

C-PRO MICRO

PROGRAMMABLE CONTROLLERS



HARDWARE MANUAL

CODICE 114CPRUHW03

C-PRO MICRO HARDWARE MANUAL

Important

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

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



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1 Introduction

The **C-PRO MICRO** family of programmable controllers is the ideal solution for refrigeration, ventilation and air conditioning applications in low complexity situations. Both in terms of regulation operations and the user interface, the controller software is fully programmable, in a simple and intuitive manner, thanks to the use of the **UNI-PRO** development environment.

The C-PRO MICRO is made for installation on a DIN rail (see the figure below).

Using the 6 relay outputs, it is possible to control various types of devices such as compressors, water circulation pumps, defrosting elements, condensation or evaporation fans, cycle inversion valves, alarm warning indicators etc. The control process makes use of NTC probes for monitoring temperature and 0/4-20 mA or 0-5V ratiometric transducers for monitoring pressure. There are two alternative versions according to the kind of bus used: CANBus version and IntraBus version.

The C-PRO MICRO is also equipped with digital inputs for monitoring unit functions; it is also possible to connect until two I/O expansion units (IntraBus version) or the expansions of the C-PRO EXP-MICRO, C-PRO EXP-KILO, C-PRO EXP-MEGA, C-PRO EXP-GIGA families to increase the I/O (CAN version).

All the parameters may be adjusted from the user interface, and it is possible to upload and download configuration data by means of a programming key.

The display has 4 red-coloured digits (plus decimal points) and 16 icons of various colours; the keypad has 4 keys; the sealed case versions have neither display nor keypad and must be used in conjunction with a remote terminal.



C-PRO MICRO
Built-in version



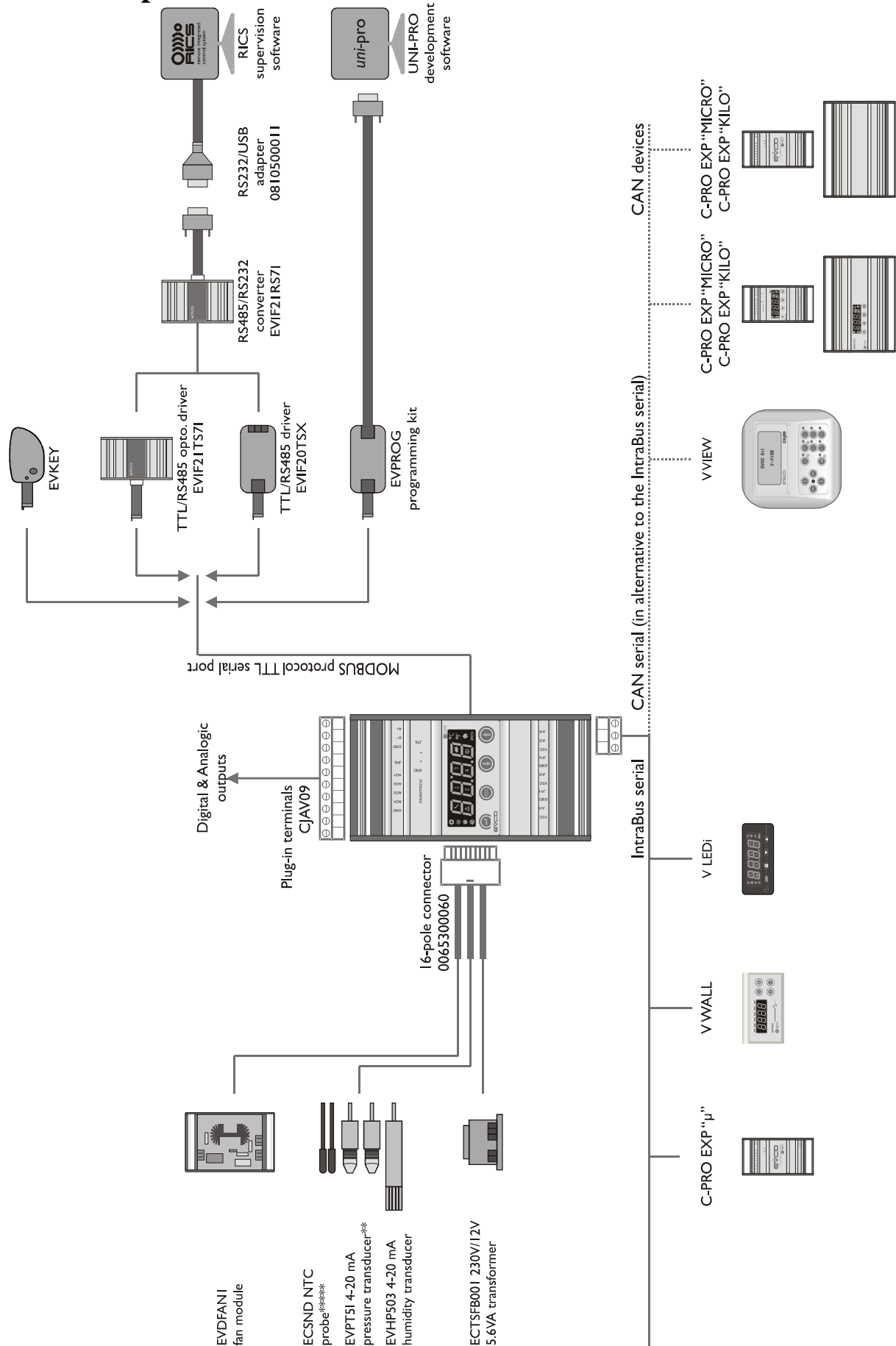
C-PRO MICRO
Sealed case version



C-PRO MICRO
Open version

2 Component and auxiliary network systems

2.1 Example for the built-in versions





3 Technical characteristics

3.1 Connections

Power supply:

The C-PRO MICRO is powered by a 12 V AC supply. It may also be powered by a 12 V DC supply; in this case, there is no option for controlling the fan cut-off modules. The maximum length of the power supply connecting cables is 1 m.

Analogue input connections:

The C-PRO MICRO has two analogue inputs for NTC probes and two for NTC probes or for 0/4-20 mA or 0-5V ratiometric transducers. Selection is made by the UNI-PRO development system. The current transducers may be supplied by means of the 12 V DC terminal (refer to the physical layout) with a non-stabilised voltage equal to 12 V DC. The maximum length of the analogue input connecting cables is 3 m.

Digital input connections:

The C-PRO MICRO has 5 non-optoisolated digital inputs (clean contact). The maximum length of the digital input connecting cables is 3 m.

Digital output connections:

The C-PRO MICRO has up to 6 electromechanical relay digital outputs. The maximum length of the digital output connecting cables is 3 m.

Analogue output connections:

The C-PRO MICRO has 1 pulse modulation analogue output to drive the cut phase modules. The maximum length of this analogue output connecting cables is 1 m.

The C-PRO MICRO has 2 voltage or current (optional) analogue outputs. The maximum length of these analogue outputs connecting cables is 3 m. Optional analogue outputs are not available for the open models.

Remote terminal connections (IntraBus):

The connection between the C-PRO MICRO and the terminal is made using a 3 way cable. The maximum length of the remote terminal connection cables is 1 m if using a DC supply from the controller; 30 m where the wall-mounted keypad is supplied using a separate transformer.

Remote expansions connection (IntraBus):

The connection between the C-PRO MICRO and the I/O expansion units is made using a 3 way cable. The maximum length of the remote I/O expansion units connecting cables is 1 m.

User interface connections (CAN):

The connection between C-PRO MICRO and the remote user interface is made using 2 way cable (better if it is two weaves couples) plus possible ground.

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

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

The CAN port baud rate is settable by parameter.

Connection with a remote expansion (or another CAN controller):

The connection between C-PRO MICRO and the remote expansion (or other CAN controller) is made using a 2 way cable (better if weaved) plus possible ground.

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

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

Notes on the electrical connections

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

Caution

The instructions governing maximum connecting cable lengths imply that a range of precautions are being observed:

In order to avoid exemption problems, it is good practice to comply with the following instructions:

- Avoid locations with antennae
- Avoid cabling probe inputs and relay outputs together; generally avoid mixing low and high voltage signals
- Avoid wrapping cabling around power components

In order to avoid safety problems, it is good practice to comply with the following instructions:

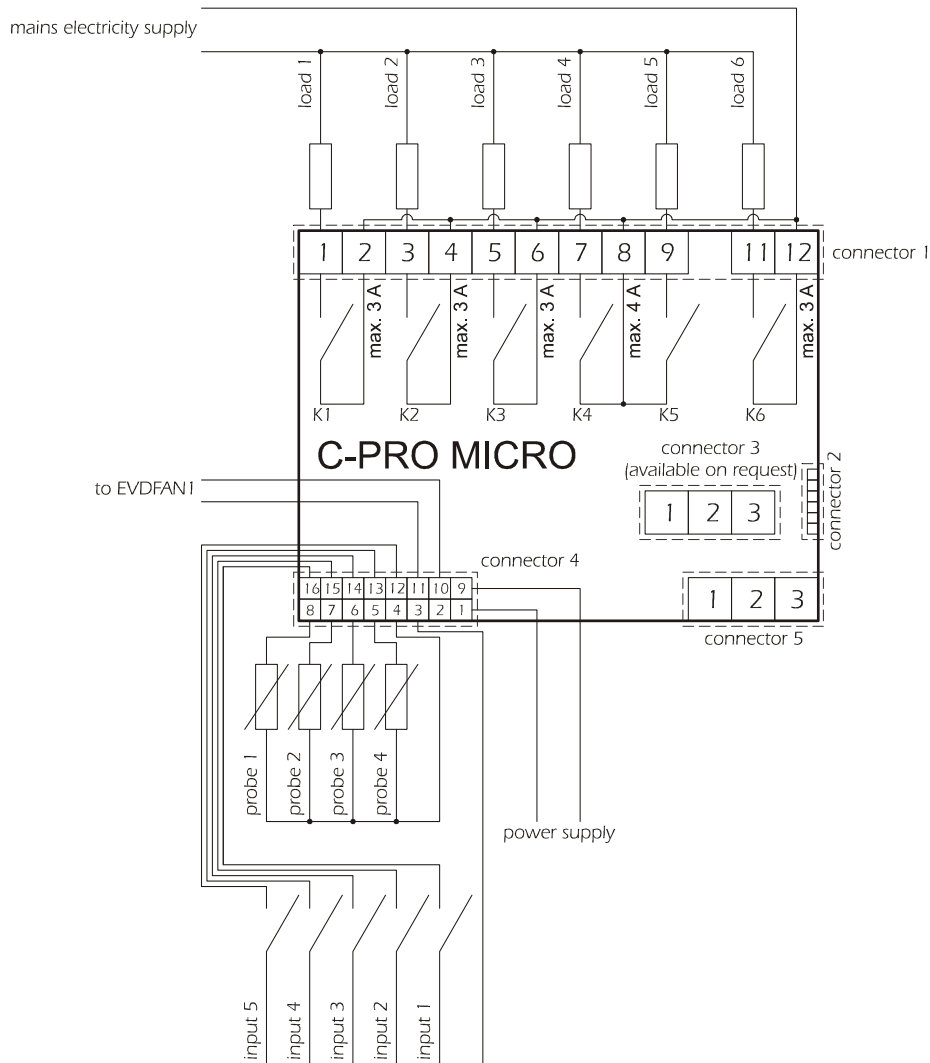
- Avoid premises with relative humidity >90%
- Avoid water
- Avoid corrosive environments
- Avoid explosive environments

Special recommendations

Finally, ensure that the operating conditions are within the limits of use described in the technical characteristics.

3.2 The C-PRO MICRO wiring layout

The C-PRO MICRO control unit wiring layout is shown below, with the meanings of the inputs and outputs given in the tables.



C-PRO MICRO wiring diagram

Connector 1: Output relay connection

| Conn. | Abbrev. | Description |
|-------|-----------------|-----------------------------------|
| C1-1 | DO1 | Relay No.1, breaker normally open |
| C1-2 | COMMON DO1 | Relay No. 1 - common |
| C1-3 | DO2 | Relay No.2, breaker normally open |
| C1-4 | COMMON DO2 | Relay No. 2 – common |
| C1-5 | DO3 | Relay No.3, breaker normally open |
| C1-6 | COMMON DO3 | Relay No. 3 - common |
| C1-7 | DO4 | Relay No.4, breaker normally open |
| C1-8 | COMMON DO4, DO5 | Relay No.s 4,5 - common |
| C1-9 | DO5 | Relay No.5, breaker normally open |
| C1-11 | DO6 | Relay No.6, breaker normally open |
| C1-12 | COMMON DO6 | Relay No. 6 - common |

Connector 2: Connection for the parameter upload/download key and/or output for RS485 module and/or controller flash download module

Connector 3: Analogue output connector (optional, not available for open versions)

| Conn. | Abbrev. | Description (V+I version) |
|---------------------------|---------|---------------------------|
| C3-1 | AO2 | 0-10 V DC |
| C3-2 | GND | Common analogue output |
| C3-3 | AO3 | 4-20 mA |
| Description (I+I version) | | |
| C3-1 | AO2 | 4-20 mA |
| C3-2 | GND | Common analogue output |
| C3-3 | AO3 | 4-20 mA |
| Description (V+V version) | | |
| C3-1 | AO2 | 0-10 V DC |
| C3-2 | GND | Common analogue output |
| C3-3 | AO3 | 0-10 V DC |

Connector 4: Connector for low voltage signals

| Conn. | Abbrev. | Description |
|-------|-----------------|------------------------------------------------------------------------------------------------------|
| C4-1 | 12 V AC (Power) | Device power supply (12 V AC/DC) |
| C4-2 | 5V | Ratiometric power supply |
| C4-3 | GND | Common analogue and digital inputs |
| C4-4 | GND | Common analogue and digital inputs |
| C4-5 | AI4 | Analogue input No. 4 (for NTC probes or for 0/4-20 mA or 0-5V transducers) |
| C4-6 | AI3 | Analogue input No. 3 (for NTC probes or for 0/4-20 mA or 0-5V transducers) |
| C4-7 | AI2 | Analogue input No. 2 (for NTC probes) |
| C4-8 | AI1 | Analogue input No. 1 (for NTC probes) |
| C4-9 | 12 V AC (Power) | Device power supply (12 V AC/DC) |
| C4-10 | 12 V DC | Current transducer and cut-off module power supply (50 mA max. not protected against short circuits) |
| C4-11 | AO1 | Cut-off module impulse output |
| C4-12 | DI5 | Digital input No. 5 |
| C4-13 | DI4 | Digital input No. 4 |
| C4-14 | DI3 | Digital input No. 3 |
| C4-15 | DI2 | Digital input No. 2 |
| C4-16 | DI1 | Digital input No. 1 |

Connector 5: Connector for remote keypad and I/O expansion unit (IntraBus)

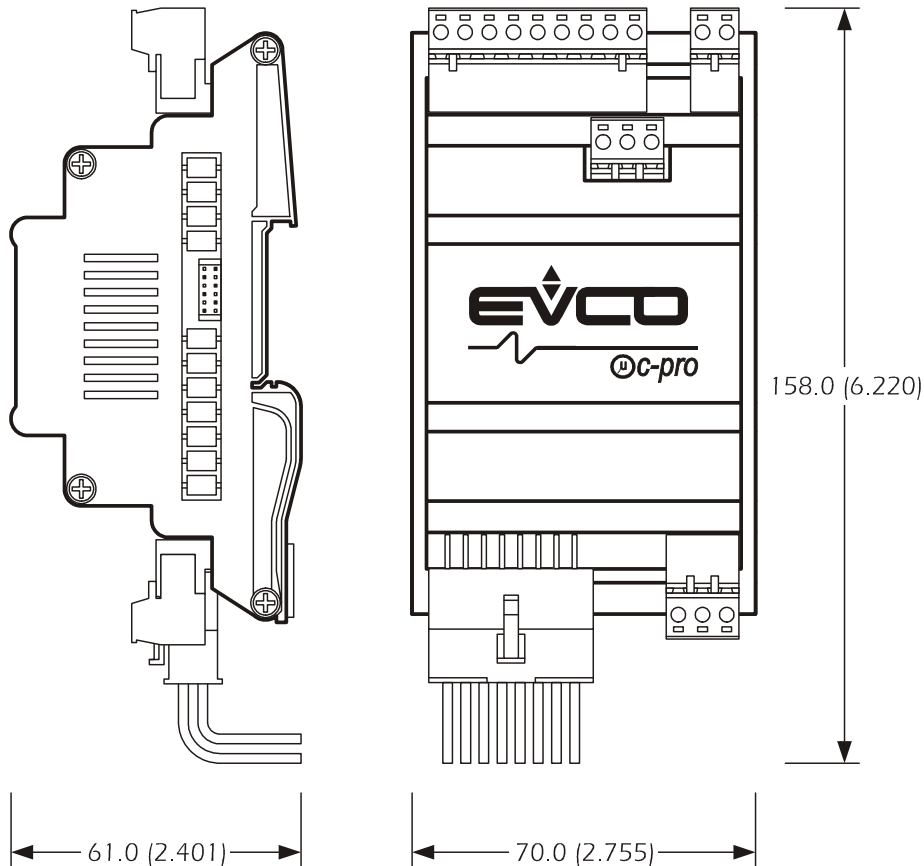
| Conn. | Abbrev. | Description |
|-------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C5-1 | VDC | Remote keypad power supply (12 V DC 50 mA max.; not protected against short circuits) (Please note: any expansion units must have a local power supply) |
| C5-2 | GND | Common |
| C5-3 | DATA | Powered serial connection |

Connector 5: Connector for remote keypad and I/O expansion unit (CAN)

| Conn. | Abbrev. | Description |
|-------|---------|------------------------------------------|
| C5-1 | + | Connector for the serial CAN+ connection |
| C5-2 | GND | Ground reference connection |
| C5-3 | - | Connector for the serial CAN- Connection |

3.3 C-PRO MICRO dimensions/installation

The mechanical dimensions for the C-PRO MICRO are given below; the measurements are in mm (in).

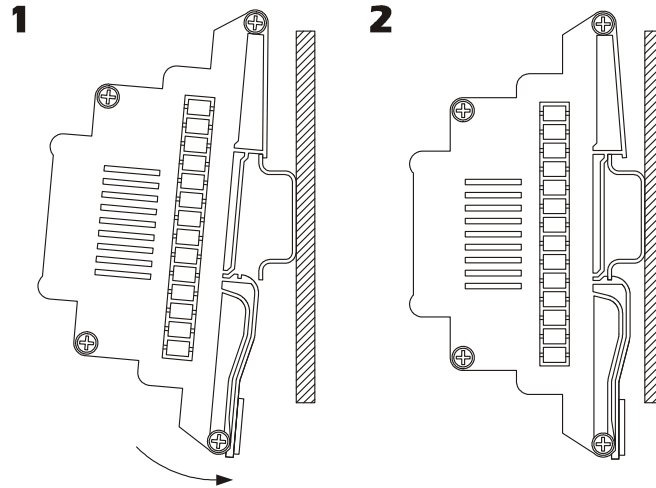


Recommendations for installation:

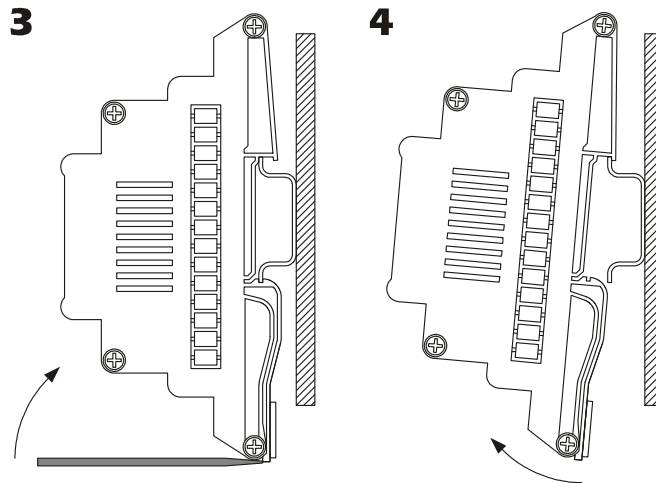
- ensure that the operating conditions (operating temperature, humidity, etc.) are within the limits indicated in the technical data sheets
- do not install the device near to any sources of heat (heating elements, hot air conduits, etc.), equipment containing powerful magnets (large diffusers, etc.), areas affected by direct sunlight, rain, humidity, excessive dust, mechanical vibration or shock
- in compliance with safety regulations, the device must be installed correctly, and in such a way as to protect against any contact with electrical parts; all safety devices must be fixed so that they cannot be removed without the use of tools.

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To install the C-PRO MICRO, proceed as indicated in the figures (points 1 and 2).



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





3.4 General characteristics

| | |
|------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Safety reference standards | EN60730-1 |
| Scope of the device | A programmable electronic controller for refrigeration, ventilation and air conditioning applications |
| Storage conditions | -10T70°C Non-condensing RU<80% |
| Operational conditions | 0T50°C Non-condensing RU<80% |
| Electric shock protection class | Add-on control device; assumes the classification of the equipment into which it is integrated |
| Disconnection type | Reduced interruption (relay breakers) |
| PTI of the insulation materials | >=250 V |
| Case | Mounting on omega rail |
| Action type | 1C |
| Pollution | Normal |
| Software class | A |
| Insulated parts electrical stress period | Long |
| Front panel protection classification | IP00 for the open versions; IP 40 otherwise |

3.5 Technical characteristics

| | |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Low voltage signal connections | 16 way Mini-Fit |
| Power connector | Phoenix pull-out terminal board; screw terminals for the open versions Cable diameter > 0.75 mm ² |
| Connection for connecting the EVCO powered serial port to the remote keypad and/or remote I/O expansion card | Phoenix pull-out terminal board; screw terminals for the open versions |
| Connection for parameter key, TTL serial output for RS485 module, Flash programming interface | 6 way AMP micro-match |
| Connection for D/A output | Phoenix pull-out terminal board; screw terminals for the open versions |

16 WAY MINI-FIT CONNECTOR SPECIFICATIONS

| SUPPLIER | CONNECTOR CODE | CONTACT CODE |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <i>Please note: use the special tool for crimping</i> |  |  |
| CVILUX | CP-01 116010 (V2) CP-01 116020 (V0) | CP-01 1000102 (AWG16÷24) |
| SELECOM | 6137R16WO (V2) | 6137TR1 (AWG16÷20) 6137TR2 (AWG22÷26) |
| JUSCOM | 1090-557-162 (V2) | 1150-156-012 (AWG18÷22) 1150-156-002 (AWG22÷26) |
| CONEXCON | 6740-1161 (V2) 6740-1160 (V0) | 6744-2000 (AWG18÷22) |
| MOLEX | 39-01-2160 (V2) 39-01-2165 (V0) | 39-00-0038 (AWG18÷24) 39-00-0046 (AWG22÷28) |

3.6 Electrical characteristics

| | | |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| CPU | Microcontroller | 8 bit |
| | Program flash memory | 128 Kbyte |
| | RAM for data memory | 4 Kbyte |
| | EEPROM | 4 Kbyte |
| | A/D | 8 channels at 10 bit |
| Power supply | Voltage | 12 V AC/DC |
| | Range | -10% +15% |
| | Frequency | 50/60 Hz / DC |
| | Maximum input power | 6 VA |
| | Fuse rating | External |
| Digital outputs | Number | 6 |
| | Type | Electromechanical relays |
| | Maximum breaker current at 250 V AC <i>Please note: maximum current for common contact (DO4+DO5): < 4 A maximum current for the other contacts: < 3 A</i> | 3(1) A |
| | Number of processing cycles | 100.000 |
| | Minimum switching interval | 20 s |
| | Micro-switch action type | 1C |
| | Insulation between relays and low voltage | Reinforced |
| | Insulation between relays | Functional |
| | Insulation between relays and DO6 | Reinforced |
| | | |
| Digital inputs | Number | 5 |
| | Type | Clean contact |
| | Breaker closure current to earth | 2 mA |
| | Maximum closure resistance | 100 Ω |
| | OFF to ON detection time | 100 ms |
| | ON to OFF detection time | 100 ms |
| Analogue inputs for NTC probes | Number | 2 |
| | Type | NTC (10 K Ω \pm 1% @25°C) |
| | NTC measurement range | -40°C \div 100°C |
| | NTC measurement accuracy | \pm 1°C |
| | NTC measurement sensitivity | 0.1°C |
| Analogue inputs for NTC probes or ratiometric pressure transducers | Number | 2 |
| | Type | NTC (10 K Ω \pm 1% @25°C) |
| | NTC measurement range | -40°C \div 100°C |
| | NTC measurement accuracy | \pm 1°C |
| | NTC measurement sensitivity | 0.1°C |
| | Type | Current |
| | Current measurement range | 0/4 \div 20 mA |
| | Current measurement accuracy | \pm 0.08 mA |
| | Current measurement sensitivity | 0.01 mA |
| | Input resistance | 200 Ohm |
| | | |

| | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| Fan analogue output | Type Voltage measurement range Voltage measurement accuracy Voltage measurement sensitivity Number | Ratiometric 0 ÷ 5V ±50 mV 10 mV 1 |
| | Type | EVCO impulse cut-off |
| UART1 TTL for RS485 serial port (Modbus) | Number | 1 |
| | Type | UART |
| | Physical layer | TTL level signals |
| | Maximum baud rate | 19200 bit/s |
| | Connector | 6 way AMP micro-match |
| | <i>Please note: The same connector for the serial port is used for the parameter key and for the interface used for programming the microcontroller flash memory</i> | |
| Serial output for remote I/O expansion unit and remote keypad | Number | 1 |
| | Type | EVCO powered serial port |
| | Physical layer | 12 V DC, GND, DATA |
| | Baud rate | 19200 bit/s |
| | Connector | Plug-in Phoenix |
| Analogue output Voltage + Current, Voltage + Voltage or Current + Current (optional, not available for open case versions) | Number | 1+1 |
| | Connector | Plug-in Phoenix |
| | Power supply | Internal (non optoisolated) |
| | Type | Current |
| | Current range | 4 ÷ 20 mA |
| | Current output accuracy | ±0.4 mA |
| | Current output sensitivity | 0.01 mA |
| | Current output load | 47 ÷ 300 Ω |
| | Adjustment time | 1 s |
| | Type | Voltage |
| | Voltage range | 0 ÷ 10 V |
| | Voltage output accuracy | ±200 mV (unloaded) |
| | Voltage output sensitivity | 10 mV |
| | Output impedance | 100 Ω |
| | Adjustment time | 1 s |
| CAN communication Bus | Number | 1 |
| | type | CAN V2.0B no optoinsulated |
| | Physical layer | 2 wires + common wire (ISO 11898) |
| | Baud rate (max. length = 1000 m) | 20K |
| | Baud rate (max. length = 500 m) | 50K |
| | Baud rate (max. length = 250 m) | 125K |
| | Baud rate (max. length = 50 m) | 500K |
| | Connector | Disconnectable screw terminals |
| | <i>Note:</i> 1) baud rate selectable by parameters 2) The CAN connection consists of a cable with twisted pair (both shielded and not shielded). The first and the last elements of the system must have the bus terminating resistor connected (impedance is 120) | |

4 The C-PRO MICRO user interface

The display has 4 red-coloured digits (plus decimal points) and 16 icons of various colours; the keypad has 4 keys; the sealed case versions have neither display nor keypad and must be used in conjunction with a remote terminal.



C-PRO MICRO
Built-in version

| | | |
|---------|------------------|-----|
| Display | Number of digits | 4 |
| | Colour | Red |

| | | |
|----------------------------------------------------|--------|-------|
| Summer icon (air conditioning display) | Colour | Green |
| Circuit 1 icon (refrigeration display) | | |
| Winter icon (air conditioning display) | Colour | Green |
| Circuit 2 icon (refrigeration display) | | |
| Fan icon (air conditioning display) | Colour | Green |
| High pressure circuit icon (refrigeration display) | | |
| Pump icon (air conditioning display) | Colour | Green |
| Low pressure circuit icon (refrigeration display) | | |
| EVCO icon | Colour | Amber |
| Defrost icon (air conditioning display) | Colour | Amber |
| Fan icon (refrigeration display) | | |
| °F icon (air conditioning display) | Colour | Red |
| Bar icon (refrigeration display) | | |
| °C icon | Colour | Red |



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| | | |
|-------------------------------------------------|--------|--------------|
| Maintenance icon | Colour | Red |
| Alarm icon | Colour | Red |
| Icon 1 | Colour | Green |
| Icon 2 | Colour | Green |
| Icon 3 | Colour | Green |
| Icon 4 | Colour | Green |
| Heating element icon (air conditioning display) | Colour | Green |
| Compressor icon (refrigeration display) | | |
| On-Off icon | Colour | Red |

| Keys | Number of keys | 4 |
|-----------------|------------------------------------------------------|--------------------------------------------------------------------------------|
| Set / enter key | Normal pressing Pressed for approx. 3 seconds | ENTER (confirms the value/runs the command) Accesses programming parameters |
| On-Off/esc key | Normal pressing Pressed for approx. 3 seconds | ESC (cancels the value/returns to the previous menu) Powers the unit on/off |
| Up key | Normal pressing Secondary function | UP Programmable |
| Down key | Normal pressing Secondary function | DOWN Programmable |
| Esc+enter keys | Pressed for approx. 3 seconds | Accesses the second level programming parameters |
| Up+down key | Pressed for approx. 3 seconds | Displays device/firmware version, revision information |

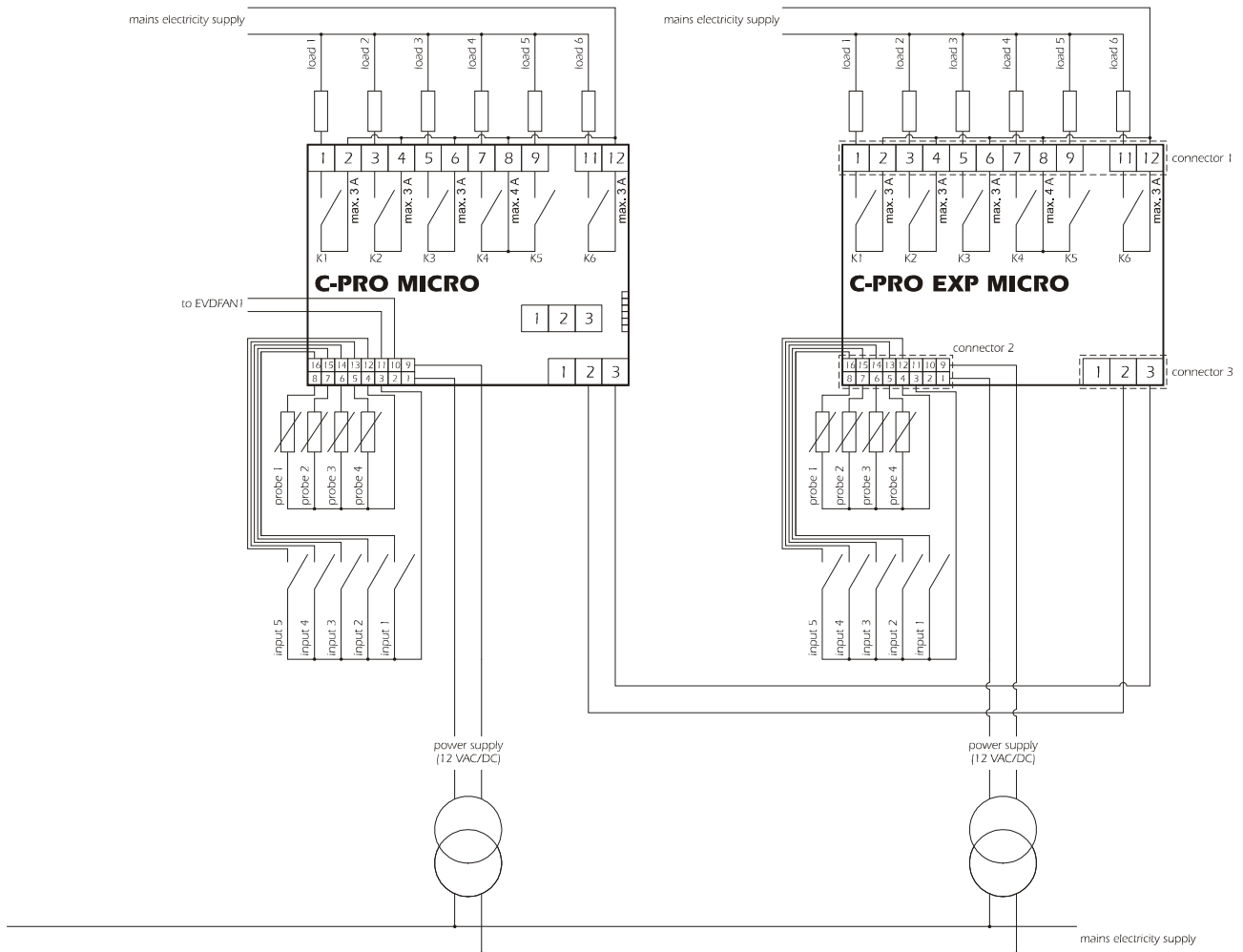
5 C-PRO EXP MICRO I/O expansion units

The C-PRO EXP MICRO I/O expansion units allow expansion of the controllers I/O capacity. There are two types of expansion unit, one sealed in a case with 4 DIN modules, and another open mounted on a base with 4 DIN modules.

| | |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |
| C-PRO EXP MICRO Sealed case version with 4 DIN modules | C-PRO EXP MICRO Open version mounted on a base 4 DIN modules |

5.1 The C-PRO EXP MICRO wiring layout (IntraBus version)

The references to connecting cable lengths reported in chapter 3 are also valid for I/O expansion units. The C-PRO EXP MICRO expansion unit wiring layout is shown below, with the meanings of the inputs and outputs given in the tables.



C-PRO EXP MICRO wiring diagram

The C-PRO MICRO and C-PRO EXP MICRO power supplies must be galvanically isolated from one another.

Connector 1: Output relay connection

| Conn. | Abbrev. | Description |
|-------|-----------------|-----------------------------------|
| C1-1 | DO1 | Relay No.1, breaker normally open |
| C1-2 | COMMON DO1 | Relay No.1 - common |
| C1-3 | DO2 | Relay No.2, breaker normally open |
| C1-4 | COMMON DO2 | Relay No.2 – common |
| C1-5 | DO3 | Relay No.3, breaker normally open |
| C1-6 | COMMON DO3 | Relay No.3 - common |
| C1-7 | DO4 | Relay No.4, breaker normally open |
| C1-8 | COMMON DO4, DO5 | Relay No.s 4, 5 - common |
| C1-9 | DO5 | Relay No.5, breaker normally open |
| C1-11 | DO6 | Relay No.6, breaker normally open |
| C1-12 | COMMON DO6 | Relay No.6 - common |

Connector 2: Connector for low voltage signals

| Conn. | Abbrev. | Description |
|-------|-----------------|------------------------------------------------------------------------------------------------------|
| C2-1 | 12 V AC (Power) | Device power supply (12 V AC/DC) |
| C2-2 | Not connected | Not connected |
| C2-3 | GND | Common analogue and digital inputs |
| C2-4 | GND | Common analogue and digital inputs |
| C2-5 | AI4 | Analogue input No. 4 (for NTC probes or for 0/4-20 mA or 0-5 V transducers) |
| C2-6 | AI3 | Analogue input No. 3 (for NTC probes or for 0/4-20 mA or 0-5 V transducers) |
| C2-7 | AI2 | Analogue input No. 2 (for NTC probes) |
| C2-8 | AI1 | Analogue input No. 1 (for NTC probes) |
| C2-9 | 12 V AC (Power) | Device power supply (12 V AC/DC) |
| C2-10 | 12 V DC | Current transducer and cut-off module power supply (50 mA max. not protected against short circuits) |
| C2-11 | AO1 | Cut-off module impulse output |
| C2-12 | DI5 | Digital input No. 5 |
| C2-13 | DI4 | Digital input No. 4 |
| C2-14 | DI3 | Digital input No. 3 |
| C2-15 | DI2 | Digital input No. 2 |
| C2-16 | DI1 | Digital input No. 1 |

Connector 3: Connector to the controller

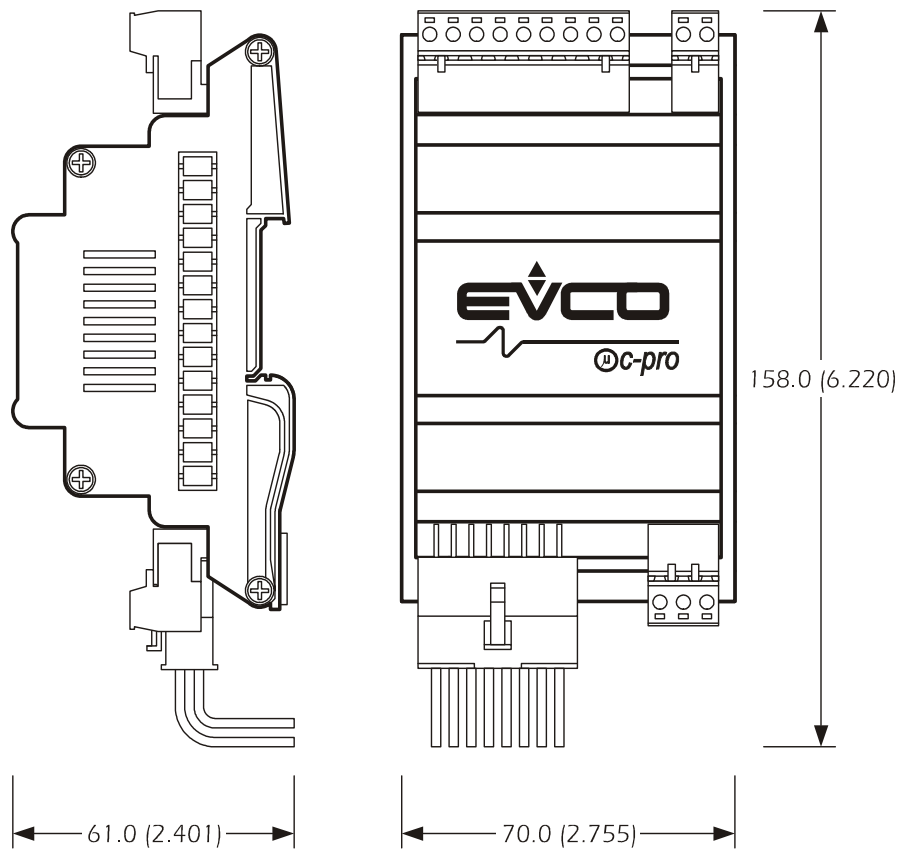
| Conn. | Abbrev. | Description |
|-------|---------|---------------------------|
| C3-1 | 12 V DC | Power supply |
| C3-2 | GND | Common |
| C3-3 | DATA | Powered serial connection |

Connector 3: Connector to the controller

| Conn. | Abbrev. | Description |
|-------|---------|-------------------------------------------|
| C3-1 | CAN + | Connector for the serial CAN + connection |
| C3-2 | GND | Ground reference connector |
| C3-3 | CAN - | Connector for the serial CAN - connection |

5.2 C-PRO EXP MICRO dimensions/installation

The mechanical dimensions for the C-PRO EXP MICRO are given below; the measurements are in mm (in).



6 Accessories

6.1 User terminals (IntraBus)

User terminals allow the control units to be controlled remotely (display and commands). There are two interface types, one panel-mounted, the other wall-mounted. The interface is connected to the special (powered) serial connector of the C-PRO MICRO controllers.



V LEDi

Versione a pannello

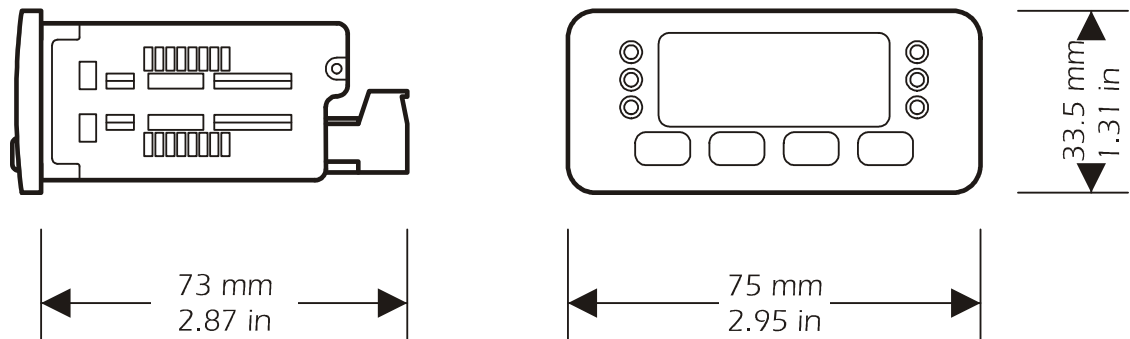


V WALL

Versione a muro

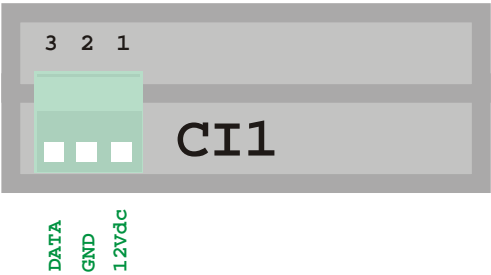
6.1.1 V LEDi dimensions and installation

For panel installation, use the snap-on brackets provided



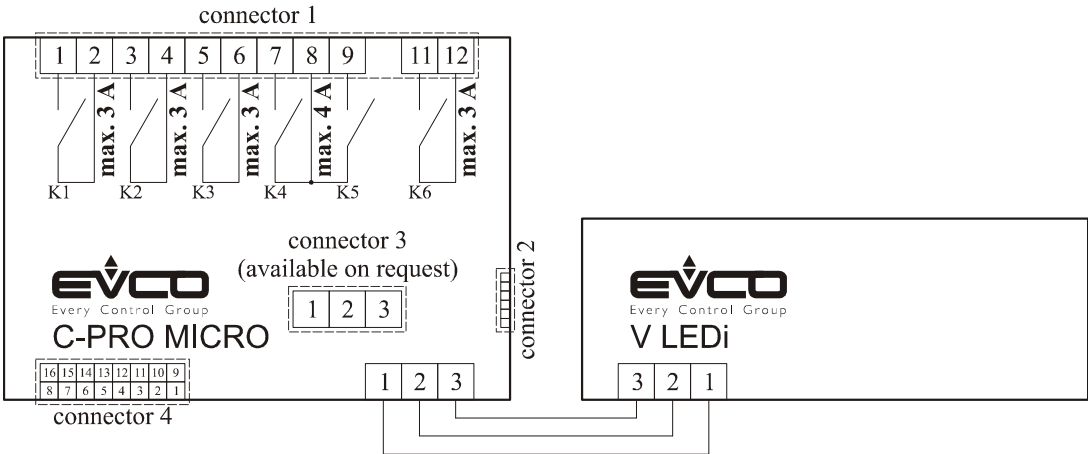
Local panel-mounted interface dimensions

Connections



Local panel-mounted interface wiring diagram

| Connector CI1 : Interface connector | | |
|--------------------------------------------|---------|--------------------------|
| Conn. | Abbrev. | Description |
| CI1-1 | 12 V DC | Keypad power supply |
| CI1-2 | GND | Common |
| CI1-3 | DATA | EVCO powered serial port |



C-PRO MICRO with V LEDi wiring diagram

The user interface has a 7 segment, 4 digit display (plus decimal point), 6 icons and the user mode is achieved using 4 keys.



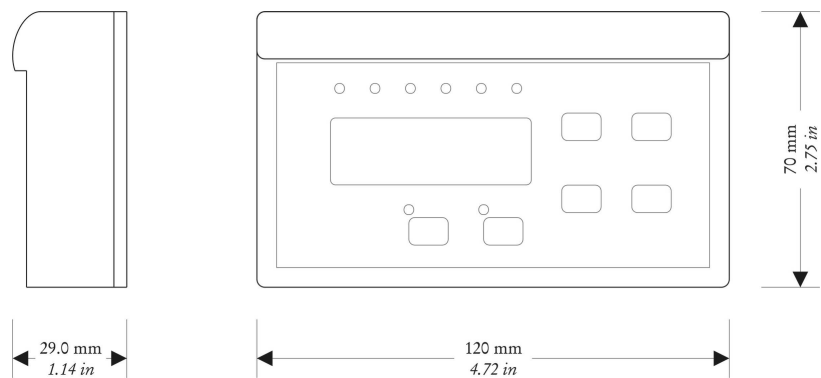
| | | |
|---------|------------------|-----|
| Display | Number of digits | 4 |
| | Colour | Red |

| | | |
|-----------------|--------|-----|
| Summer icon | Colour | Red |
| Winter icon | Colour | Red |
| Compressor icon | Colour | Red |
| Pump icon | Colour | Red |
| Defrost icon | Colour | Red |
| Alarm icon | Colour | Red |

| | | |
|-----------------|--------------------------------------------------|--------------------------------------------------------------------------------|
| Keys | Number of keys | 4 |
| Set / enter key | Normal pressing Pressed for approx. 3 seconds | ENTER (confirms the value/runs the command) Accesses programming parameters |
| On-Off/esc key | Normal pressing Pressed for approx. 3 seconds | ESC (cancels the value/returns to the previous menu) Powers the unit on/off |
| Up key | Normal pressing Secondary function | UP Programmable |
| Down key | Normal pressing Secondary function | DOWN Programmable |
| Esc+enter keys | Pressed for approx. 3 seconds | Accesses the second level programming parameters |
| Up+down key | Pressed for approx. 3 seconds | Displays device/firmware version, revision information |

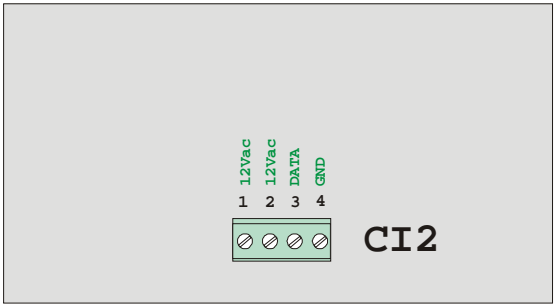
6.1.2 V WALL dimensions and installation

For wall installation, use appropriate rawplugs and screws.



Wall-mounted version - dimensions

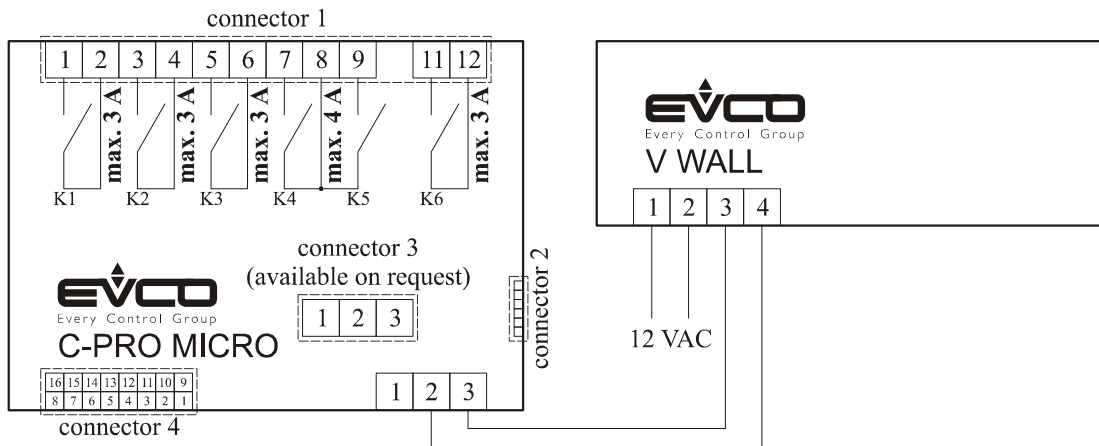
Connections



Wall-mounted version wiring diagram

Connector CI2: Terminal connector powered by a separate transformer

| Conn. | Abbrev. | Description |
|-------|---------|----------------------------------|
| CI2-1 | 12 V AC | Remote interface AC power supply |
| CI2-2 | 12 V AC | Remote interface AC power supply |
| CI2-3 | DATA | EVCO powered serial port |
| CI2-4 | GND | Common |

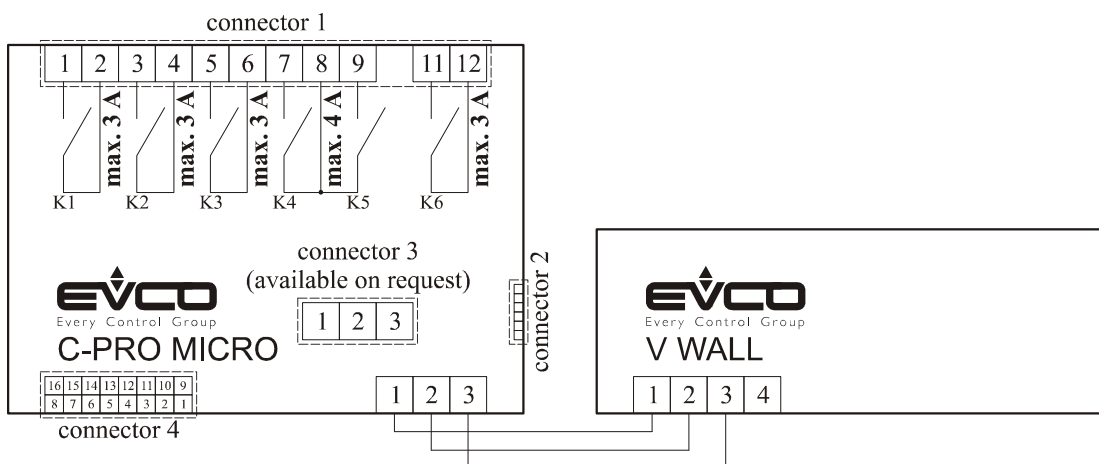


C-PRO MICRO with V WALL wiring diagram (terminal powered by a separate 12 V AC transformer; the maximum length of the terminal power cables is 1 m, the maximum length of cables connecting the C-PRO MICRO and V WALL is 30 m)

Make the C-PRO MICRO – V WALL connection using a twisted-pair cable; ensure that the cable does not run along side any high voltage sections.

Connector CI2: Terminal connector, powered by the C-PRO MICRO

| Conn. | Abbrev. | Description |
|-------|---------|--------------------------|
| CI2-1 | 12 V DC | Keypad DC power supply |
| CI2-2 | GND | Common |
| CI2-3 | DATA | EVCO powered serial port |
| CI2-4 | GND | Common |



C-PRO MICRO with V WALL wiring diagram (terminal powered by C-PRO MICRO; the maximum length of the connecting cables is 1 m)

The user interface has a 7 segment, 4 digit display (plus decimal point), 6 icons and the user mode is achieved using 4 keys.



| | | |
|---------|------------------|-----|
| Display | Number of digits | 4 |
| | Colour | Red |

| | | |
|--------|--------|-----|
| Led L0 | Colour | Red |
| Led L1 | Colour | Red |
| Led L2 | Colour | Red |
| Led L3 | Colour | Red |
| Led L4 | Colour | Red |
| Led L5 | Colour | Red |

| | | |
|-----------------|--------------------------------------------------|--------------------------------------------------------------------------------|
| Keys | Number of keys | 4 |
| Set / enter key | Normal pressing Pressed for approx. 3 seconds | ENTER (confirms the value/runs the command) Accesses programming parameters |
| On-Off/esc key | Normal pressing Pressed for approx. 3 seconds | ESC (cancels the value/returns to the previous menu) Powers the unit on/off |
| Up key | Normal pressing Secondary function | UP Programmable |
| Down key | Normal pressing Secondary function | DOWN Programmable |
| Esc+enter keys | Pressed for approx. 3 seconds | Accesses the second level programming parameters |
| Up+down key | Pressed for approx. 3 seconds | Displays device/firmware version, revision information |

6.2 Remote User interface (CAN)

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

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

6.2.1 V-VIEW

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

The typical implemental functionality are :



















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

6.2.1.1 V-VIEW User Interface











V-VIEW

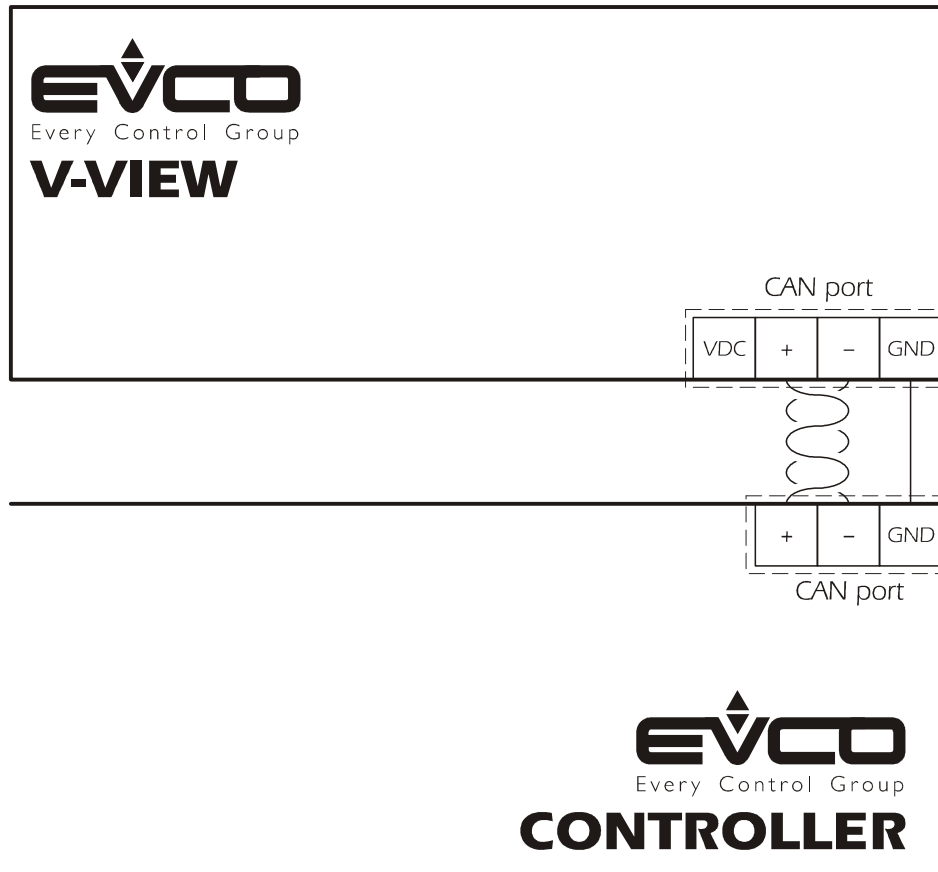
The following table summarizes the keyboard button meaning:

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

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

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

6.2.1.2 V-VIEW wiring layout



6.2.1.3 V-VIEW specifications

General specifications

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

Housing

| | |
|--------------|-----------------|
| Installation | Pannel mounting |
| Housing | 160 x 160 mm |

Electrical specifications

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

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

6.3 EVDFAN1 cut-off speed regulator

The EVDFAN1 is a cut-off speed regulator for controlling single-phase fans (fans with maximum current absorption equal to 5 A).
It is ideal for controlling the condensation/evaporation fans on a refrigeration control unit.

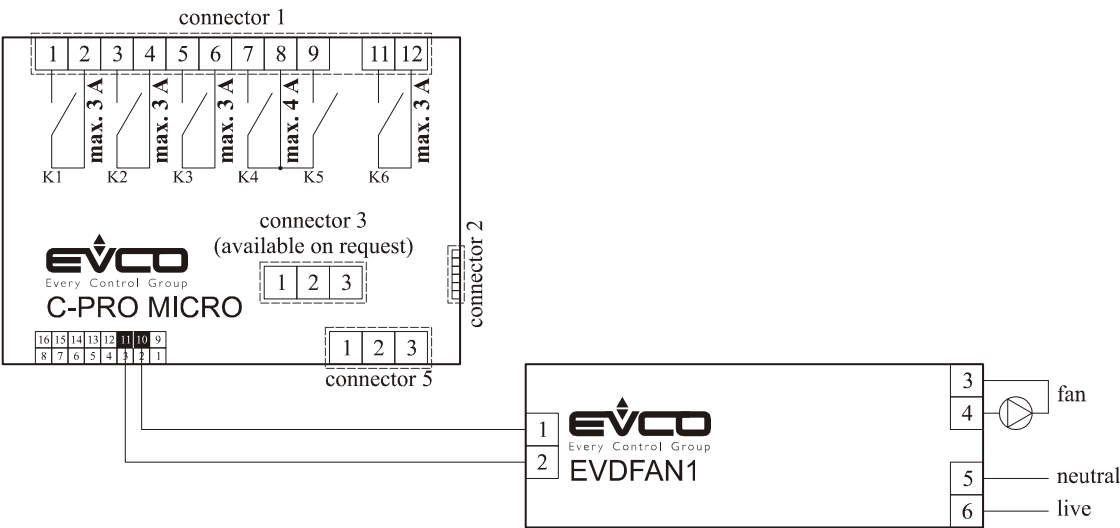


EVDFAN1

The fan module is available as an open card version, and is mounted on a plastic base suitable for fitting on a DIN rail.

| |
|--------------------------------|
| 135 mm x 71 mm |
| DIN rail fan module dimensions |

Connections



C-PRO MICRO with EVDFAN1 wiring diagram

Terminals 1 and 2: Control input connector (Phoenix pull-out)

| Conn. | Abbrev. | Description |
|-------|---------|-----------------------|
| 1 | 12 V DC | 12 V DC power supply |
| 2 | AO1 | Impulse cut-off input |

Terminals 3, 4, 5 and 6: Power connectors (FAST-ON)

| Conn. | Abbrev. | Description |
|-------|---------|------------------|
| 3 | LOAD | Load |
| 4 | LOAD | Load (Neutral) |
| 5 | LOAD | Neutral 230 V AC |
| 6 | LOAD | Live 230 V AC |

The cut-off module allows the control of single-phase fans with a maximum current equal to 5 A. The fan module live feed must be the same that supplies the controller.

If the C-PRO MICRO is supplied with a DC supply, then it is not possible to use the EVDFAN1 module to control the fan.

Example:

$V_{AC} = 230 \text{ V}$

$I_{max} = 5 \text{ A}$

$VA_{(max)} = 230 * 5 = 1150 \text{ VA}$

$W_{(max)} = 230 * 5 * \cos\phi = 1150 \text{ Watts}$ if $\cos\phi = 1$

6.4 Supervision and monitoring accessories

These modules allow the conversion of TTL signals to RS485 signals (with or without insulation) for supervision using the MODBUS protocol.

The modules are connected to the special 6 way AMP micro-match connector on the controller; this connector is shared with the parameter programming key and the controller flash memory programming tools.

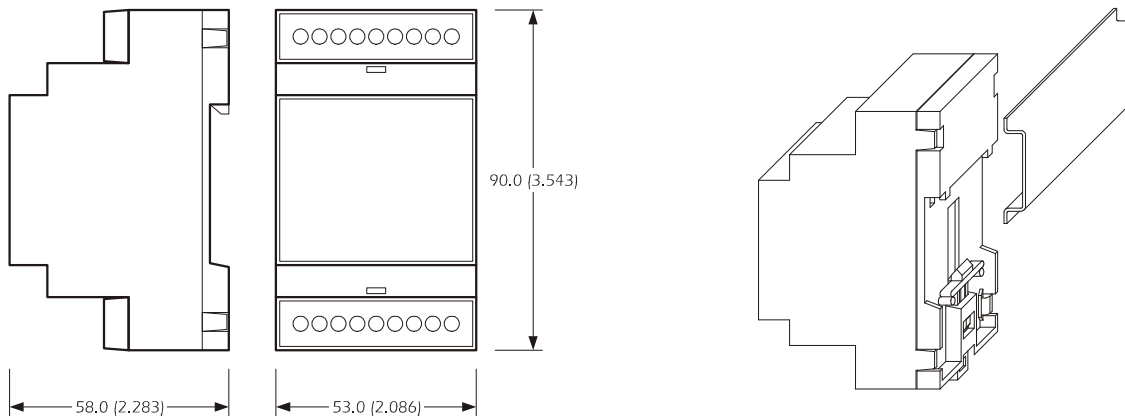
6.4.1 Non-insulated TTL/RS485 interface



EVIF20TSX

6.4.2 Insulated TTL/RS485 interface

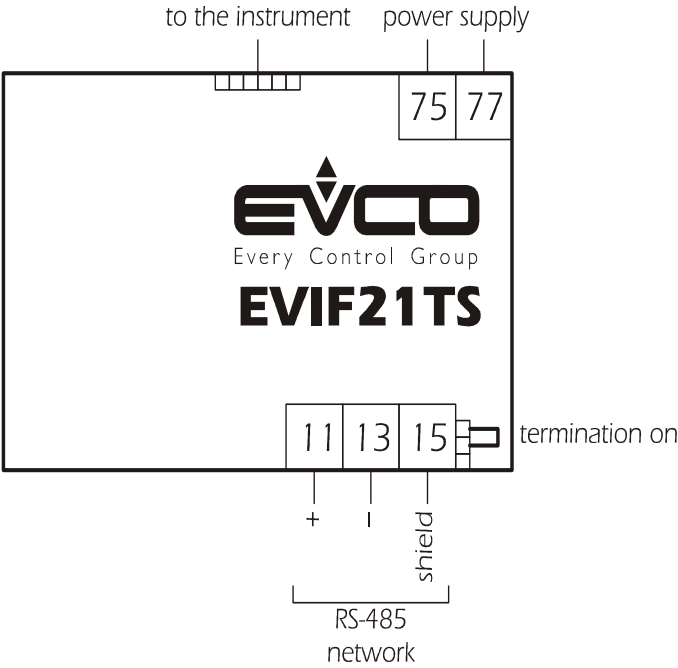
EVIF21TS7I dimensions/installation



EVIF21TS7I

Dimensions/Installation on DIN rail

EVIF21TS7I connections



Insulated interface wiring diagram

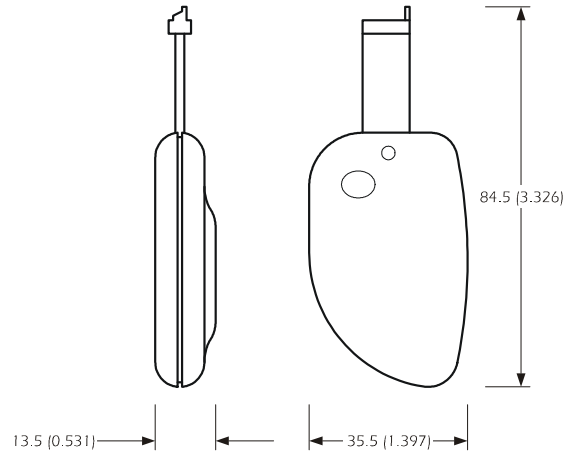
| Connector | | |
|-----------|--------------|-------------|
| Conn. | Abbrev. | Description |
| 11 | + | RS485+ |
| 13 | - | RS485- |
| 15 | shield | COMMON |
| 75 | Power supply | 230 V AC |
| 77 | Power supply | 230 V AC |

6.5 Programming accessories

6.5.1 EVKEY programming key

The EVKEY programming key allows downloading/uploading parameters (even when the controller is not powered; in this case it is necessary to use the EVPS power supply).

The key is connected to the special 6 way AMP micro-match connector, also used for supervision.



EVKEY

6.5.2 EVPROG programming kit

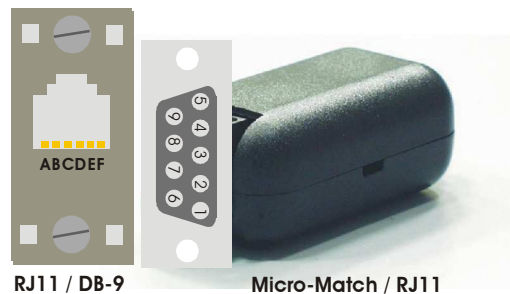
The EVPROG programming kit allows downloading programs into the flash memory of the C-PRO MICRO controller (even when the controller is not powered; in this case, it is necessary to use the EVPS power supply). The EVPROG is connected to the special 6 way AMP micro-match connector, also used for the parameter programming key or for supervision.

The kit is comprised of the following components:

1. The EVIF20TRX interface.
2. Pony Prog (9 pin – RJ 11) tray adapter.
3. ECCC506 telephone cable.

Preparation of the EVPROG kit hardware:

Connect the Pony Prog tray adapter to the computer serial port. Connect the EVIF20TRX interface to the controller AMP micro-match connector. Connect one end of the ECCC506 telephone cable to the Pony Prog tray adapter, and the other end to the EVIF20TRX interface.

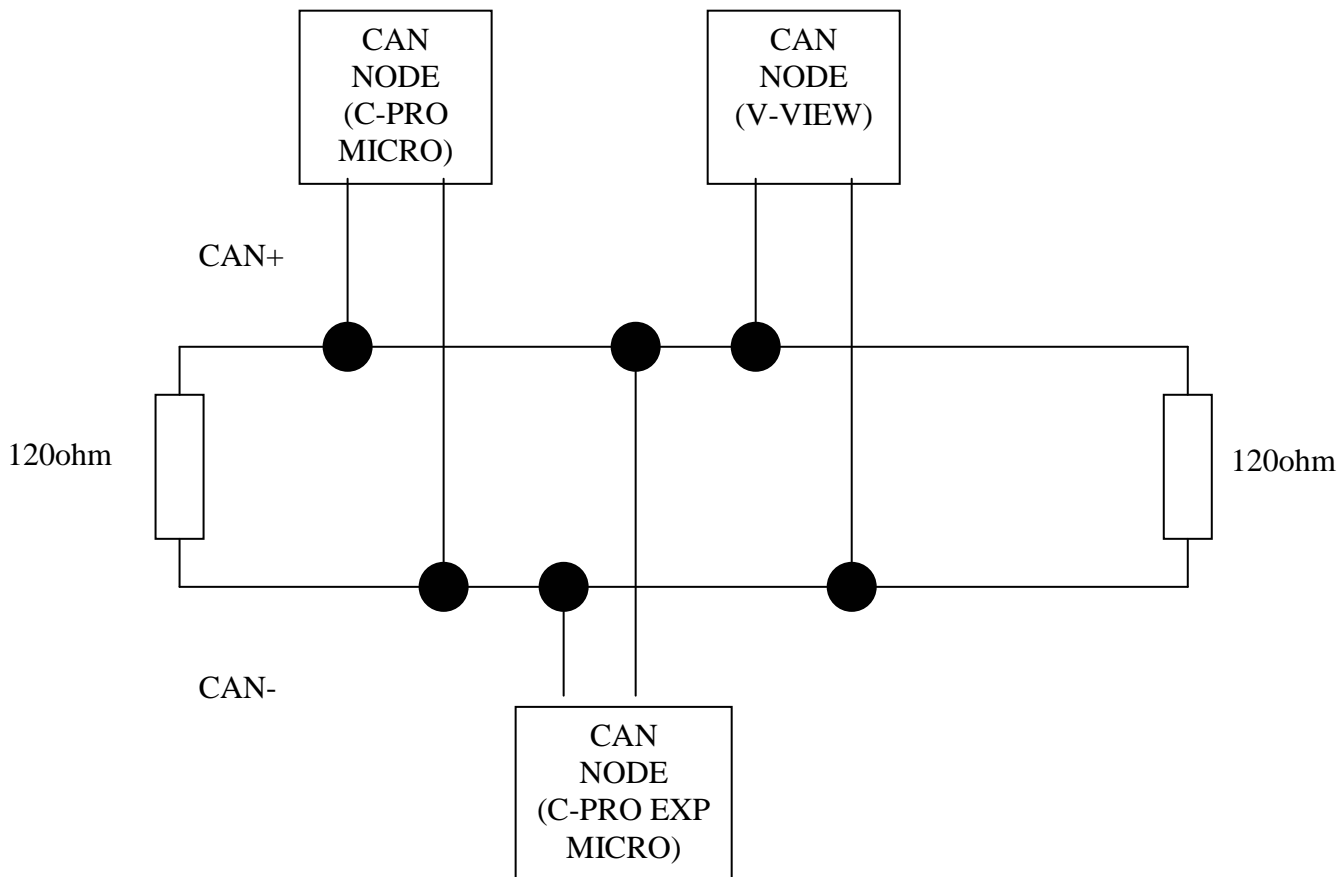


EVPROG

7 CAN Connection

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

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



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

| C-PRO MICRO | V-VIEW User Interface |
|-------------|-------------------------------------------|
| | PA 1 (VCD) needs independent power supply |
| C3-1 (CAN+) | PA 2 (CAN+) |
| C3-3 (CAN-) | PA 3 (CAN-) |
| C3-2 (GND) | PA 4 (GND) |



The maximum number of expansions and user terminals is 32.

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






7.1 Notes on the parameter of the controller relative to the CAN net configuration

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

Both for the remote or built-in user interface :

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





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

1. Press and release  button to select “CAN” voice.
2. Press and release  button: if the controller is visualizing the net parameters, the voice “Input Password” will be visualized: in this case see the following 3. and 4. (in opposite case see directly point 5.).
3. Press and release  button: the cursor blinking.
4. Press and release  button to set “ -19”.
5. Press and release  button: the first voice available will be visualized.


To select a parameter:

1. Press and release  button

To modify a parameter:

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

For a quick closing procedure :

1. Press and release repeatedly  button

The main parameters of the CAN net are the following :

- “My Node” (represents the data sender ID)
- “Network Node” (represents the receiver ID)
- Baud rate (represent the data transmissions speed; initially it can be useful to let this value set at “Auto”; in this way the device will try to connect a few time with different speed)
- Master (represents network operation) when instrument is set as master it checks device network to find Devices presence. A controller with I/O expansions needs to have MASTER = TRUE.

Predefined value :

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

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

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

Example:

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

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

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

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

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