* (the document is available on the internet site www.modbus.org).

Connect the RS-485 port using a twisted pair.

The following table shows the *function codes* supported by the controller.

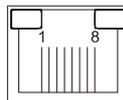
| Function code | Meaning |
|---------------|-------------------------------|
| FC 01 | read coils |
| FC 02 | read discrete inputs |
| FC 03 | read multiple registers |
| FC 04 | read input registers |
| FC 05 | write single coil |
| FC 06 | write single register |
| FC 08 | diagnostic |
| FC 15 | write multiple coils |
| FC 16 | write multiple registers |
| FC 23 | read write multiple registers |

For the settings about the RS-485 port look at chapter 6 “CONFIGURATION”.

MODBUS2

RS-485 port with Modbus master / slave communication protocol (configurable via application software).

The following drawing shows the aspect of the RS-485 port.



The following table shows the meaning of the pins of the RS-485 port.

| Pin | Meaning |
|-----|---------------|
| 1 | common |
| 2 | not connected |

| | |
|---|---|
| 3 | not connected |
| 4 | D0 = B = - (terminal 0 of the transceiver) |
| 5 | D1 = A = + (terminale 1 of the transceiver) |
| 6 | not connected |
| 7 | not connected |
| 8 | not connected |



The maximum length of the connecting cables of the RS-485 port is 1,000 m (3,280 ft); also look at the *Modbus specifications and implementation guides manual* (the document is available on the internet site www.modbus.org).

Connect the RS-485 port using a twisted pair.

The following table shows the *function codes* supported by the controller.

| Function code | Meaning |
|---------------|-------------------------------|
| FC 01 | read coils |
| FC 02 | read discrete inputs |
| FC 03 | read multiple registers |
| FC 04 | read input registers |
| FC 05 | write single coil |
| FC 06 | write single register |
| FC 08 | diagnostic |
| FC 15 | write multiple coils |
| FC 16 | write multiple registers |
| FC 23 | read write multiple registers |

For the settings about the RS-485 port look at chapter 6 “CONFIGURATION”.

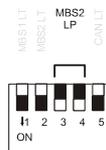
MICRO-SWITCH

Micro-switch to:

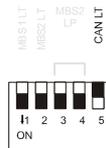
- plug in the terminations of the RS-485 ports (120 Ω, 0.25 W); position micro-switch 1 on position ON to plug in the termination of the first RS-485 port and micro-switch 2 on position ON to plug in the termination of the second RS-485 port (plug in the termination of the first and of the last element of the network)



- polarize the network of the second RS-485 port (560 Ω, 0.25 W); position micro-switches 3 and 4 on position ON to polarize the network of the second RS-485 port (the network must be polarized by an element of the network same).



- plug in the termination of the CAN port (120 Ω, 0.5 W); position micro-switch 4 on position ON to plug in the termination of the CAN port (plug in the termination of the first and of the last element of the network).



CAN BUS

CAN port.

| Terminal | Meaning |
|----------|----------|
| CAN + | signal + |
| CAN - | signal - |
| GND | ground |

The maximum number of devices that can make a CAN network (32) depends on the bus load; the bus load depends on the baud rate of the CANbus communication and on the kind of device in the network.



For example: a CAN network can be made of a programmable controller, of four I / O expansions and of four user interfaces with baud rate 500,000 baud.



The maximum length of the connecting cables of the CAN port depends on the baud rate of the CANbus communication, as follows:

- 1,000 m (3,280 ft) with baud rate 20,000 baud
- 500 m (1,640 ft) with baud rate 50,000 baud
- 250 m (820 ft) with baud rate 125,000 baud
- 50 m (164 ft) with baud rate 500,000 baud.

Connect the CAN port using a twisted pair.

For the settings about the CAN port look at chapter 6 "CONFIGURATION".

Power supply user interface.

| Terminal | Meaning |
|----------|---|
| GND | ground |
| VDC | power supply user interface (24 VDC, 120 mA max.) |



The maximum length of the connecting cables of the power supply of the user interface is 30 m (98 ft).

The controller incorporates a restorable thermal protection of the power supplies against the short circuit and the overload.

DIGITAL OUTPUTS

Digital outputs 1, 2 and 3 (electromechanical relays).

| Terminal | Meaning |
|----------|--|
| CO1/2 | common digital outputs 1 and 2 |
| NO1 | normally open contact digital output 1 |
| NO2 | normally open contact digital output 2 |
| CO3 | common digital output 3 |
| NO3 | normally open contact digital output 3 |

Digital outputs 4, 5, 6 e 7 (electromechanical relays).

| Terminal | Meaning |
|----------|--|
| CO4/5 | common digital outputs 4 and 5 |
| NO4 | normally open contact digital output 4 |
| NO5 | normally open contact digital output 5 |
| CO6/7 | common digital outputs 6 and 7 |
| NO6 | normally open contact digital output 6 |
| NO7 | normally open contact digital output 7 |

Digital output 8 (electromechanical relay).

| Terminal | Meaning |
|----------|-------------------------|
| CO8 | common digital output 8 |

| | |
|-----|--|
| NO8 | normally open contact digital output 8 |
| NC8 | normally closed contact digital output 8 |



The maximum length of the connecting cables of the digital outputs is 100 m (328 ft).

The maximum current allowed on the loads is 10 A.

BMS CONNECTIVITY SLOT (in c-pro 3 NODE mega only)

Slot for gateway *c-pro 3 plug-in*; also look at the User guide of *c-pro 3 plug-in*.

ANALOG OUTPUTS

Analog outputs.

| Terminal | Meaning |
|----------|--|
| VDC | power supply driving analog output 1 (24 VDC, 50 mA max.) |
| AO1 | analog output 1 (PWM signal) |
| GND | ground |
| AO2 | analog output 2 (configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal) |
| AO3 | analog output 3 (configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal) |



The maximum length of the connecting cables of the PWM analog output is 1 m (3.280 ft); the one of the connecting cables of the 0-20 mA / 4-20 mA / 0-10 V analog outputs is instead of 30 m (98 ft).

For the settings about the analog outputs look at chapter 6 "CONFIGURATION".

The analog output 1 is usable on condition that the controller is powered in alternate current and the phase powering the controller is the same powering the user driven by the output.

DIGITAL INPUTS

Digital inputs.

| Terminal | Meaning |
|----------|-----------------|
| DI1 | digital input 1 |
| DI2 | digital input 2 |
| DI3 | digital input 3 |
| DI4 | digital input 4 |
| DI5 | digital input 5 |
| DI6 | digital input 6 |

| | |
|-----|-----------------------|
| DI7 | digital input 7 |
| COM | common digital inputs |



The maximum length of the connecting cables of the digital inputs is 100 m (328 ft).

The digital inputs can be used on condition that they are powered at 24 VAC / DC.

ANALOG INPUTS

Analog inputs.

Each analog input is configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers.

| Terminal | Meaning |
|----------|---|
| GND | ground |
| AI1 | analog input 1 |
| AI2 | analog input 2 |
| AI3 | analog input 3 |
| AI4 | analog input 4 |
| AI5 | analog input 5 |
| GND | ground |
| +5V | power supply 0-5 V ratiometric transducers (5 VDC, 40 mA max.) |
| +24V | power supply 0-20 mA / 4-20 mA / 0-10 V transducers (24 VDC, 120 mA max.) |



The maximum length of the connecting cables of the analog inputs and the one of the power supply of the transducers is 100 m (328 ft).

The controller incorporates a restorable thermal protection of the power supplies against the short circuit and the overload.

For the settings about the analog inputs look at chapter 6 "CONFIGURATION".

PROG

Programming and debugging port.

POWER SUPPLY

Power supply.

| Terminal | Meaning |
|----------|---|
| V≡ | power supply controller (24 VAC / 20... 40 VDC) |
| V≡ | power supply controller (24 VAC / 20... 40 VDC) |



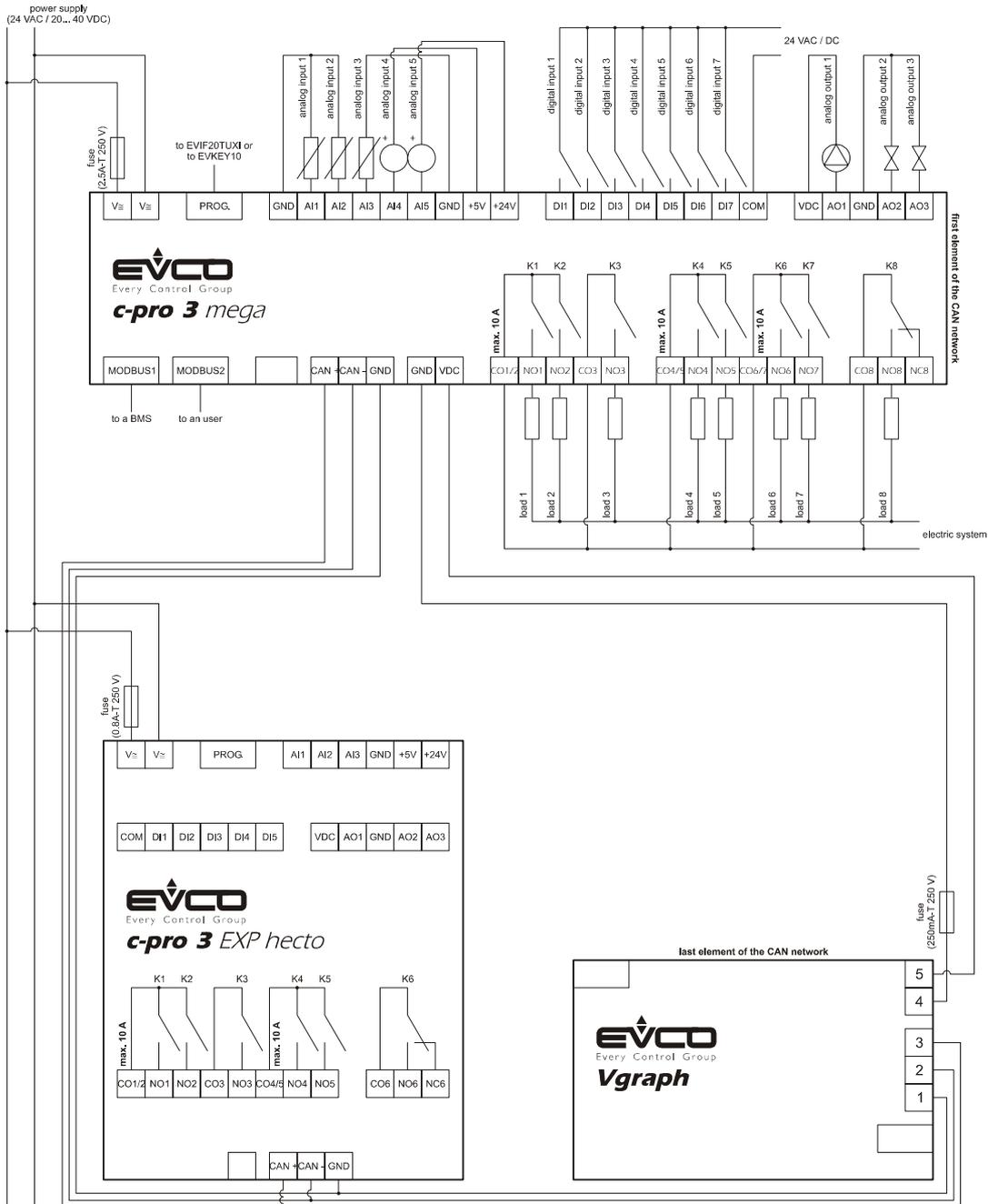
The maximum length of the connecting cables of the power supply of the controller is 30 m (98 ft).

Protect the power supply with a fuse rated 2.5A-T 250 V.

If the controller is powered in direct current, one will not have to respect the polarity of the power supply voltage.

4.2.2. Example of electrical connection of c-pro 3 mega

The following drawing shows an example of electrical connection of c-pro 3 mega.

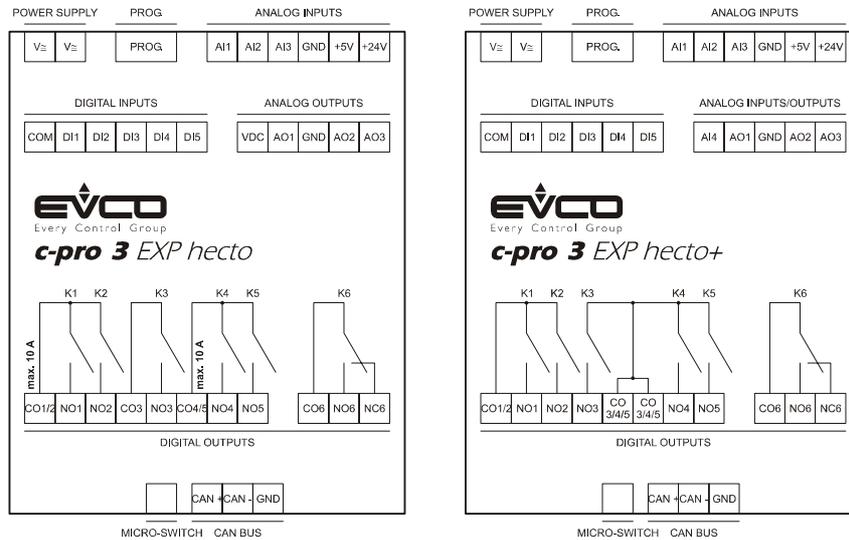


To reduce the reflections on the signal transmitted through the cables connecting the devices each other, plug in the termination of the CAN port of the first and of the last element of the network.

4.3. Electrical connection c-pro 3 EXP hecto and c-pro 3 EXP hecto+

4.3.1. Meaning of the connectors of c-pro 3 EXP hecto and of c-pro 3 EXP hecto+

The following drawing shows the connectors of c-pro 3 EXP hecto and of c-pro 3 EXP hecto+.



The following tables show the meaning of the connectors.

MICRO-SWITCH

Micro switch to plug in the termination of the CAN port (120 Ω, 0.5 W); position micro-switch 2 on position ON to plug in the termination of the CAN port (plug in the termination of the first and of the last element of the network).



CAN BUS

CAN port.

| Terminal | Meaning |
|----------|----------|
| CAN + | signal + |
| CAN - | signal - |
| GND | ground |

The maximum number of devices that can make a CAN network (32) depends on the bus load; the bus load depends on the baud rate of the CANbus communication and on the kind of device in the network.



For example: a CAN network can be made of a programmable controller, of four I / O expansions and of four user interfaces with baud rate 500,000 baud.



The maximum length of the connecting cables of the CAN port depends on the baud rate of the CANbus communication, as follows:

- 1,000 m (3,280 ft) with baud rate 20,000 baud
- 500 m (1,640 ft) with baud rate 50,000 baud
- 250 m (820 ft) with baud rate 125,000 baud
- 50 m (164 ft) with baud rate 500,000 baud.

Connect the CAN port using a twisted pair.

For the settings about the CAN port look at chapter 6 "CONFIGURATION".

DIGITAL OUTPUTS

In c-pro 3 EXP hecto.

Digital outputs 1, 2, 3, 4 and 5 (electromechanical relays).

| Terminal | Meaning |
|----------|--|
| CO1/2 | common digital outputs 1 and 2 |
| NO1 | normally open contact digital output 1 |
| NO2 | normally open contact digital output 2 |
| CO3 | common digital output 3 |
| NO3 | normally open contact digital output 3 |
| CO4/5 | common digital outputs 4 and 5 |
| NO4 | normally open contact digital output 4 |
| NO5 | normally open contact digital output 5 |

Digital output 6 (electromechanical relay).

| Terminal | Meaning |
|----------|--|
| CO6 | common digital output 6 |
| NO6 | normally open contact digital output 6 |
| NC6 | normally closed contact digital output 6 |



The maximum length of the connecting cables of the digital outputs is 100 m (328 ft).

The maximum current allowed on the loads is 10 A.

DIGITAL OUTPUTS

In **c-pro 3 EXP hecto+**.

Digital outputs 1, 2, 3, 4 and 5 (electromechanical relays).

| Terminal | Meaning |
|----------|--|
| CO1/2 | common digital outputs 1 and 2 |
| NO1 | normally open contact digital output 1 |
| NO2 | normally open contact digital output 2 |
| NO3 | normally open contact digital output 3 |
| CO3/4/5 | common digital outputs 3, 4 and 5 |
| CO3/4/5 | common digital outputs 3, 4 and 5 |
| NO4 | normally open contact digital output 4 |
| NO5 | normally open contact digital output 5 |

Digital output 6 (electromechanical relay).

| Terminal | Meaning |
|----------|--|
| CO6 | common digital output 6 |
| NO6 | normally open contact digital output 6 |
| NC6 | normally closed contact digital output 6 |



The maximum length of the connecting cables of the digital outputs is 100 m (328 ft).

ANALOG OUTPUTS (in c-pro 3 EXP hecto only)

Analog outputs.

| Terminal | Meaning |
|----------|--|
| VDC | power supply driving analog output 1 (24 VDC, 50 mA max.) |
| AO1 | analog output 1 (PWM signal) |
| GND | ground |
| AO2 | analog output 2 (configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal) |
| AO3 | analog output 3 (configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal) |



The maximum length of the connecting cables of the PWM analog output is 1 m (3.280 ft); the one of the connecting cables of the 0-20 mA / 4-20 mA / 0-10 V analog outputs is instead of 30 m (98 ft).

For the settings about the analog outputs look at chapter 6 "CONFIGURATION".

The analog output 1 is usable on condition that the expansion is powered in alternate current and the phase powering the controller is the same powering the user driven by the output.

ANALOG INPUTS/OUTPUTS (in c-pro 3 EXP hecto+ only)

Analog inputs and analog outputs.

| Terminal | Meaning |
|----------|--|
| AI4 | analog input 4 (NTC probes) |
| AO1 | analog output 1 (PWM signal) |
| GND | ground |
| AO2 | analog output 2 (configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal) |
| AO3 | analog output 3 (configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal) |



The maximum length of the connecting cables of the PWM analog output is 1 m (3.280 ft); the one of the connecting cables of the 0-20 mA / 4-20 mA / 0-10 V analog outputs is instead of 30 m (98 ft).

For the settings about the analog outputs look at chapter 6 "CONFIGURATION".

The analog output 1 is usable on condition that the expansion is powered in alternate current and the phase powering the controller is the same powering the user driven by the output.

The analog output 1 and the analog output 2 are not independent each other but they work in the same way.

DIGITAL INPUTS

Free of voltage digital inputs.

| Terminal | Meaning |
|----------|-----------------------|
| COM | common digital inputs |
| DI1 | digital input 1 |
| DI2 | digital input 2 |
| DI3 | digital input 3 |
| DI4 | digital input 4 |
| DI5 | digital input 5 |



The maximum length of the connecting cables of the digital inputs is 100 m (328 ft).

ANALOG INPUTS

Analog inputs.

Each analog input is configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers.

| Terminal | Meaning |
|----------|---|
| AI1 | analog input 1 |
| AI2 | analog input 2 |
| AI3 | analog input 3 |
| GND | ground |
| +5V | power supply 0-5 V ratiometric transducers (5 VDC, 40 mA max.) |
| +24V | power supply 0-20 mA / 4-20 mA / 0-10 V transducers (24 VDC, 120 mA max.) |



The maximum length of the connecting cables of the analog inputs and the one of the power supply of the transducers is 100 m (328 ft).

The expansion incorporates a restorable thermal protection of the power supplies against the short circuit and the overload.

For the settings about the analog inputs look at chapter 6 "CONFIGURATION".

PROG

Port to update the firmware of the instrument.

POWER SUPPLY

Power supply.

| Terminal | Meaning |
|----------|--|
| V≡ | power supply expansion (24 VAC / 20... 40 VDC) |
| V≡ | power supply expansion (24 VAC / 20... 40 VDC) |



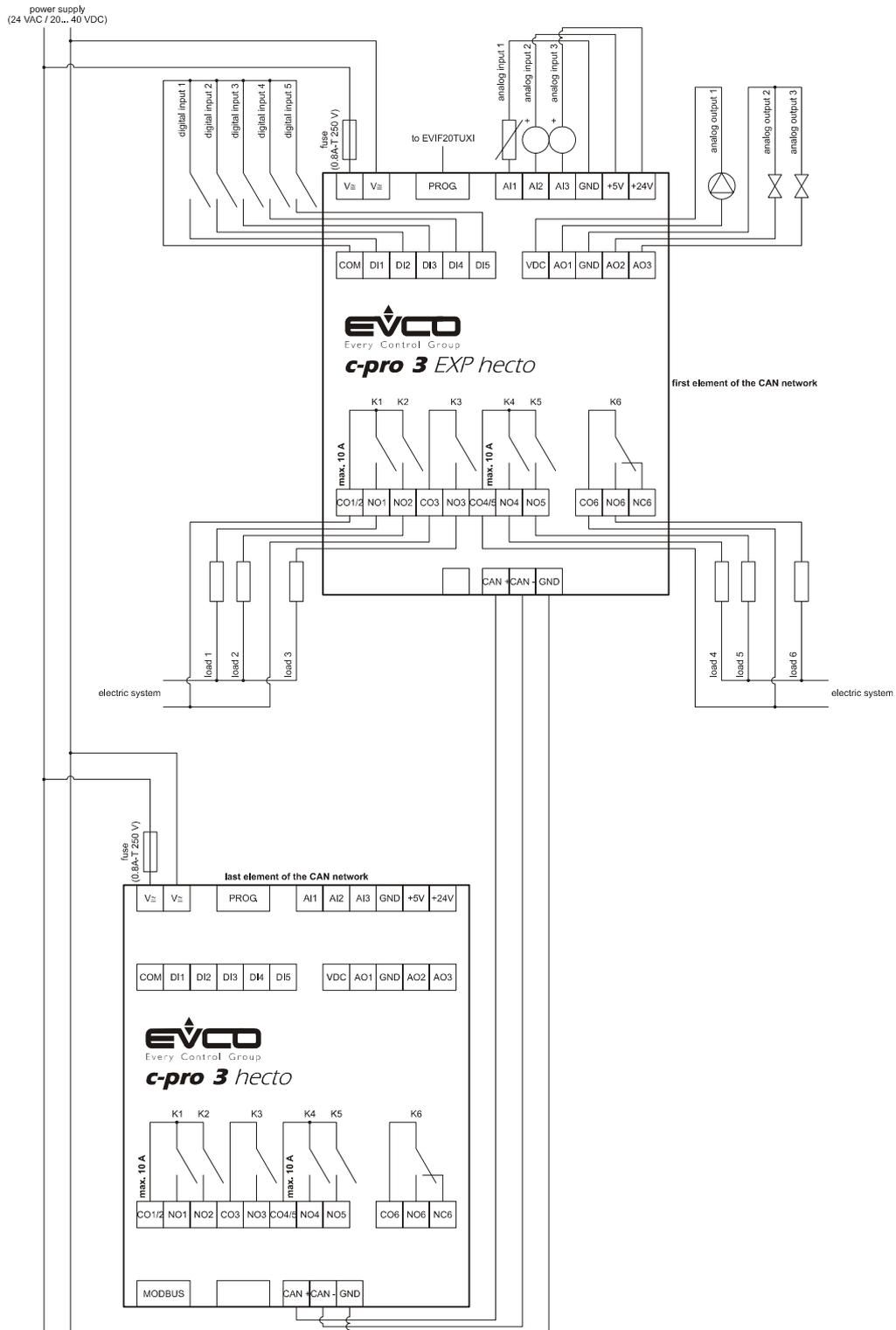
The maximum length of the connecting cables of the power supply of the expansion is 30 m (98 ft).

Protect the power supply with a fuse rated 0.8A-T 250 V.

If the expansion is powered in direct current, one will not have to respect the polarity of the power supply voltage.

4.3.2. Example of electrical connection of c-pro 3 EXP hecto

The following drawing shows an example of electrical connection of c-pro 3 EXP hecto.



To reduce the reflections on the signal transmitted through the cables connecting the devices each other, plug in the termination of the CAN port of the first and of the last element of the network.

4.4. Additional information for electrical connection

- do not operate on the terminal blocks with electrical or pneumatic screwdrivers
- if the device has been moved from a cold location to a warm one, the humidity could condense on the inside; wait about an hour before powering it
- test the working power supply voltage, working electrical frequency and working electrical power of the controller; they must correspond with the local power supply
- connect the device to the other devices using a twisted pair
- disconnect the local power supply before servicing the device
- do not use the device as safety device
- for repairs and information on the device please contact the EVCO's sales network.

5. USER INTERFACE

5.1. Keyboard

The following table shows the meaning of the keyboard.

| Button | Preset function |
|---|---|
|  | cancel, hereinafter also called "button ESC" |
|  | move to left, hereinafter also called "button LEFT" |
|  | increase, hereinafter also called "button UP" |
|  | decrease, hereinafter also called "button DOWN" |
|  | move to right, hereinafter also called "button RIGHT" |
|  | confirmation, hereinafter also called "button ENTER" |

The keyboard is not available in the blind versions.

5.2. Signalling LEDs

5.2.1. LEDs at the front of the device

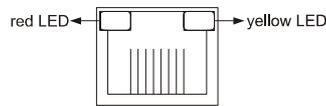
The following table shows the meaning of the LEDs at the front of the device.

| LED | Meaning |
|---|---|
| ON | LED power supply if it is lit, the device will be powered if it is out, the device will not be powered |
| RUN | LED run if it is lit, the application software will be compiled and running in <i>release</i> modality if it flashes slowly, the application software will be compiled and running in <i>debug</i> modality (condition not allowed in c-pro 3 EXP hecto and in in c-pro 3 EXP hecto+) if it flashes quickly, the application software will be compiled, running in <i>debug</i> modality and stopped in a <i>breakpoint</i> (condition not allowed in c-pro 3 EXP hecto and in in c-pro 3 EXP hecto+) if it is out (condition not allowed in c-pro 3 EXP hecto and in in c-pro 3 EXP hecto+): - the controller will not be compatible with the application software - the controller will not be enabled to work with the <i>Special ABL (Application Block Libraries)</i> |
|  | LED system alarm if it is lit, an alarm system not restorable via software will be running if it flashes slowly, a system alarm with automatic reset will be running if it flashes quickly, a system alarm with manual reset will be running if it is out, no alarm system will be running |

| | |
|------------|--|
| CAN | <p>LED CANbus communication</p> <p>if it is lit, the device will be configured to communicate via CANbus with another device but the CAN communication will not have been set up</p> <p>if it flashes slowly, the CANbus communication will have been set up but it will not be completely correct</p> <p>if it flashes quickly, the CANbus communication will have been set up and will be correct</p> <p>if it is out, no CANbus communication will be running</p> |
| L1 | <p>LED auxiliary (not used in <i>c-pro 3 hecto</i>, in <i>c-pro 3 hecto+</i>, in <i>c-pro 3 EXP hecto</i> and in <i>c-pro 3 EXP hecto</i>)</p> <p>The operation of this LED can be programmed through the development environment UNI-PRO 3</p> |

5.2.2. LEDs on the RS-485 ports

The following drawing shows the aspect of a RS-485 port.



The following table shows the meaning of the LEDs on the RS-485 ports.

| LED | Meaning |
|-------------------|--|
| red LED | <p>LED error</p> <p>if it is lit, an internal error will have arisen</p> <p>if it flashes quickly, a configuration error will have arisen</p> <p>if it is out, no error will be running</p> |
| yellow LED | <p>LED Modbus communication</p> <p>if it is lit, no Modbus communication will be running</p> <p>if it flashes quickly, the Modbus communication will have been set up and will be correct</p> <p>if it is out, the controller will not be configured to communicate via Modbus</p> |

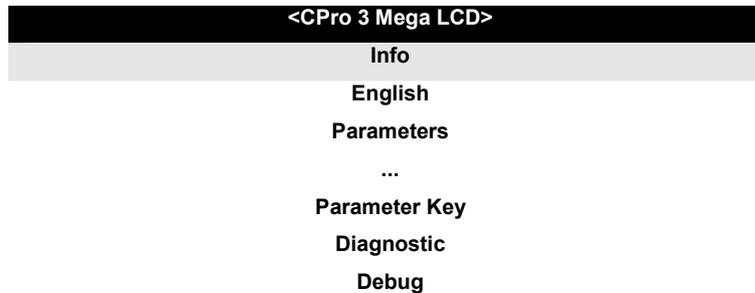
6. CONFIGURATION

6.1. Configuring a programmable controller

6.1.1. Configuring a built-in programmable controller

To gain access to the procedure operate as follows:

1. Make sure the power supply is switched on.
2. Keep pressed 2 s buttons UP and DOWN: the display will show the following menu (hereinafter called *Main menu*).



It is also possible to configure the controller using an user interface; look at paragraph 6.3 “Configuring a device through an user interface”.

To gain access to a submenu operate as follows:

3. Press and release button UP or button DOWN to select the submenu.
4. Press and release button ENTER.



The access to the *Parameters* submenu, to the *Networks* submenu, to the *Password* submenu and to the *Parameter Key* submenu is protected by password.

To gain access to the *Parameters* submenu, to the *Networks* submenu, to the *Password* submenu and to the *Parameter Key* submenu operate as follows:

5. From step 2, press and release button UP or button DOWN to select the submenu.
6. Press and release button ENTER.
7. Press and release button ENTER again to set the password value.
8. Press and release button DOWN over and over again to set “-19”.
9. Press and release button ENTER again.

To modify a parameter operate as follows:

10. From step 9, press and release button UP or button DOWN to select the parameter (some parameters belong to a possible submenu; press and release button ENTER to gain access to them).
11. Press and release button ENTER.
12. Press and release button UP or button DOWN to modify the value.
13. Press and release button ENTER to confirm the value.
14. Press and release button ESC over and over again to go back to the *Main menu*.

To modify the language of the application software pages operate as follows:

15. From step 2, press and release button UP or button DOWN to select the voice *Language* (according to the factory setting it has value “**English**”).
16. Press and release button ENTER.
17. Press and release button UP or button DOWN to modify the language.
18. Press and release button ENTER to confirm the value.

To modify the real date and time operate as follows:

19. From step 2, press and release button UP or button DOWN to select the voice *Data e ora reale*.
20. Press and release button ENTER.
21. Press and release button UP or button DOWN to modify the value.
22. Press and release button ENTER or button RIGHT to confirm the value and modify the following field (press and release button LEFT or button RIGHT to move among the fields).
23. Repeat steps 21 and 22.

To copy the parameters from the controller to the programming key EVKEY10 operate as follows:

24. Make sure the power supply is switched on.
25. Connect the key to the controller; look at paragraph 8.2.4 "Connection to the controller".
26. Gain access to the submenu *Parameter Key*.
27. Press and release button UP or button DOWN to select "**PAR APP**" to copy the application software parameters or "**PAR DRV**" to copy the configuration parameters.
28. Press and release button UP or button DOWN to select "**SAVE**".
29. Press and release button ENTER: the parameters will be copied from the controller to the key (this operation usually takes a few seconds; if an error had to arise the *LED system alarm* (look at paragraph 5.2.1 "LEDs at the front of the device") will light up and parameter *Key Par* (it belongs to the *Diagnostic* submenu) will assume value *Err*.
30. Disconnect the programming key.

To copy the parameters from the programming key EVKEY10 to the controller operate as follows:

31. Make sure the power supply is switched on.
32. Connect the key to the controller; look at paragraph 8.2.4 "Connection to the controller".
33. Gain access to the submenu *Parameter Key*.
34. Press and release button UP or button DOWN to select "**RESTOR**".
35. Press and release button ENTER: the parameters will be copied from the key to the controller (this operation usually takes a few seconds; if an error had to arise the *LED system alarm* (look at paragraph 5.2.1 "LEDs at the front of the device") will light up and parameter *Key Par* (it belongs to the *Diagnostic* submenu) will assume value *Err*.
36. Disconnect the programming key.



The copy of the parameters from the programming key EVKEY10 to the controller is allowed on condition that the firmware of the controllers coincides.

To quit the procedure operate as follows:

37. Press and release button ESC over and over again; possible modifications will not be saved.



Switch off the power supply after the modification of the configuration.

6.1.2. Configuring a blind programmable controller

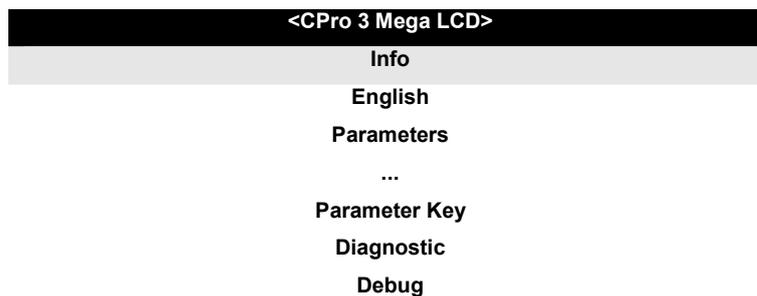
The following procedures show an example of configuration of a blind programmable controller through a built-in programmable controller (in the example it is **c-pro 3 mega**) and through its user interface.



It is also possible to configure the controller using an user interface; look at paragraph 6.3 “Configuring a device through an user interface”.

Operate as follows:

1. Switch off the power supply of the controllers.
2. Connect the blind controller to the built-in controller through the CAN port; look at chapter 4 “ELECTRICAL CONNECTION”.
3. Switch on the power supply of the controllers.
4. Keep pressed 2 s buttons UP and DOWN: the display will show the following menu.



5. Press and release button UP or button DOWN to select “**Networks**”.
6. Press and release button ENTER.
7. Press and release button ENTER again to set the password value.
8. Press and release button DOWN over and over again to set “-19”.
9. Press and release button ENTER again.
10. Press and release button UP or button DOWN to select “**CAN Bus**”.
11. Press and release button ENTER again.
12. Set parameter *NetworkNode* using button UP or button DOWN to select the parameter and using button ENTER to modify and to confirm the value.



According to the factory setting the address of the CAN node of a programmable controller has value 1 (therefore operate on the controller to set parameter *NetworkNode* to [1] 1).

13. Press and release button UP or button DOWN to select “>”.
14. Press and release button ENTER again: the display will show the *Main menu* of the blind controller.
15. Operate as shown in paragraph 6.1.1 “Configuring a built-in programmable controller”.

6.2. Configuring an I / O expansion

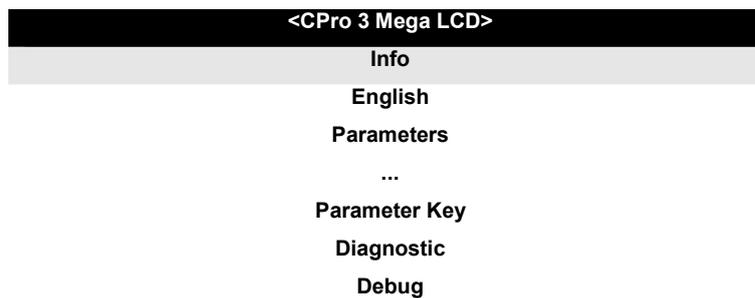
The following procedures show an example of configuration of an I / O expansion through a built-in programmable controller (in the example it is **c-pro 3 mega**) and through its user interface.



It is also possible to configure the expansion using an user interface; look at paragraph 6.3 “Configuring a device through an user interface”.

Operate as follows:

1. Switch off the power supply of the controller and of the expansion.
2. Connect the controller to the expansion through the CAN port; look at chapter 4 “ELECTRICAL CONNECTION”.
3. Switch on the power supply of the controller and of the expansion.
4. Keep pressed 2 s buttons UP and DOWN: the display will show the following menu.



5. Press and release button UP or button DOWN to select “**Networks**”.
6. Press and release button ENTER.
7. Press and release button ENTER again to set the password value.
8. Press and release button DOWN over and over again to set “-19”.
9. Press and release button ENTER again.
10. Press and release button UP or button DOWN to select “**CAN Bus**”.
11. Press and release button ENTER again.
12. Set parameter *NetworkNode* using button UP or button DOWN to select the parameter and using button ENTER to modify and to confirm the value.



According to the factory setting the address of the CAN node of an I / O expansion has value 2 (therefore operate on the controller to set parameter *NetworkNode* to [2] 2).

13. Press and release button UP or button DOWN to select “>”.
14. Press and release button ENTER again: the display will show the *Main menu* of the expansion.
15. Operate as shown in paragraph 6.1.1 “Configuring a built-in programmable controller”.

6.3. Configuring a device through an user interface (*Vgraph*, *Vtouch* or *Vroom*)

The following procedures show an example of configuration of a device through an user interface (in the example *Vgraph*) and through its user interface.

For further information please consult the hardware manual of the user interface.

Operate as follows:

1. Switch off the power supply of the device and of the interface.
2. Connect the device to the interface through the CAN port; look at chapter 4 "ELECTRICAL CONNECTION".
3. Keep pressed 2 s buttons ESC and RIGHT.
4. Switch on the power supply of the device and of the interface.
5. When the display of the interface will show the following menu release buttons ESC and RIGHT.

| |
|----------------------------------|
| Vgraph |
| Parameters |
| Contrast |
| CAN Network |
| Modbus |
| Info |
| <i>Real date and time</i> |

6. Press and release button UP or button DOWN to select "CAN Network".
7. Press and release button ENTER.
8. Press and release button ENTER again to set the password value.
9. Press and release button DOWN over and over again to set "-19".
10. Press and release button ENTER again.
11. Set parameter *NW Node* using button UP or button DOWN to select the parameter and using button ENTER to modify and to confirm the value.



According to the factory setting the address of the CAN node of a programmable controller has value 1 (therefore operate on the interface to set parameter *NW Node* to [1] 1) and the address of the CAN node of an I / O expansion has value 2 (therefore operate on the interface to set parameter *NW Node* to [2] 2).

12. Switch off the power supply of the interface.
13. Switch on the power supply of the interface.
14. Keep pressed 2 s buttons LEFT and ENTER: the display will show the following menu.

| Network Status | | | |
|-----------------------|-----------|-----------|-----------------|
| Loc | 99 | OK | >> |
| 1 | 1 | OK | >> |
| 2 | 2 | OK | >> |
| 3 | 0 | - | >> |
| 4 | 0 | - | >> |
| 5 | 0 | - | >> |

15. Press and release button UP or button DOWN to select the device.
16. Press and release button ENTER: the display will show the *Main menu* of the device.
17. Operate as shown in paragraph 6.1.1 "Configuring a built-in programmable controller".

6.4. List of configuration parameters

6.4.1. List of configuration parameters of *c-pro 3 hecto* and of *c-pro 3 hecto+*

| Submenu | Parameter | Min. | Max. | Unit | Preset | Description |
|----------------|---------------|---|------|------|--------|--|
| Info | PROJ | parameter available in read only modality | | | | information about the application project (project, version and revision) |
| Info | FW | parameter available in read only modality | | | | information about the firmware (project, version, revision and subrevision) |
| Info | HW | parameter available in read only modality | | | | information about the hardware (version, revision, generic (G) or special (S)) |
| Info | SW | parameter available in read only modality | | | | information about UNI-PRO 3 (version and revision) |
| Info | SN | parameter available in read only modality | | | | information about the serial number and the result of the productive test |
| Info | MASK | parameter available in read only modality | | | | information about the mask (it depends on the builder's coding system) |
| Info | date and time | parameter available in read only modality | | | | date and time of the last compilation of the application project |
| Parameters (1) | AI1 | --- | --- | --- | NTC | kind of probe analog input 1 PTC = PTC probe NTC = NTC probe 0-20mA = 0-20 mA transducer 4-20mA = 4-20 mA transducer 0-5V = 0-5 V ratiometric transducer 0-10V = 0-10 V ratiometric transducer PT1000 = Pt 1000 probe |
| Parameters (1) | AI2 | --- | --- | --- | NTC | kind of probe analog input 2 PTC = PTC probe NTC = NTC probe 0-20mA = 0-20 mA transducer 4-20mA = 4-20 mA transducer 0-5V = 0-5 V ratiometric transducer 0-10V = 0-10 V ratiometric transducer PT1000 = Pt 1000 probe |

| | | | | | | |
|---|---------------|-----|-----|-----|-------|---|
| Parameters (1) | AI3 | --- | --- | --- | NTC | <p>kind of probe analog input 3</p> <p>PTC = PTC probe</p> <p>NTC = NTC probe</p> <p>0-20mA = 0-20 mA transducer</p> <p>4-20mA = 4-20 mA transducer</p> <p>0-5V = 0-5 V ratiometric transducer</p> <p>0-10V = 0-10 V ratiometric transducer</p> <p>PT1000 = Pt 1000 probe</p> |
| Parameters (1) | AI Err Time | 0 | 240 | s | 2 | analog inputs time-out (after this time without communication with an analog input, the controller signals the analog input error) |
| Parameters (1) | AO1 | --- | --- | --- | PWM | <p>kind of signal analog input 1</p> <p>PWM = PWM (Pulse With Modulation)</p> |
| Parameters (1) | AO2 | --- | --- | --- | 0-10V | <p>kind of signal analog input 2</p> <p>0-20mA = 0-20 mA</p> <p>4-20mA = 4-20 mA</p> <p>0-10V = 0-10 V</p> |
| Parameters (1) | AO3 | --- | --- | --- | 0-10V | <p>kind of signal analog input 3</p> <p>0-20mA = 0-20 mA</p> <p>4-20mA = 4-20 mA</p> <p>0-10V = 0-10 V</p> |
| Parameters (1) | CosPhi 10us | --- | --- | --- | --- | reserved |
| Parameters (2) [press button RIGHT to show it] | I/O Timeout | 1 | 240 | s | 60 | time-out of the CANbus communication for the test of the remote values of the I / O (after this time without CANbus communication, the I / O of the controller is disabled) |
| Parameters (2) [press button RIGHT to show it] | En. Prg Level | --- | --- | --- | NO | <p>enabling the access to the first level page pressing a combination of buttons</p> <p>YES = yes, operating as follows:</p> <ul style="list-style-type: none"> - keep pressed 3 s button ENTER to gain access to the first page of level 1 - keep pressed 3 s buttons ENTER and ESC to gain access to the first page of level 2 - keep pressed 3 s buttons LEFT and RIGHT to gain access to the first page of level 3 |

| | | | | | | |
|--|---------------|---------|---------------|------|----------|---|
| Parameters (2) [press button RIGHT to show it] | Password Indi | --- | --- | --- | NO | connection among the passwords to gain access to the levels NO = one has not to set any password to gain access to levels lower than the one one has already gained access YES = one has to set a password to gain access to each level |
| Parameters (2) [press button RIGHT to show it] | Debug Baud | ---- | ---- | ---- | 19200 | baud rate for the debug 19200 = 19,200 baud 28800 = 28,800 baud 38400 = 38,400 baud 57600 = 57,600 baud 76800 = 76,800 baud 115K2 = 115,200 baud |
| Networks / CAN Bus | MyNode | 1 | 127 | --- | 1 | local (or of the controller) CAN node address |
| Networks / CAN Bus | Master | --- | --- | --- | YES | enabling the operation as master in a CAN network YES = yes |
| Networks / CAN Bus | Baud | --- | --- | --- | 20K | CANbus communication baud rate 20K = 20,000 baud 50K = 50,000 baud 125K = 125,000 baud 500K = 500,000 baud |
| Networks / CAN Bus | Timeout | 1 | 60 | s | 5 | remote (or with a device in the network) CANbus communication time-out (after this time without CANbus communication with a device, it is excluded by the network) |
| Networks / CAN Bus | NetworkNode | [1] 0 | [32] 127 | --- | [1] 99 | address of a remote (or of a device in the network) CAN node; example for [1] 2: [1] = node 2 = node's address |
| Networks / CAN Bus [press button RIGHT to show it] | TSEG1 | 0 | 63 | --- | 31 | reserved |

| | | | | | | |
|---|-----------|-----|-----|-----|-------|---|
| Networks / CAN Bus [press button RIGHT to show it] | TSEG2 | 1 | 7 | --- | 7 | reserved |
| Networks / CAN Bus [press button RIGHT to show it] | SJW | 0 | 3 | --- | 0 | reserved |
| Networks / CAN Bus [press button RIGHT to show it] | BTR(1) | 1 | 15 | --- | 15 | reserved |
| Networks / UART1 ⁽¹⁾ | Address | 1 | 247 | --- | 1 | local (or of the controller) Modbus node address in a RS-485 network wired on the RS-485 port |
| Networks / UART1 ⁽¹⁾ | Baud Rate | --- | --- | --- | 9600 | Modbus communication baud rate in a RS-485 network wired on the RS-485 port 1200 = 1,200 baud 2400 = 2,400 baud 4800 = 4,800 baud 9600 = 9,600 baud 19200 = 19,200 baud 28800 = 28,000 baud 38400 = 38,400 baud 57600 = 57,600 baud |
| Networks / UART1 ⁽¹⁾ | Parity | --- | --- | --- | EVEN | Modbus communication parity in a RS-485 network wired on the RS-485 port NONE = no parity ODD = odd EVEN = even |
| Networks / UART1 ⁽¹⁾ | Stop | --- | --- | --- | 1 BIT | Modbus communication stop bit number in a RS-485 network wired on the RS-485 port 1 BIT = 1 bit 2 BIT = 2 bit |

| | | | | | | |
|------------------------------------|----------|--------|-------|-----|----|--|
| Networks / UART2 ⁽¹⁾ | Timeout | 2 | 240 | s | 10 | Modbus communication time-out in a RS-485 network wired on the RS-485 port for the test of the remote values of the I / O (after this time without Modbus communication, the request is considered not sent and the controller moves to the following request) (1) |
| Password | Level 1: | -32768 | 32767 | --- | 0 | value of the password to gain access to level 1 |
| | | --- | --- | --- | ON | enabling the password to gain access to level 1 OFF = to gain access to level 1 one has not to set any password ON = to gain access to level 1 one has to set a password |
| Password | Level 2: | -32768 | 32767 | --- | 0 | value of the password to gain access to level 2 |
| | | --- | --- | --- | ON | enabling the password to gain access to level 2 OFF = to gain access to level 2 one has not to set any password ON = to gain access to level 2 one has to set a password |
| Password | Level 3: | -32768 | 32767 | --- | 0 | value of the password to gain access to level 3 |
| | | --- | --- | --- | ON | enabling the password to gain access to level 3 OFF = to gain access to level 3 one has not to set any password ON = to gain access to level 3 one has to set a password |
| Password | Level 4: | -32768 | 32767 | --- | 0 | value of the password to gain access to level 4 |
| | | --- | --- | --- | ON | enabling the password to gain access to level 4 OFF = to gain access to level 4 one has not to set any password ON = to gain access to level 4 one has to set a password |

| | | | | | | |
|------------|--------------|---|-------|-----|-----|--|
| Password | Level 5: | -32768 | 32767 | --- | 0 | value of the password to gain access to level 5 |
| | | --- | --- | --- | ON | enabling the password to gain access to level 5 OFF = to gain access to level 5 one has not to set any password ON = to gain access to level 5 one has to set a password |
| Password | Timeout | 0 | 240 | s | 240 | time-out of the passwords to gain access to the levels (after this time since the last operation with the buttons, to gain access to the level one has to set a password again, if foreseen) |
| Diagnostic | FRAM | parameter available in read only modality | | | | non volatile memory status ok = not in error err = in error |
| Diagnostic | RTC | parameter available in read only modality | | | | clock status ok = not in error err = in error low = loss of data |
| Diagnostic | STACK | parameter available in read only modality | | | | stack status ok = not in error err = in error (because of overflow) |
| Diagnostic | Power Supply | parameter available in read only modality | | | | power supply voltage status ok = not in error err = in error (because of out of range voltage) |
| Diagnostic | 5V Ratio | parameter available in read only modality | | | | status of the power supply voltage of the ratiometric transducers ok = not in error err = in error (because of out of range voltage) |
| Diagnostic | 24V Sensor | parameter available in read only modality | | | | status of the power supply voltage of the 0-20 mA / 4-20 mA / 0-10 V transducers ok = not in error err = in error (because of out of range voltage) |

| | | | |
|----------------------|-----------|---|--|
| Diagnostic | Math | parameter available in read only modality | Math status ok = not in error err = in error (because of overflow, underflow, division by zero or NaN) |
| Diagnostic | Key Par | parameter available in read only modality | result of the copy of the parameters from the controller to the programming key EVKEY10 and vice versa ok = operation successful completed err = operazione failed |
| Debug [Algo] | Main time | parameter available in read only modality | main cycle time of the application software (in milliseconds) |
| | Int. time | parameter available in read only modality | interrupt cycle time of the application software (in milliseconds) |
| Debug [CAN bus] | rx | parameter available in read only modality | number of packages in transmission |
| | tx | parameter available in read only modality | number of packages in reception |
| Debug [CAN bus] | err | parameter available in read only modality | number of packages in error |
| | ovf | parameter available in read only modality | number of packages in overflow |
| Debug | 5VP | parameter available in read only modality | reading the power supply voltage of the ratiometric transducers |
| Debug | 24VP | parameter available in read only modality | reading the power supply voltage of the 0-20 mA / 4-20 mA / 0-10 V transducers |
| Debug | Stack | parameter available in read only modality | minimum free stack |
| | Buf | parameter available in read only modality | number of free buffers |

Notes:

- (1) the submenu is visible on condition that the application software expects the RS-485 port is configured to support the Modbus communication protocol.

6.4.2. List of configuration parameters of *c-pro 3 mega* and of *c-pro 3 NODE mega*

| Submenu | Parameter | Min. | Max. | Unit | Preset | Description |
|----------------|---------------|---|------|------|--------|--|
| Info | PROJ | parameter available in read only modality | | | | information about the application project (project, version and revision) |
| Info | FW | parameter available in read only modality | | | | information about the firmware (project, version, revision and subrevision) |
| Info | HW | parameter available in read only modality | | | | information about the hardware (version, revision, generic (G) or special (S)) |
| Info | SW | parameter available in read only modality | | | | information about UNI-PRO 3 (version and revision) |
| Info | SN | parameter available in read only modality | | | | information about the serial number and the result of the productive test |
| Info | MASK | parameter available in read only modality | | | | information about the mask (it depends on the builder's coding system) |
| Info | date and time | parameter available in read only modality | | | | date and time of the last compilation of the application project |
| Parameters (1) | AI1 | --- | --- | --- | NTC | kind of probe analog input 1 PTC = PTC probe NTC = NTC probe 0-20mA = 0-20 mA transducer 4-20mA = 4-20 mA transducer 0-5V = 0-5 V ratiometric transducer 0-10V = 0-10 V ratiometric transducer PT1000 = Pt 1000 probe |
| Parameters (1) | AI2 | --- | --- | --- | NTC | kind of probe analog input 2 PTC = PTC probe NTC = NTC probe 0-20mA = 0-20 mA transducer 4-20mA = 4-20 mA transducer 0-5V = 0-5 V ratiometric transducer 0-10V = 0-10 V ratiometric transducer PT1000 = Pt 1000 probe |

| | | | | | | |
|----------------|-------------|-----|-----|-----|-------|--|
| Parameters (1) | AI3 | --- | --- | --- | NTC | kind of probe analog input 3 PTC = PTC probe NTC = NTC probe 0-20mA = 0-20 mA transducer 4-20mA = 4-20 mA transducer 0-5V = 0-5 V ratiometric transducer 0-10V = 0-10 V ratiometric transducer PT1000 = Pt 1000 probe |
| Parameters (1) | AI4 | --- | --- | --- | NTC | kind of probe analog input 4 PTC = PTC probe NTC = NTC probe 0-20mA = 0-20 mA transducer 4-20mA = 4-20 mA transducer 0-5V = 0-5 V ratiometric transducer 0-10V = 0-10 V ratiometric transducer PT1000 = Pt 1000 probe |
| Parameters (1) | AI5 | --- | --- | --- | NTC | kind of probe analog input 5 PTC = PTC probe NTC = NTC probe 0-20mA = 0-20 mA transducer 4-20mA = 4-20 mA transducer 0-5V = 0-5 V ratiometric transducer 0-10V = 0-10 V ratiometric transducer PT1000 = Pt 1000 probe |
| Parameters (1) | AI Err Time | 0 | 240 | s | 2 | analog inputs time-out (after this time without communication with an analog input, the controller signals the analog input error) |
| Parameters (1) | AO1 | --- | --- | --- | PWM | kind of signal analog input 1 PWM = PWM (Pulse With Modulation) |
| Parameters (1) | AO2 | --- | --- | --- | 0-10V | kind of signal analog input 2 0-20mA = 0-20 mA 4-20mA = 4-20 mA 0-10V = 0-10 V |
| Parameters (1) | AO3 | --- | --- | --- | 0-10V | kind of signal analog input 3 0-20mA = 0-20 mA 4-20mA = 4-20 mA 0-10V = 0-10 V |
| Parameters (1) | CosPhi 10us | --- | --- | --- | --- | reserved |

| | | | | | | |
|--|----------------------|------------|------------|------------|-------------|--|
| <p>Parameters (2) [press button RIGHT to show it]</p> | <p>I/O Timeout</p> | <p>1</p> | <p>240</p> | <p>s</p> | <p>60</p> | <p>time-out of the CANbus communication for the test of the remote values of the I / O (after this time without CANbus communication, the I / O of the controller is disabled)</p> |
| <p>Parameters (2) [press button RIGHT to show it]</p> | <p>En. Prg Level</p> | <p>---</p> | <p>---</p> | <p>---</p> | <p>NO</p> | <p>enabling the access to the first level page pressing a combination of buttons YES = yes, operating as follows: - keep pressed 3 s button ENTER to gain access to the first page of level 1 - keep pressed 3 s buttons ENTER and ESC to gain access to the first page of level 2 - keep pressed 3 s buttons LEFT and RIGHT to gain access to the first page of level 3</p> |
| <p>Parameters (2) [press button RIGHT to show it]</p> | <p>Password Indi</p> | <p>---</p> | <p>---</p> | <p>---</p> | <p>NO</p> | <p>connection among the passwords to gain access to the levels NO = one has not to set any password to gain access to levels lower than the one one has already gained access YES = one has to set a password to gain access to each level</p> |
| <p>Parameters (2) [press button RIGHT to show it; not available in the blind versions]</p> | <p>Backlight</p> | <p>---</p> | <p>---</p> | <p>---</p> | <p>TIME</p> | <p>kind of backlight OFF = the backlight is never lit ON = the backlight is always lit TIME = the backlight is lit the time one has set with parameter <i>B. Time</i> since the last operation with the buttons</p> |
| <p>Parameters (2) [press button RIGHT to show it; not available in the blind versions]</p> | <p>B. Time</p> | <p>0</p> | <p>60</p> | <p>s</p> | <p>240</p> | <p>backlight duration (only if parameter <i>Backlight</i> has value <i>TIME</i>)</p> |

| | | | | | | |
|--|---------------|-----|-----|-----|-------|--|
| Parameters (2) [press button RIGHT to show it; not available in the blind versions] | Contrast | 0 | 100 | --- | 50 | display contrast |
| Parameters (2) [press button RIGHT to show it; not available in the blind versions] | Date Char Sep | --- | --- | --- | / | date separator (ASCII character) |
| Parameters (2) [press button RIGHT to show it; not available in the blind versions] | Year format | --- | --- | --- | YY | year format YY = two numbers (for example 10) YYYY = four numbers (for example 2010) |
| Parameters (2) [press button RIGHT to show it; not available in the blind versions] | Date format | --- | --- | --- | D-M-Y | date format D-M-Y = day, month and year M-D-Y = month, day and year Y-M-D = year, month and day |
| Parameters (2) [press button RIGHT to show it; not available in the blind versions] | Time Char Sep | --- | --- | --- | : | time separator (ASCII character) |
| Parameters (2) [press button RIGHT to show it; not available in the blind versions] | Time With Sec | --- | --- | --- | YES | showing the seconds in the real time YES = yes |
| Parameters (2) [press button RIGHT to show it; not available in the blind versions] | Time AM/PM | --- | --- | --- | NO | time format NO = 24 h (for example 15:20) YES = 12 h (for example 3:20 PM) |

| | | | | | | |
|--|-------------|---------|---------------|------|----------|---|
| Parameters (2) [press button RIGHT to show it] | Debug Baud | ---- | ---- | ---- | 19200 | baud rate for the debug 19200 = 19,200 baud 28800 = 28,800 baud 38400 = 38,400 baud 57600 = 57,600 baud 76800 = 76,800 baud 115K2 = 115,200 baud |
| Networks / CAN Bus | MyNode | 1 | 127 | --- | 1 | local (or of the controller) CAN node address |
| Networks / CAN Bus | Master | --- | --- | --- | YES | enabling the operation as master in a CAN network YES = yes |
| Networks / CAN Bus | Baud | --- | --- | --- | 20K | CANbus communication baud rate 20K = 20,000 baud 50K = 50,000 baud 125K = 125,000 baud 500K = 500,000 baud |
| Networks / CAN Bus | Timeout | 1 | 60 | s | 5 | remote (or with a device in the network) CANbus communication time-out (after this time without CANbus communication with a device, it is excluded by the network) |
| Networks / CAN Bus | NetworkNode | [1] 0 | [32] 127 | --- | [1] 99 | address of a remote (or of a device in the network) CAN node; example for [1] 2: [1] = node 2 = node's address |
| Networks / CAN Bus [press button RIGHT to show it] | TSEG1 | 0 | 63 | --- | 31 | reserved |
| Networks / CAN Bus [press button RIGHT to show it] | TSEG2 | 1 | 7 | --- | 7 | reserved |
| Networks / CAN Bus [press button RIGHT to show it] | SJW | 0 | 3 | --- | 0 | reserved |

| | | | | | | |
|---|--------------|-----|---------|-----|-------|---|
| Networks / CAN Bus [press button RIGHT to show it] | BTR(1) | 1 | 15 | --- | 15 | reserved |
| Networks / BMS (4) | MAC ID | -1 | 127 | --- | -1 | local (or of the controller) BACnet MS/TP node address -1 = not enabled |
| Networks / BMS (4) | Baud Rate | --- | --- | --- | 19200 | BACnet MS/TP communication baud rate 9600 = 9,600 baud 19200 = 19,200 baud 38400 = 28,000 baud 76800 = 76,800 baud |
| Networks / BMS (4) | Max Master | 0 | 127 | --- | 127 | maximum number of master in a BACnet MS/TP network |
| Networks / BMS (4) | Max InfoFram | 1 | 127 | --- | 3 | maximum number of packages transmitted as master before giving the token |
| Networks / BMS (4) | Device ID | 1 | 4194303 | --- | 108 | identity in a BACnet MS/TP multinetwork |
| Networks / UART1 ⁽¹⁾ | Address | 1 | 247 | --- | 1 | local (or of the controller) Modbus node address in a RS-485 network wired on the first RS-485 port |
| Networks / UART1 ⁽¹⁾ | Baud Rate | --- | --- | --- | 9600 | Modbus communication baud rate in a RS-485 network wired on the first RS-485 port 1200 = 1,200 baud 2400 = 2,400 baud 4800 = 4,800 baud 9600 = 9,600 baud 19200 = 19,200 baud 28800 = 28,000 baud 38400 = 38,400 baud 57600 = 57,600 baud |
| Networks / UART1 ⁽¹⁾ | Parity | --- | --- | --- | EVEN | Modbus communication parity in a RS-485 network wired on the first RS-485 port NONE = no parity ODD = odd EVEN = even |

| | | | | | | |
|------------------------------------|-----------|--------|-------|-----|-------|--|
| Networks / UART1 ⁽¹⁾ | Stop | --- | --- | --- | 1 BIT | Modbus communication stop bit number in a RS-485 network wired on the first RS-485 port 1 BIT = 1 bit 2 BIT = 2 bit |
| Networks / UART2 ⁽²⁾ | Address | 1 | 247 | --- | 1 | local (or of the controller) Modbus node address in a RS-485 network wired on the second RS-485 port |
| Networks / UART2 ⁽²⁾ | Baud Rate | --- | --- | --- | 9600 | Modbus communication baud rate in a RS-485 network wired on the second RS-485 port 1200 = 1,200 baud 2400 = 2,400 baud 4800 = 4,800 baud 9600 = 9,600 baud 19200 = 19,200 baud 28800 = 28,000 baud 38400 = 38,400 baud 57600 = 57,600 baud |
| Networks / UART2 ⁽²⁾ | Parity | --- | --- | --- | EVEN | Modbus communication parity in a RS-485 network wired on the second RS-485 port NONE = no parity ODD = odd EVEN = even |
| Networks / UART2 ⁽²⁾ | Stop | --- | --- | --- | 1 BIT | Modbus communication stop bit number in a RS-485 network wired on the second RS-485 port 1 BIT = 1 bit 2 BIT = 2 bit |
| Networks / UART2 ⁽²⁾ | Timeout | 2 | 240 | s | 10 | Modbus communication time-out in a RS-485 network wired on the second RS-485 port for the test of the remote values of the I / O (after this time without Modbus communication, the request is considered not sent and the controller moves to the following request) ⁽³⁾ |
| Password | Level 1: | -32768 | 32767 | --- | 0 | value of the password to gain access to level 1 |

| | | | | | | |
|----------|----------|--------|-------|-----|----|---|
| | | --- | --- | --- | ON | <p>enabling the password to gain access to level 1</p> <p>OFF = to gain access to level 1 one has not to set any password</p> <p>ON = to gain access to level 1 one has to set a password</p> |
| Password | Level 2: | -32768 | 32767 | --- | 0 | value of the password to gain access to level 2 |
| | | --- | --- | --- | ON | <p>enabling the password to gain access to level 2</p> <p>OFF = to gain access to level 2 one has not to set any password</p> <p>ON = to gain access to level 2 one has to set a password</p> |
| Password | Level 3: | -32768 | 32767 | --- | 0 | value of the password to gain access to level 3 |
| | | --- | --- | --- | ON | <p>enabling the password to gain access to level 3</p> <p>OFF = to gain access to level 3 one has not to set any password</p> <p>ON = to gain access to level 3 one has to set a password</p> |
| Password | Level 4: | -32768 | 32767 | --- | 0 | value of the password to gain access to level 4 |
| | | --- | --- | --- | ON | <p>enabling the password to gain access to level 4</p> <p>OFF = to gain access to level 4 one has not to set any password</p> <p>ON = to gain access to level 4 one has to set a password</p> |
| Password | Level 5: | -32768 | 32767 | --- | 0 | value of the password to gain access to level 5 |
| | | --- | --- | --- | ON | <p>enabling the password to gain access to level 5</p> <p>OFF = to gain access to level 5 one has not to set any password</p> <p>ON = to gain access to level 5 one has to set a password</p> |

| | | | | | | |
|------------|--------------|---|-----|---|-----|--|
| Password | Timeout | 0 | 240 | s | 240 | time-out of the passwords to gain access to the levels (after this time since the last operation with the buttons, to gain access to the level one has to set a password again, if foreseen) |
| Diagnostic | FRAM | parameter available in read only modality | | | | time-out of the passwords to gain access to the levels (after this time since the last operation with the buttons, to gain access to the level one has to set a password again, if foreseen) |
| Diagnostic | RTC | parameter available in read only modality | | | | non volatile memory status ok = not in error err = in error |
| Diagnostic | STACK | parameter available in read only modality | | | | clock status ok = not in error err = in error low = loss of data |
| Diagnostic | Power Supply | parameter available in read only modality | | | | stack status ok = not in error err = in error (because of overflow) |
| Diagnostic | 5V Ratio | parameter available in read only modality | | | | power supply voltage status ok = not in error err = in error (because of out of range voltage) |
| Diagnostic | 24V Sensor | parameter available in read only modality | | | | status of the power supply voltage of the ratiometric transducers ok = not in error err = in error (because of out of range voltage) |
| Diagnostic | 24V CAN bus | parameter available in read only modality | | | | status of the power supply voltage of the user interface ok = not in error err = in error (because of out of range voltage) |
| Diagnostic | Math | parameter available in read only modality | | | | Math status ok = not in error err = in error (because of overflow, underflow, division by zero or NaN) |

| | | | |
|----------------------|-----------|---|--|
| Diagnostic | Key Par | parameter available in read only modality | result of the copy of the parameters from the controller to the programming key EVKEY10 and vice versa ok = operation successful completed err = operazione failed |
| Debug [Algo] | Main time | parameter available in read only modality | main cycle time of the application software (in milliseconds) |
| | Int. time | parameter available in read only modality | interrupt cycle time of the application software (in milliseconds) |
| Debug [CAN bus] | rx | parameter available in read only modality | number of packages in transmission |
| | tx | parameter available in read only modality | number of packages in reception |
| Debug [CAN bus] | err | parameter available in read only modality | number of packages in error |
| | ovf | parameter available in read only modality | number of packages in overflow |
| Debug | 24VPS | parameter available in read only modality | misura della tensione di alimentazione |
| | 5VP | parameter available in read only modality | reading the power supply voltage of the ratiometric transducers |
| Debug | 24VP | parameter available in read only modality | reading the power supply voltage of the 0-20 mA / 4-20 mA / 0-10 V transducers |
| | 24VE | parameter available in read only modality | reading the power supply voltage of the user interface |
| Debug | Stack | parameter available in read only modality | minimum free stack |
| | Buf | parameter available in read only modality | number of free buffers |

Notes:

- (1) the submenu is visible on condition that the application software expects the first RS-485 port is configured to support the Modbus communication protocol
- (2) the submenu is visible on condition that the application software expects the second RS-485 port is configured to support the Modbus communication protocol
- (3) the parameter is meaningful on condition that the second RS-485 port is configured to support the Modbus master communication protocol
- (4) the parameter is visible only in **c-pro 3 NODE mega**.

6.4.3. List of configuration parameters of c-pro 3 EXP hecto and of c-pro 3 EXP hecto+

| Submenu | Parameter | Min. | Max. | Unit | Preset | Description |
|----------------|---------------|---|------|------|--------|--|
| Info | PROJ | parameter available in read only modality | | | | information about the application project (project, version and revision) |
| Info | FW | parameter available in read only modality | | | | information about the firmware (project, version, revision and subrevision) |
| Info | HW | parameter available in read only modality | | | | information about the hardware (version, revision, generic (G) or special (S)) |
| Info | SW | parameter available in read only modality | | | | information about UNI-PRO 3 (version and revision) |
| Info | SN | parameter available in read only modality | | | | information about the serial number and the result of the productive test |
| Info | MASK | parameter available in read only modality | | | | information about the mask (it depends on the builder's coding system) |
| Info | date and time | parameter available in read only modality | | | | date and time of the last compilation of the application project |
| Parameters (1) | AI1 | --- | --- | --- | NTC | kind of probe analog input 1 PTC = PTC probe NTC = NTC probe 0-20mA = 0-20 mA transducer 4-20mA = 4-20 mA transducer 0-5V = 0-5 V ratiometric transducer 0-10V = 0-10 V ratiometric transducer PT1000 = Pt 1000 probe |
| Parameters (1) | AI2 | --- | --- | --- | NTC | kind of probe analog input 2 PTC = PTC probe NTC = NTC probe 0-20mA = 0-20 mA transducer 4-20mA = 4-20 mA transducer 0-5V = 0-5 V ratiometric transducer 0-10V = 0-10 V ratiometric transducer PT1000 = Pt 1000 probe |

| | | | | | | |
|---|-------------|---------|---------------|-----|----------|---|
| Parameters (1) | AI3 | --- | --- | --- | NTC | <p>kind of probe analog input 3</p> <p>PTC = PTC probe</p> <p>NTC = NTC probe</p> <p>0-20mA = 0-20 mA transducer</p> <p>4-20mA = 4-20 mA transducer</p> <p>0-5V = 0-5 V ratiometric transducer</p> <p>0-10V = 0-10 V ratiometric transducer</p> <p>PT1000 = Pt 1000 probe</p> |
| Parameters (1) | AI Err Time | 0 | 240 | s | 2 | <p>analog inputs time-out (after this time without communication with an analog input, the expansion signals the analog input error)</p> |
| Parameters (1) | AO1 | --- | --- | --- | PWM | <p>kind of signal analog input 1</p> <p>PWM = PWM (Pulse With Modulation)</p> |
| Parameters (1) | AO2 | --- | --- | --- | 0-10V | <p>kind of signal analog input 2</p> <p>0-20mA = 0-20 mA</p> <p>4-20mA = 4-20 mA</p> <p>0-10V = 0-10 V</p> |
| Parameters (1) | AO3 | --- | --- | --- | 0-10V | <p>kind of signal analog input 3</p> <p>0-20mA = 0-20 mA</p> <p>4-20mA = 4-20 mA</p> <p>0-10V = 0-10 V</p> |
| Parameters (2) [press button RIGHT to show it] | I/O Timeout | 1 | 240 | s | 60 | <p>time-out of the CANbus communication for the test of the remote values of the I / O (after this time without CANbus communication, the I / O of the expansion is disabled)</p> |
| Networks / CAN Bus | MyNode | 1 | 127 | --- | 2 | <p>local (or of the expansion) CAN node address</p> |
| Networks / CAN Bus | Master | --- | --- | --- | YES | <p>enabling the operation as master in a CAN network</p> <p>YES = yes</p> |
| Networks / CAN Bus | Baud | --- | --- | --- | 20K | <p>CANbus communication baud rate</p> <p>20K = 20,000 baud</p> <p>50K = 50,000 baud</p> <p>125K = 125,000 baud</p> <p>500K = 500,000 baud</p> |
| Networks / CAN Bus | NetworkNode | [1] 0 | [32] 127 | --- | [1] 99 | <p>address of a remote (or of a device in the network) CAN node; example for [1] 2:</p> <p>[1] = node</p> <p>2 = node's address</p> |

| | | | | | | |
|---|------------|---|----|-----|----|---|
| Networks / CAN Bus [press button RIGHT to show it] | TSEG1 | 0 | 63 | --- | 31 | reserved |
| Networks / CAN Bus [press button RIGHT to show it] | TSEG2 | 1 | 7 | --- | 7 | reserved |
| Networks / CAN Bus [press button RIGHT to show it] | SJW | 0 | 3 | --- | 0 | reserved |
| Networks / CAN Bus [press button RIGHT to show it] | BTR(1) | 1 | 15 | --- | 15 | reserved |
| Diagnostic | FRAM | parameter available in read only modality | | | | non volatile memory status ok = not in error err = in error |
| Diagnostic | 5V Ratio | parameter available in read only modality | | | | status of the power supply voltage of the ratiometric transducers ok = not in error err = in error (because of out of range voltage) |
| Diagnostic | 24V Sensor | parameter available in read only modality | | | | status of the power supply voltage of the 0-20 mA / 4-20 mA / 0-10 V transducers ok = not in error err = in error (because of out of range voltage) |
| Debug [Algo] | Main time | parameter available in read only modality | | | | main cycle time of the application software (in milliseconds) |
| | Int. time | parameter available in read only modality | | | | interrupt cycle time of the application software (in milliseconds) |
| Debug [CAN bus] | rx | parameter available in read only modality | | | | number of packages in transmission |
| | tx | parameter available in read only modality | | | | number of packages in reception |

| | | | |
|----------------------|-------|---|--|
| Debug [CAN bus] | err | parameter available in read only modality | number of packages in error |
| | ovf | parameter available in read only modality | number of packages in overflow |
| Debug | 5VP | parameter available in read only modality | reading the power supply voltage of the ratiometric transducers |
| Debug | 24VP | parameter available in read only modality | reading the power supply voltage of the 0-20 mA / 4-20 mA / 0-10 V transducers |
| Debug | Stack | parameter available in read only modality | minimum free stack |
| | Buf | parameter available in read only modality | number of free buffers |

7. USER INTERFACES

7.1. Preliminary information

The controllers in blind version can be used for example with an user interface such as **Vgraph**, **Vtouch** or **Vroom**.

7.2. Vgraph

7.2.1. Introduction

Vgraph is a new and innovative user interface for the programmable controllers of the family **c-pro 3**.

The main features of the interface are the possibility to communicate to the user a great deal of information and the remarkable ease of control; these features are due to the use of a 128 x 64 pixel single colour LCD graphic display (black with rearlighting through white LEDs), to the 6 buttons (with preset functions) membrane keyboard and to the CAN bus (for the connection to the controllers).

This last also allows the use of the interface in multimaster networks.

Thanks to its constructive features, **Vgraph** offers several mounting typologies; this is possible:

- by panel, at the front of units, of machines for refrigeration or for air conditioning, of electrical panels and as well as in all those applications where a frontal protection degree IP65 is required
- built-in by wall, in traditional box (like "506" by BTicino)
- by wall, on the support CPVW00 by EVCO (to order separately).

Also the necessity to customize the interface, in order to integrate it aesthetically in residential and commercial environments, is satisfied by **Vgraph** since at the front of the interface one can apply both the plates CPVP* by EVCO (to order separately, made in plastic material and available in two different colorations, white and black) and the numerous plates series "Living" and "Light" by BTicino.

Vgraph also has got:

- real time clock
- alarm buzzer.

For further information consult the *Hardware manual of Vgraph*.

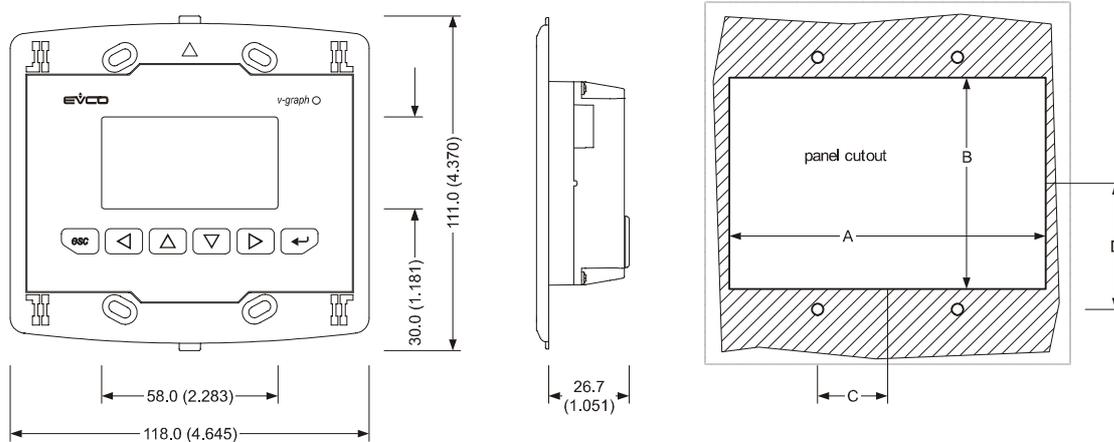
7.2.2. Summarizing table of the main features and available models

| | Vgraph | |
|--|---------------------------------------|---------------------------------------|
| Power supply | 24 VAC / 20... 40 VDC not isolated | 12... 24 VAC / 15... 40 VDC isolated |
| Real time clock | incorporated | incorporated |
| Alarm buzzer | incorporated | incorporated |
| Display | 128 x 64 pixel LCD graphic display | 128 x 64 pixel LCD graphic display |
| Communication ports | | |
| a) CAN port with CANbus communication protocol | 2 | 2 |
| b) programming port | a + b | a + b |
| Code | EPV4GBR | EPV3GBR |

For further models please contact the EVCO's sales network at the address sales@evco.it.

7.2.3. Size

Size in mm (in).



| Size | Minimum | Typical | Maximum |
|------|---------------|---------------|---------------|
| A | 104.0 (4.094) | 104.0 (4.094) | 104.8 (4.125) |
| B | 70.0 (2.755) | 70.0 (2.755) | 70.8 (2.787) |
| C | 22.0 (0.866) | 23.0 (0.905) | 24.0 (0.944) |
| D | 40.8 (1.606) | 41.8 (1.645) | 42.8 (1.685) |

7.3. Vtouch

7.3.1. Introduction

Vtouch is a new and innovative user interface for the programmable controllers of the family **c-pro 3**.

The main features of the interface are the possibility to communicate to the user a great deal of information and the remarkable ease of control; these features are due to the use of a 240 x 140 pixel single colour touch-screen LCD graphic display (black with rearlighting through white LEDs), to the 6 buttons (with preset functions) membrane keyboard and to the CAN bus (for the connection to the controllers).

This last also allows the use of the interface in multimaster networks.

Thanks to its constructive features, **Vtouch** offers several mounting typologies; this is possible:

- by panel, at the front of units, of machines for refrigeration or for air conditioning, of electrical panels and as well as in all those applications where a frontal protection degree IP65 is required
- built-in by wall, in traditional box (like "506" by BTicino)
- by wall, on the support CPVW00 by EVCO (to order separately).

Also the necessity to customize the interface, in order to integrate it aesthetically in residential and commercial environments, is satisfied by **Vtouch** since at the front of the interface one can apply both the plates CPVP* by EVCO (to order separately, made in plastic material and available in two different colorations, white and black) and the numerous plates series "Living" and "Light" by BTicino.

Vtouch also has got:

- real time clock
- alarm buzzer.

For further information consult the *Hardware manual of Vtouch*.

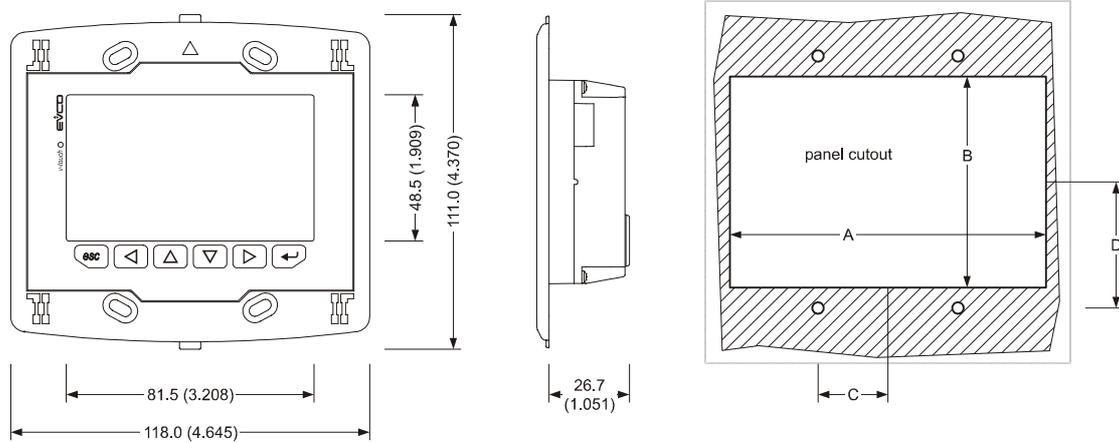
7.3.2. Summarizing table of the main features and available models

| | Vtouch | |
|--|---|---|
| Power supply | 24 VAC / 20... 40 VDC not isolated | 12... 24 VAC / 15... 40 VDC isolated |
| Real time clock | incorporated | incorporated |
| Alarm buzzer | incorporated | incorporated |
| Display | 240 x 140 pixel touch-screen LCD graphic display | 240 x 140 pixel touch-screen LCD graphic display |
| Communication ports | | |
| a) CAN port with CANbus communication protocol | 2 | 2 |
| b) programming port | a + b | a + b |
| Code | EPV4TBR | EPV3TBR |

For further models please contact the EVCO's sales network at the address sales@evco.it.

7.3.3. Size

Size is in mm (in).



| Size | Minimum | Typical | Maximum |
|------|---------------|---------------|---------------|
| A | 104.0 (4.094) | 104.0 (4.094) | 104.8 (4.125) |
| B | 70.0 (2.755) | 70.0 (2.755) | 70.8 (2.787) |
| C | 22.0 (0.866) | 23.0 (0.905) | 24.0 (0.944) |
| D | 40.8 (1.606) | 41.8 (1.645) | 42.8 (1.685) |

7.4. Vroom

7.4.1. Introduction

Vroom is a new and innovative user interface for the programmable controllers of the family **c-pro 3**.

The main features of the interface are the possibility to communicate to the user a great deal of information and the remarkable ease of control; these features are due to the use of a 128 x 64 pixel single colour LCD graphic display (black with rearlighting through white LEDs), to the 6 buttons (with preset functions) membrane keyboard and to the CAN bus (for the connection to the controllers).

This last also allows the use of the interface in multimaster networks.

The user interface incorporates a temperature sensor or a temperature and humidity one; the values read by these sensors are transmitted via CAN bus, making easier the wiring.

Thanks to its constructive features, **Vroom** offers several mounting typologies; this is possible:

- by panel, at the front of units, of machines for refrigeration or for air conditioning, of electrical panels and as well as in all those applications where a frontal protection degree IP65 is required
- built-in by wall, in traditional box (like "506" by BTicino)
- by wall, on the support CPVW00 by EVCO (to order separately).

Also the necessity to customize the interface, in order to integrate it aesthetically in residential and commercial environments, is satisfied by **Vroom** since at the front of the interface one can apply both the plates CPVP* by EVCO (to order separately, made in plastic material and available in two different colorations, white and black) and the numerous plates series "Living" and "Light" by BTicino.

Vroom also has got:

- real time clock
- alarm buzzer.

For further information consult the *Hardware manual of Vroom*.

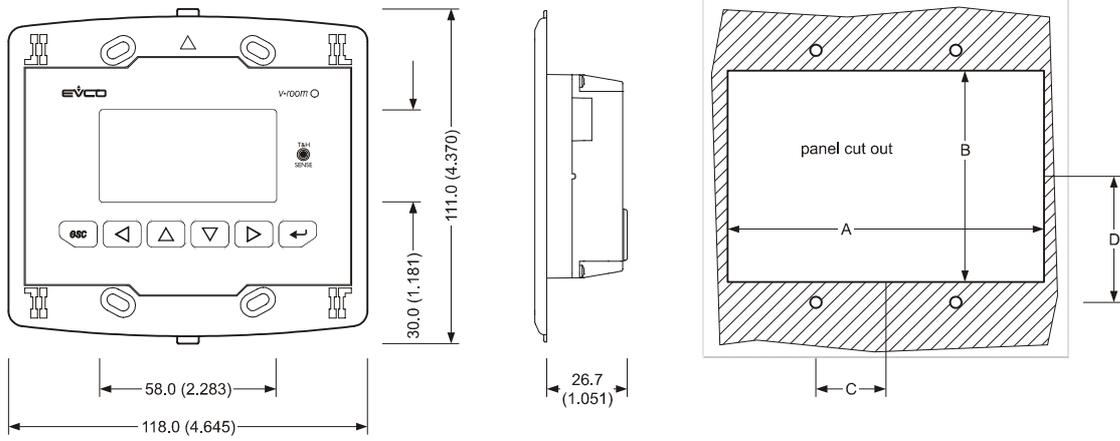
7.4.2. Summarizing table of the main features and available models

| | Vroom | | | |
|--|------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|
| Power supply | 24 VAC / 20... 40 VDC not isolated | 24 VAC / 20... 40 VDC not isolated | 12... 24 VAC / 15... 40 VDC isolated | 12... 24 VAC / 15... 40 VDC isolated |
| Real time clock | incorporated | incorporated | incorporated | incorporated |
| Alarm buzzer | incorporated | incorporated | incorporated | incorporated |
| Alarm buzzer | temperature | temperature and humidity | temperature | temperature and humidity |
| Display | 128 x 64 pixel LCD graphic display | 128 x 64 pixel LCD graphic display | 128 x 64 pixel LCD graphic display | 128 x 64 pixel LCD graphic display |
| Communication ports | | | | |
| a) CAN port with CANbus communication protocol | 2 a + b | 2 a + b | 2 a + b | 2 a + b |
| b) programming port | | | | |
| Code | EPV4QBR | EPV4RBR | EPV3QBR | EPV3RBR |

For further models please contact the EVCO's sales network at the address sales@evco.it.

7.4.3. Size

Size in mm (in).



| Size | Minimum | Typical | Maximum |
|------|---------------|---------------|---------------|
| A | 104.0 (4.094) | 104.0 (4.094) | 104.8 (4.125) |
| B | 70.0 (2.755) | 70.0 (2.755) | 70.8 (2.787) |
| C | 22.0 (0.866) | 23.0 (0.905) | 24.0 (0.944) |
| D | 40.8 (1.606) | 41.8 (1.645) | 42.8 (1.685) |

8. ACCESSORIES

8.1. Programming kit EVIF20TUXI

8.1.1. Introduction

EVIF20TUXI is a programming kit.

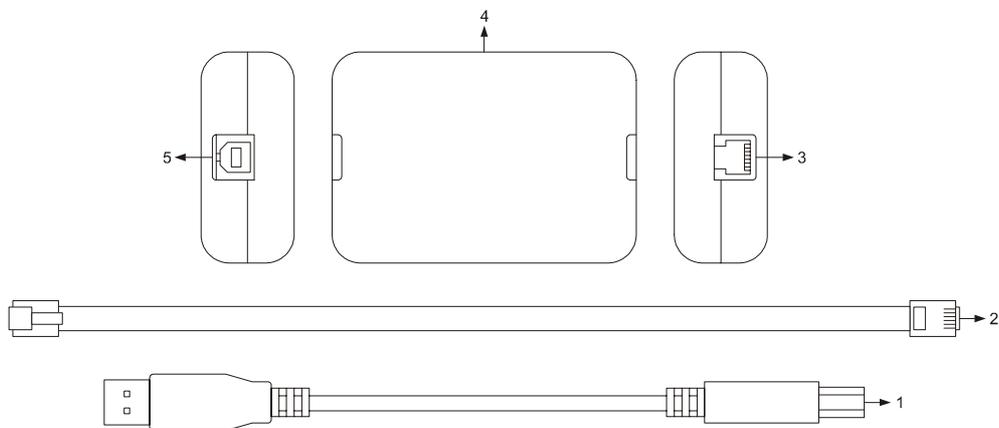
Through the kit it is possible to program the controllers with the application software realized through UNI-PRO 3.

The kit is made of:

- TTL / USB isolated serial interface
- USB cable (to connect the serial interface to the Personal Computer)
- TTL cable (to connect the serial interface to the controller).

8.1.2. Description

The following drawing shows the aspect of the programming kit EVIF20TUXI.

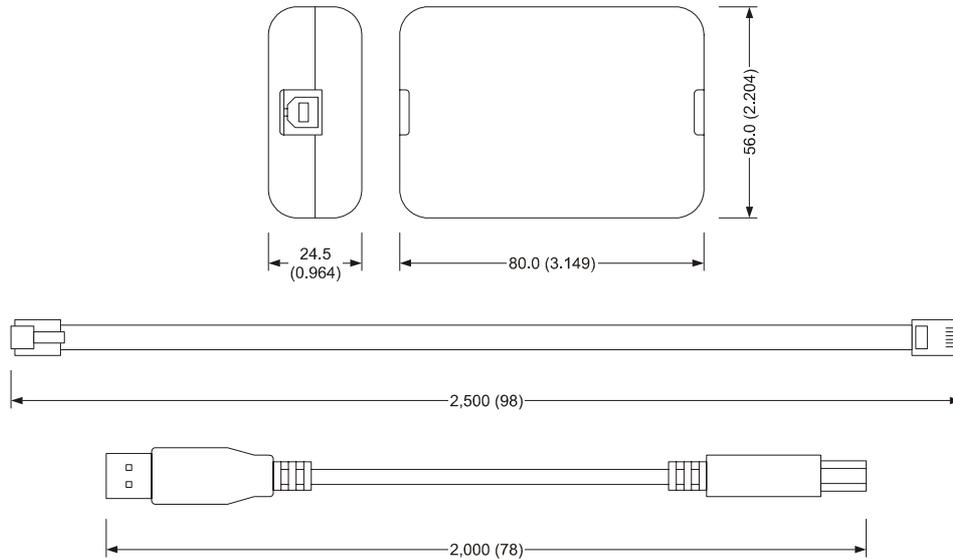


The following table shows the meaning of the parts of the kit.

| Part | Meaning |
|------|-------------------------------------|
| 1 | USB cable 2 m (6 ft) long |
| 2 | TTL cable 2.5 m (8 ft) long |
| 3 | TTL port |
| 4 | TTL / USB isolated serial interface |
| 5 | USB port |

8.1.3. Size

Size is in mm (in).



8.1.4. Connection to the Personal Computer

Operate as follows:

1. Plug in an end of the TTL cable into the TTL port of the serial interface.
2. Plug in the other end of the TTL cable into the programming and debugging port of the controller.
3. Plug in an end of the USB cable into the USB port of the serial interface.
4. Plug in the other end of the USB cable into an USB port of the Personal Computer.

For further information consult the *Software manual of UNI-PRO 3*.

8.2. Programming key EVKEY10

8.2.1. Introduction

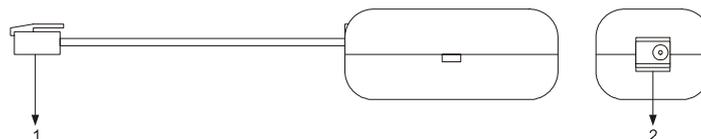
EVKEY10 is a programming key.

Through the key it is possible to make the upload and the download of the application software parameters and / or of the configuration ones.

The key can be used both with powered controllers and not powered; in this last case one has to use the power supplier EVPS (to order separately).

8.2.2. Description

The following drawing shows the aspect of the programming key EVKEY10.

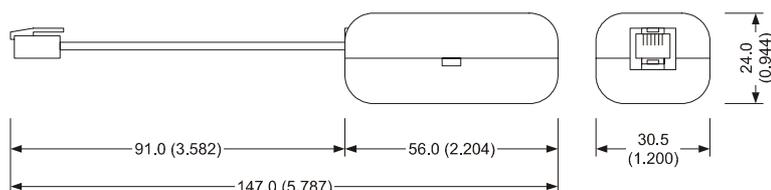


The following table shows the meaning of the parts of the key.

| Part | Meaning |
|------|-----------------------------------|
| 1 | telephone connector |
| 2 | connector for power supplier EVPS |

8.2.3. Size

Size is in mm (in).



8.2.4. Connection to the controller

Operate as follows:

1. Plug in the telephone connector of the key into the programming and debugging port of the controller.

To copy the parameters from the controller to the key and vice-versa look at chapter 6 "CONFIGURATION".

For further information consult the *Software manual of UNI-PRO 3*.

9. TECHNICAL DATA

9.1. Technical data

| | | | |
|---|---|---|--|
| Purpose of control: | programmable controller for applications in refrigeration, ventilation and air conditioning. | | |
| Construction of control: | electronic control device to be incorporated. | | |
| Box: | self-extinguishing grey UL94 V0. | | |
| | Heat and fire resistance category: D. | | |
| Size: | <i>c-pro 3 hecto</i> and <i>c-pro 3 hecto+</i> | <i>c-pro 3 mega</i> | <i>c-pro 3 EXP hecto</i> and <i>c-pro 3 EXP hecto+</i> |
| | 71.0 x 128.0 x 60.0 mm (2.795 x 5.039 x 2.362 in); 4 DIN modules. | 179.0 x 128.0 x 60.0 mm (7.047 x 5.039 x 2.362 in); 10 moduli DIN. | 71.0 x 128.0 x 60.0 mm (2.795 x 5.039 x 2.362 in); 4 DIN modules. |
| | | <i>c-pro 3 NODE mega</i> | |
| | | 251.0 x 128.0 x 60.0 mm (9.881 x 5.039 x 2.362 in); 14 moduli DIN. | |
| Size refers to the device with all the connectors properly plugged. | | | |
| Installation: | on DIN rail 35.0 x 7.5 mm (1.377 x 0.295 in) or 35.0 x 15.0 mm (1.377 x 0.590 in) according to EN 50022. | | |
| Index of protection: | IP20; IP40 the front. | | |
| Connections: | <i>c-pro 3 hecto</i> and <i>c-pro 3 hecto+</i> | <i>c-pro 3 mega</i> and <i>c-pro 3 NODE mega</i> | <i>c-pro 3 EXP hecto</i> and <i>c-pro 3 EXP hecto+</i> |
| | male extractable screw terminal blocks pitch 5.0 mm (0.196 in; power supply, inputs, outputs and CAN port) for conductors up to 2.5 mm ² (0.0038 in ²), 8 poles female RJ45 telephone connector (RS-485 port), 6 poles female RJ11 telephone connector (programming and debugging port). | male extractable screw terminal blocks pitch 5.0 mm (0.196 in; power supply, inputs, outputs and CAN port) for conductors up to 2.5 mm ² (0.0038 in ²), 8 poles female RJ45 telephone connectors (RS-485 ports), 6 poles female RJ11 telephone connector (programming and debugging port). | male extractable screw terminal blocks pitch 5.0 mm (0.196 in; power supply, inputs, outputs and CAN port) for conductors up to 2.5 mm ² (0.0038 in ²), 6 poles female RJ11 telephone connector (port to update the firmware of the expansion). |

| | | | |
|------------------------------------|---|---|---|
| | <p>The maximum lengths of the connecting cables are the followings:</p> <ul style="list-style-type: none"> • power supply controller: 30 m (98 ft) • analog inputs: 100 m (328 ft) • power supply transducers: 100 m (328 ft) • digital inputs: 100 m (328 ft) • PWM analog output: 1 m (3.280 ft) • 0-20 mA / 4-20 mA / 0-10 V analog outputs: 30 m (98 ft) • digital outputs (electromechanical relays): 100 m (328 ft) • RS-485 ports: 1,000 m (3,280 ft); also look at the <i>Manuale Modbus specifications and implementation guides</i> • CAN port: <ul style="list-style-type: none"> - 1,000 m (3,280 ft) with baud rate 20,000 baud - 500 m (1,640 ft) with baud rate 50,000 baud - 250 m (820 ft) with baud rate 125,000 baud - 50 m (164 ft) with baud rate 500,000 baud • power supply user interface: 30 m (98 ft). | | |
| | <p>One suggests using the connecting kit CJAV15 (female extractable screw terminal blocks pitch 5.0 mm, 0.196 in; to order separately).</p> | <p>One suggests using the connecting kit CJAV16 (female extractable screw terminal blocks pitch 5.0 mm, 0.196 in; to order separately).</p> | <p>One suggests using the connecting kit CJAV15 (female extractable screw terminal blocks pitch 5.0 mm, 0.196 in; to order separately).</p> |
| | <p>To program the controller one has to use the programming kit EVIF20TUXI (TTL / USB isolated serial interface + TTL cable 2.5 m, 8 ft long + USB cable 2 m, 6 ft long; to order separately).</p> | | |
| <p>Working temperature:</p> | <p>from -10 to 55 °C (14 to 131 °F) for the built-in versions, from -20 to 55 °C (-4 to 131 °F) for the blind versions.</p> | | |
| <p>Storage temperature:</p> | <p>from -30 to 70 °C (-22 to 158 °F).</p> | | |
| <p>Working humidity:</p> | <p>from 5 to 95% of relative humidity without condensate.</p> | | |
| <p>Pollution situation:</p> | <p>2.</p> | | |
| <p>Working altitude:</p> | <p>from 0 to 2,000 m (0 to 6591 ft).</p> | | |
| <p>Transport altitude:</p> | <p>from 0 to 3,048 m (0 to 10,000 ft).</p> | | |
| <p>Ambient conformity:</p> | <p>ROHS 2002 / 95, WEEE 2002 / 96 / EC, REACH CE 1907 / 2006.</p> | | |
| <p>EMC conformity:</p> | <p>EN / IEC 60730-1 enclosure 16.</p> | | |

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| Power supply: | 24 VAC ($\pm 15\%$), 50 / 60 Hz (± 3 Hz), 30 VA max. isolated or 20... 40 VDC, 22 W max. isolated, supplied by a class 2 circuit. The devices incorporate a protection against the reversal of polarity. <u>If the controller is powered in direct current, one will not have to respect the polarity of the power supply voltage.</u> | | |
| | Protect the power supply of: <ul style="list-style-type: none"> • c-pro 3 hecto and of c-pro 3 EXP hecto with a fuse rated 0.8A-T 250 V • c-pro 3 mega with a fuse rated 2.5A-T 250 V. | | |
| Overvoltage category: | III. | | |
| Consumption: | c-pro 3 hecto and c-pro 3 hecto+ | c-pro 3 mega and c-pro 3 NODE mega | c-pro 3 EXP hecto and c-pro 3 EXP hecto+ |
| | 10 VA max. if the controller is powered in alternate current; 6 W max. if the controller is powered in direct current. | 30 VA max. se il controllore viene alimentato in corrente alternata; 22 W max. se il controllore viene alimentato in corrente continua. | 10 VA max. if the expansion is powered in alternate current; 6 W max. if the expansion is powered in direct current. |
| Real time clock: | c-pro 3 hecto and c-pro 3 hecto+ | c-pro 3 mega and c-pro 3 NODE mega | c-pro 3 EXP hecto and c-pro 3 EXP hecto+ |
| | incorporated (with SuperCap battery). | | not available. |
| | Drift: \leq to 30 s / month at 25 °C (77 °F). | | |
| Alarm buzzer: | c-pro 3 hecto and c-pro 3 hecto+ | c-pro 3 mega and c-pro 3 NODE mega | c-pro 3 EXP hecto and c-pro 3 EXP hecto+ |
| | not available. | incorporated (not available in the blind versions). | not available. |
| Analog inputs: | c-pro 3 hecto | c-pro 3 mega and c-pro 3 NODE mega | c-pro 3 EXP hecto |
| | 3 non optoisolated inputs, configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers. | 5 non optoisolated inputs, configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers. | 3 non optoisolated inputs, configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers. |
| | c-pro 3 hecto+ | | c-pro 3 EXP hecto+ |

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| | <p>4 non optoisolated inputs, of which 3 configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers and 1 for NTC probes.</p> | | <p>4 non optoisolated inputs, of which 3 configurable via configuration parameter for PTC / NTC / Pt 1000 probes / 0-20 mA / 4-20 mA / 0-5 V ratiometric / 0-10 V transducers and 1 for NTC probes</p> |
| <p>Power supply 0-5 V ratiometric transducers: 5 VDC (+0% -12%), 40 mA max. Power supply 0-20 mA / 4-20 mA / 0-10 V transducers: 24 VDC (+50% -25%), 120 mA max. The devices incorporate a restorable thermal protection of the power supplies against the short circuit and the overload.</p> | | | |
| <p><u>PTC analog inputs (990 Ω @ 25 °C, 77 °F)</u> Kind of sensor: KTY 81-121. Working range: from -50 to 150 °C (-58 to 302 °F). Accuracy: ±0.5% of the full scale between -40 and 100 °C, ±1 °C between -50 and -40 °C and between 100 and 150 °C. Resolution: 0.1 °C. Conversion time: 100 ms. Protection: no protection.</p> | | | |
| <p><u>NTC analog inputs (10K Ω @ 25 °C, 77 °F)</u> Kind of sensor: β3435. Working range: from -50 to 120 °C (-58 to 248 °F). Accuracy: ±0.7% of the full scale between -40 and 100 °C, ±1 °C between -50 to -40 °C and between 100 and 120 °C. Resolution: 0.1 °C. Conversion time: 100 ms. Protection: no protection.</p> | | | |
| <p><u>Pt 1000 analog inputs (1K Ω @ 0 °C, 32 °F)</u> Working range: from -100 to 400 °C (-148 to 752 °F). Accuracy: ±0.5% of the full scale. Resolution: 0.1 °C. Conversion time: 100 ms. Protection: no protection.</p> | | | |
| <p><u>0-20 mA / 4-20 mA analog inputs</u> Input resistance: ≤ to 200 Ω. Accuracy: ±0.5% of the full scale. Resolution: 0.01 mA. Conversion time: 100 ms. Protection: no protection; the maximum current allowed on each input is 25 mA.</p> | | | |

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| | <p><u>0-5 V ratiometric / 0-10 V analog inputs</u></p> <p>Input resistance: \geq to 10K Ω. Accuracy: $\pm 0.5\%$ of the full scale. Resolution: 0.01 V. Conversion time: 100 ms. Protection: against the reversal of the polarity.</p> | | |
| Digital inputs: | <i>c-pro 3 hecto</i> | <i>c-pro 3 mega</i> and <i>c-pro 3 NODE mega</i> | <i>c-pro 3 EXP hecto</i> |
| | 5 non optoisolated free of voltage digital inputs. | | 5 non optoisolated free of voltage digital inputs. |
| | <i>c-pro 3 hecto+</i> | 7 optoisolated digital inputs at 24 VAC / DC. | <i>c-pro 3 EXP hecto+</i> |
| | 5 optoisolated digital inputs at 24 VAC / DC. | | 5 optoisolated digital inputs at 24 VAC / DC. |
| | <p><u>Non optoisolated free of voltage digital inputs</u></p> <p>Power supply: no power supply. Input resistance: \geq to 10K Ω. Protection: no protection.</p> | | |
| | <p><u>Optoisolated digital inputs at 24 VAC / DC</u></p> <p>Power supply: 24 VAC ($\pm 15\%$), 50 / 60 Hz (± 3 Hz) or 24 VDC (+66% -16%). Input resistance: \geq to 10K Ω. Protection: no protection.</p> | | |
| Displays: | <i>c-pro 3 hecto</i> and <i>c-pro 3 hecto+</i> | <i>c-pro 3 mega</i> and <i>c-pro 3 NODE mega</i> | <i>c-pro 3 EXP hecto</i> and <i>c-pro 3 EXP hecto+</i> |
| | signalling LEDs. | 122 x 32 pixel single colour LCD graphic display (black with rearlighting through white LEDs; not available in the blind versions), signalling LEDs. | signalling LEDs. |
| Analog outputs: | <p>3 outputs:</p> <ul style="list-style-type: none"> • 1 non optoisolated PWM output • 2 non optoisolated outputs configurable via configuration parameter for 0-20 mA / 4-20 mA / 0-10 V signal. <p>Power supply driving the PWM analog output: 24 VDC, 50 mA max.</p> <p><u>The PWM analog output is usable on condition that the device is powered in alternate current and the phase powering the device is the same powering the user driven by the output.</u></p> | | |

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| | <u>PWM analog outputs</u> | | |
| | Driving power supply: 24 VDC (+16% -25%), 50 mA max. | | |
| | Frequency: the same as the one of the phase powering the device. | | |
| Protection: no protection. | | | |
| <u>0-20 mA / 4-20 mA analog outputs</u> | | | |
| Input resistance: 40... 300 Ω. | | | |
| Accuracy: ±3% of the full scale. | | | |
| Resolution: 0.05 mA. | | | |
| Conversion time: 1 s. | | | |
| Protection: restorable thermal protection against the short circuit and the overload. | | | |
| <u>0-10 V analog outputs</u> | | | |
| Input resistance: 1K Ω min. | | | |
| Accuracy: +2% -5% of the full scale for users having impedance between 1 and 5K Ω, ±2% of the full scale for users having impedance > of 5K Ω. | | | |
| Resolution: 0.01 V. | | | |
| Conversion time: 1 s. | | | |
| Protection: restorable thermal protection against the short circuit and the overload. | | | |
| Digital outputs: | <i>c-pro 3 hecto</i> | <i>c-pro 3 mega and c-pro 3 NODE mega</i> | <i>c-pro 3 EXP hecto</i> |
| | 6 outputs (electromechanical relays): <ul style="list-style-type: none"> • five 5 res. A @ 250 VAC (6,000 cycles) SPST outputs (K1, K2, K3, K4 and K5) • one 8 res. A @ 250 VAC (6,000 cycles) SPDT output (K6). | 8 outputs (electromechanical relays): <ul style="list-style-type: none"> • three 5 res. A @ 250 VAC (6,000 cycles) SPST outputs (K1, K5 and K7) • four 8 res. A @ 250 VAC (6,000 cycles) SPST outputs (K2, K3, K4 and K6) • one 8 res. A @ 250 VAC (6,000 | 6 outputs (electromechanical relays): <ul style="list-style-type: none"> • five 5 res. A @ 250 VAC (6,000 cycles) SPST outputs (K1, K2, K3, K4 and K5) • one 8 res. A @ 250 VAC (6,000 cycles) SPDT output (K6). |
| | <i>c-pro 3 hecto+</i> | | <i>c-pro 3 EXP hecto+</i> |

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| | <p>6 outputs (electromechanical relays):</p> <ul style="list-style-type: none"> • five 3 res. A @ 250 VAC (6,000 cycles) SPST outputs (K1, K2, K3, K4 and K5) • one 5 res. A @ 250 VAC (6,000 cycles) SPDT output (K6). | <p>cycles) SPDT output (K8).</p> | <p>6 outputs (electromechanical relays):</p> <ul style="list-style-type: none"> • five 3 res. A @ 250 VAC (6,000 cycles) SPST outputs (K1, K2, K3, K4 and K5) • one 5 res. A @ 250 VAC (6,000 cycles) SPDT output (K6). |
| <p>Type of actions and additional features:</p> | <p>The devices ensure a double isolation among each terminal of the digital outputs and the remaining parts of the device.</p> | | |
| <p>Communication ports:</p> | <p><i>c-pro 3 hecto</i> and <i>c-pro 3 hecto+</i></p> | <p><i>c-pro 3 mega</i> and <i>c-pro 3 NODE mega</i></p> | <p><i>c-pro 3 EXP hecto</i> and <i>c-pro 3 EXP hecto+</i></p> |

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| | <p>3 non optoisolated ports:</p> <ul style="list-style-type: none"> • 1 CAN port with CANbus communication protocol • 1 RS-485 port with Modbus master / slave communication protocol (configurable via application software) • 1 programming and debugging port. | <p>4 non optoisolated ports (5 in c-pro 3 NODE mega):</p> <ul style="list-style-type: none"> • 1 CAN port with CANbus communication protocol • 1 RS-485 port with Modbus slave communication protocol • 1 RS-485 port with Modbus master / slave communication protocol (configurable via application software) • 1 programming and debugging port • 1 port for gateway c-pro 3 plug-in (only in c-pro 3 NODE mega). <p>Power supply user interface: 24 VDC, 122 mA max.</p> <p>The controller incorporates a restorable thermal protection of the power supply against the short circuit and the overload.</p> | <p>2 non optoisolated ports:</p> <ul style="list-style-type: none"> • 1 CAN port with CANbus communication protocol • 1 port to update the firmware of the expansion. |
| Microprocessor: | 16 bit. | | |
| Program memory (FLASH): | c-pro 3 hecto and c-pro 3 hecto+ | c-pro 3 mega and c-pro 3 NODE mega | c-pro 3 EXP hecto and c-pro 3 EXP hecto+ |
| | 288 KB. | 544 KB. | - |
| Data memory (RAM): | c-pro 3 hecto and c-pro 3 hecto+ | c-pro 3 mega and c-pro 3 NODE mega | c-pro 3 EXP hecto and c-pro 3 EXP hecto+ |
| | 12 KB. | 24 KB. | - |

c-pro 3

PROGRAMMABLE CONTROLLERS

Hardware manual ver. 2.0

PT - February 2012

Code 114CP3E204

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EVCO S.p.A.

Via Mezzaterra 6, 32036 Sedico Belluno ITALY

Phone +39 / 0437 / 85.24.68

Fax +39 / 0437 / 83.648

info@evco.it

www.evco.it