C-PRO NANO

PROGRAMMABLE CONTROLLERS

HARDWARE MANUAL

CODICE 114CPRNHWE03

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.

Contents

1 Introduction

The **C-PRO NANO** 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 NANO is manufactured as a panel installation version.

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.

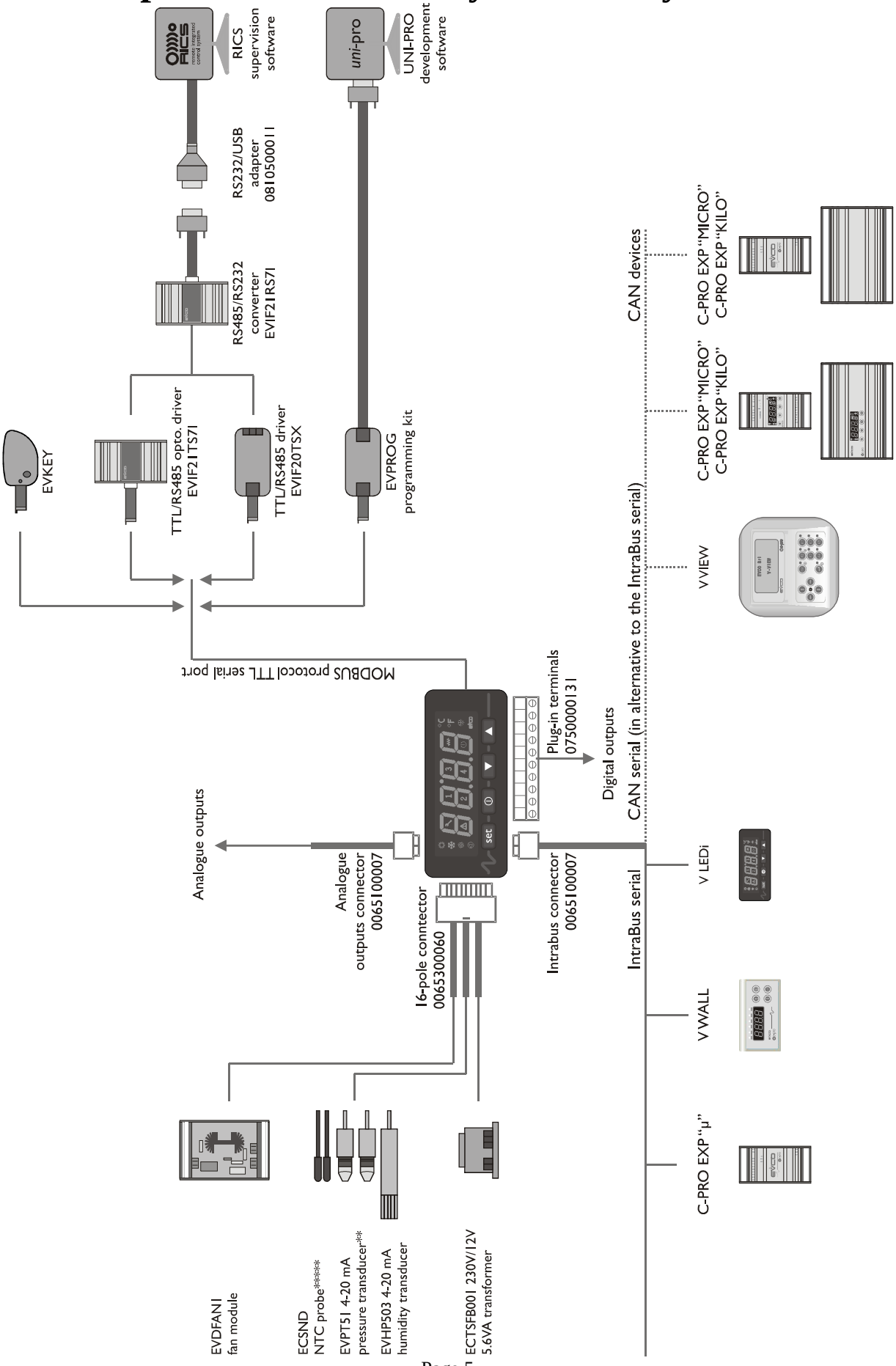
The C-PRO NANO is also equipped with digital inputs for monitoring unit functions; and it is also possible to connect until two I/O expansion units (IntraBus version) or the expansions of the C-PRO EXP-MICRO, C-PRO EXP-KILO, C-PRO EXP-MEGA, C-PRO EXP-GIGA families to increase the I/O (CAN version).

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 four red-coloured digits (plus decimal points) and 16 icons of various colours; the keypad has 4 keys.

C-PRO NANO

2 Component and auxiliary network systems



3 Technical characteristics

3.1 Connections

Power supply:
The C-PRO NANO 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 NANO 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 NANO 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 NANO 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 NANO 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 NANO has 2 voltage or current (optional) analogue outputs. The maximum length of these analogue outputs connecting cables is 3 m.

Remote terminal connections (IntraBus):
The connection between the C-PRO NANO and the terminal is made using a 3 way cable. The maximum length of the 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 NANO 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 NANO and the remote user interface is made using a 2 way cable (better if it is two weaved 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 an other CAN controller) :
The connection between C-PRO NANO 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 NANO 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

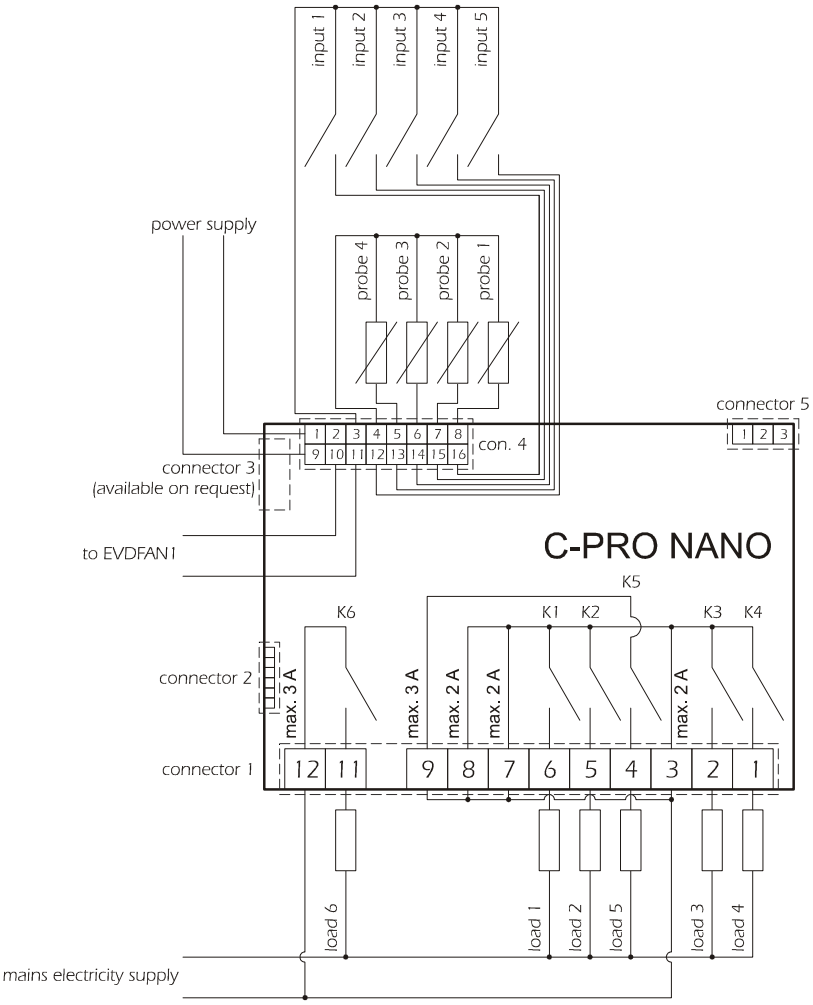
In order to avoid safety problems, it is good practice to comply with the following instructions:
- Avoid premises with relative humidity >90%
- Avoid water
- Avoid corrosive environments
- Avoid explosive environments

Special recommendations

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

3.2 The C-PRO NANO wiring layout

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



C-PRO NANO wiring diagram

Connector 1: Output relay connection		
Conn.	**Abbrev.**	**Description**
C1-1	DO4	Relay No.4, breaker normally open
C1-2	DO3	Relay No.3, breaker normally open
C1-3	COMMON1	Relays No.s 1,2,3,4 - common
C1-4	DO5	Relay No.5, breaker normally open
C1-5	DO2	Relay No.2, breaker normally open
C1-6	DO1	Relay No.1, breaker normally open
C1-7	COMMON1	Relays No.s 1,2,3,4 - common
C1-8	COMMON1	Relays No.s 1,2,3,4 - common
C1-9	COMMON DO5	Relay No.5 - common
C1-10		Not used
C1-11	DO6	Relay No.6, breaker normally open

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		
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

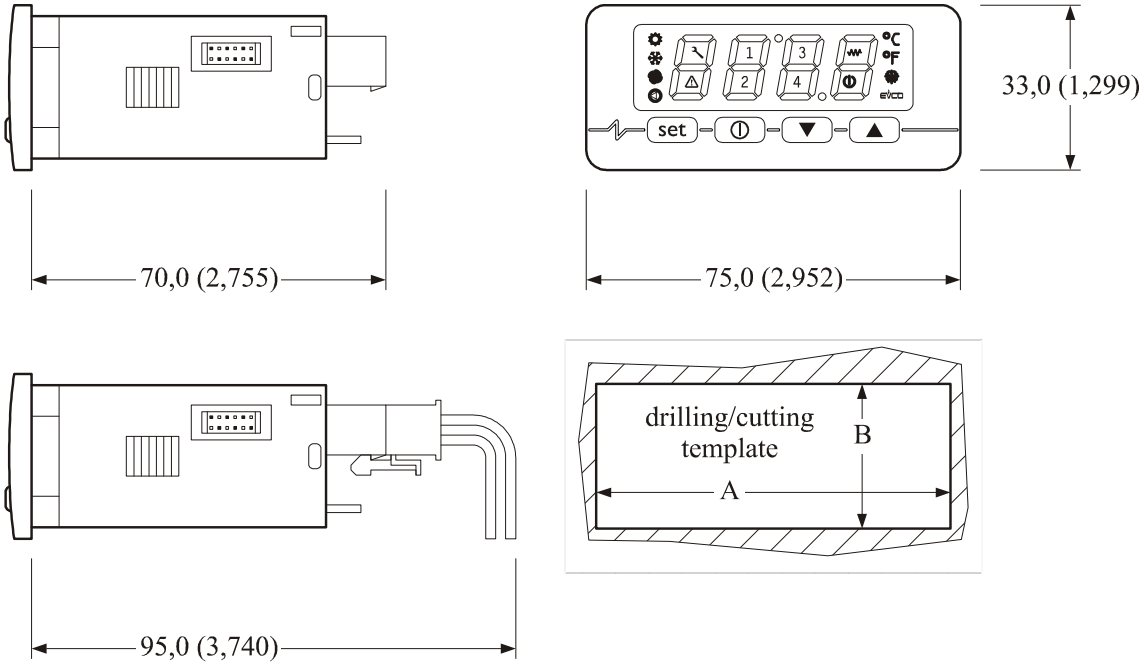
Connector 4: Connector for low voltage signals		
Conn.	**Abbrev.**	**Description**
C4-1	12 V AC (Power)	Device power supply (12 V AC/DC)
C4-2	5V	Ratiometric power supply
C4-3	GND	Common analogue and digital inputs
C4-4	GND	Common analogue and digital inputs
C4-5	AI4	Analogue input No. 4 (for NTC probes 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 unitb(IntraBus)		
Conn.	**Abbrev.**	**Description**
C5-1	12 V DC	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	CAN+	Connector for the serial CAN+ connection
C5-2	GND	Ground reference connection
C5-3	CAN-	Connector for the serial CAN- Connection

3.3 C-PRO NANO dimensions/installation

The mechanical dimensions for the C-PRO NANO are given below; the measurements are in mm (in).
For fitting, use the snap-on brackets provided.



Dimension	Minimum	Typical	Maximum
A	71.0 (2.795)	71.0 (2.795)	71.8 (2.826)
B	29.0 (1.141)	29.0 (1.141)	29.8 (1.173)

Recommendations for installation:

- the panel thickness must not exceed 8 mm (0.314 in)
- 95.0 (3.740) is the maximum depth with casing 0065300060 correctly inserted (the connector is not supplied with the device)
- 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.

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	Panel mounted
Action type	1C
Pollution	Normal
Software class	A
Insulated parts electrical stress period	Long
Front panel protection classification	IP65

3.5 Technical characteristics

Low voltage signal connections	16 way Mini-Fit
Power connector	12 way Inarca Edge connector
	Cable diameter > 0.75 mm^2; as altenative, 12 way Sauro Edge connector
Connection for connecting the EVCO powered serial port to the remote keypad and/or remote I/O expansion card	JST 3 way P2.5
Connection for parameter key, TTL serial output for RS485 module, Flash programming interface	6 way AMP micro-match
Connection for D/A output	JST 3 way P2.5

16 WAY MINI-FIT CONNECTOR SPECIFICATIONS		
SUPPLIER	CONNECTOR CODE	CONTACT CODE
Please note: *use the special tool for crimping*		
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 ***Use all common connectors.***	2 (1) A for DO1, DO2, DO3 and DO4 3 (1) A for DO5 and DO6
	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 KΩ ±1% @25°C)
	NTC measurement range	-40°C ÷ 100°C
	NTC measurement accuracy	±1°C
	NTC measurement sensitivity	0.1°C
Analogue inputs for NTC probes or Ratiometric pressure Transducers	**Number**	**2**
	Type	NTC (10 KΩ ±1% @25°C)
	NTC measurement range	-40°C ÷ 100°C
	NTC measurement accuracy	±1°C
	NTC measurement sensitivity	0.1°C
	Type	Current
	Current measurement range	0/4 ÷ 20 mA
	Current measurement accuracy	±0.08 mA
	Current measurement sensitivity	0.01 mA
	Input resistance Type Voltage measurement range Voltage measurements accuracy Voltage measurement sensitivity	200 Ohm Ratiometric 0 ÷ 5V ±50 mV 10 mV

Fan analogue output	**Number**	**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
	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	
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	sconn. JST 3 way P2.5
Analogue output Voltage + Current, Voltage + Voltage or Current + Current	**Number**	**1+1**
	Connector	sconn. JST 3 way P2.5
	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
	Note: *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 120Ω).*	

4 The C-PRO NANO user interface

The display has four red-coloured digits (plus decimal points) and 16 icons of various colours; the keypad has 4 keys.

C-PRO NANO

Display	Number of digits	4
	Colour	**Red**

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

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) Compressor icon (refrigeration display)	Colour	**Green**
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
OnOff/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

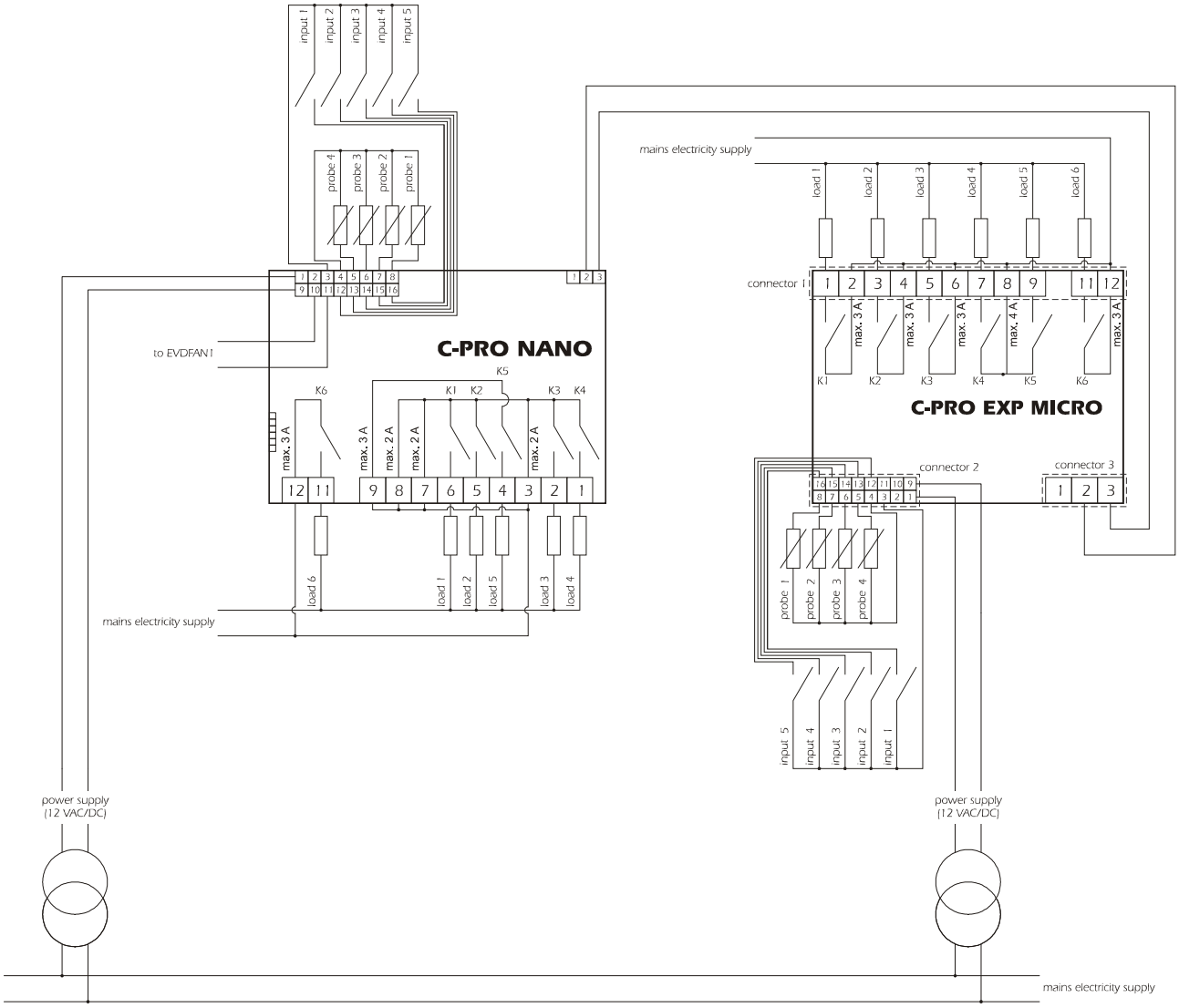
5 C-PRO EXP MICRO I/O expansion units

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 with 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 NANO 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

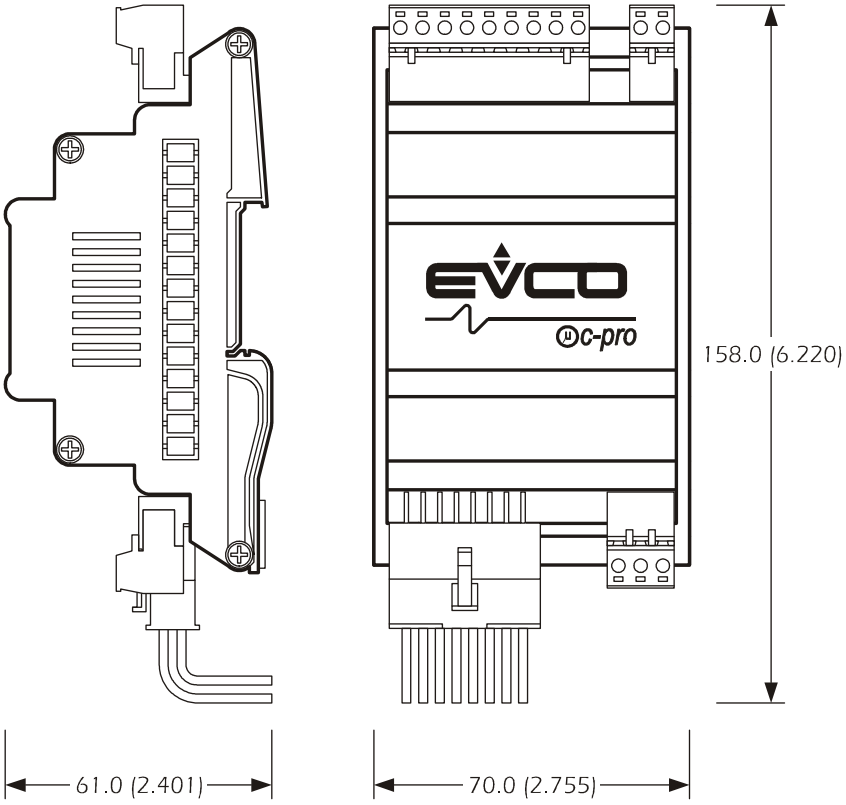
Connector 2: Connector for low voltage signals		
Conn.	**Abbrev.**	**Description**
C2-1	12 V AC (Power)	Device power supply (12 V AC/DC)
C2-2	Not connected	Not connected
C2-3	GND	Common analogue and digital inputs
C2-4	GND	Common analogue and digital inputs
C2-5	AI4	Analogue input No. 4 (for NTC probes or for 0/4-20 mA or 0-5V transducers)
C2-6	AI3	Analogue input No. 3 (for NTC probes or for 0/4-20 mA or 0-5V 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 (IntraBus)		
Conn.	**Abbrev.**	**Description**
C3-1	VDC	Power supply
C3-2	GND	Common
C3-3	DATA	Powered serial connection

Connector 3: Connector to the controller (CAN)		
Conn.	**Abbrev.**	**Description**
C3-1	+	Connector for the serial CAN + connection
C3-2	GND	Ground reference connector
C3-3	-	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 NANO controllers.

V LEDi

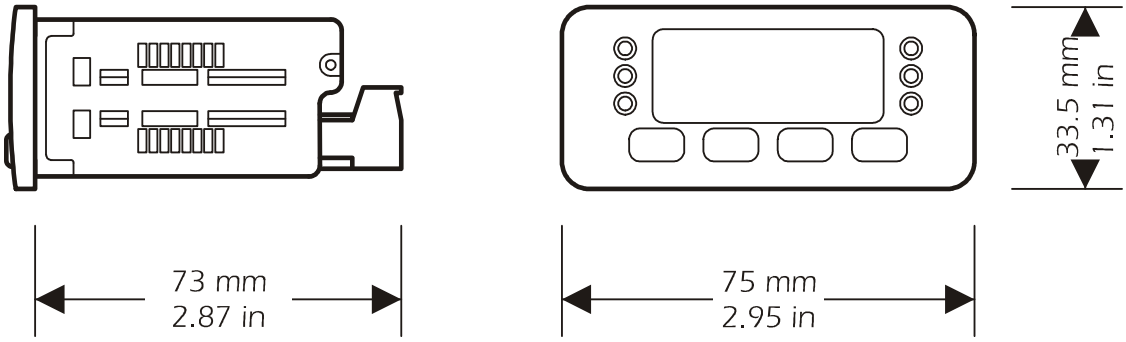
Panel-mounted version

V WALL

Wall-mounted version

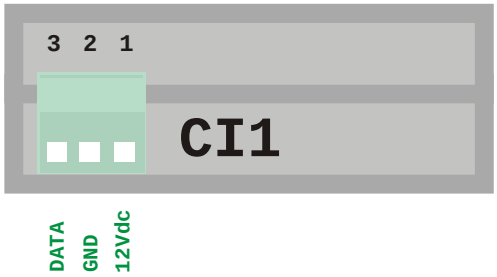
6.1.1 V LEDi dimensions and installation

For panel installation, use the snap-on brackets provided



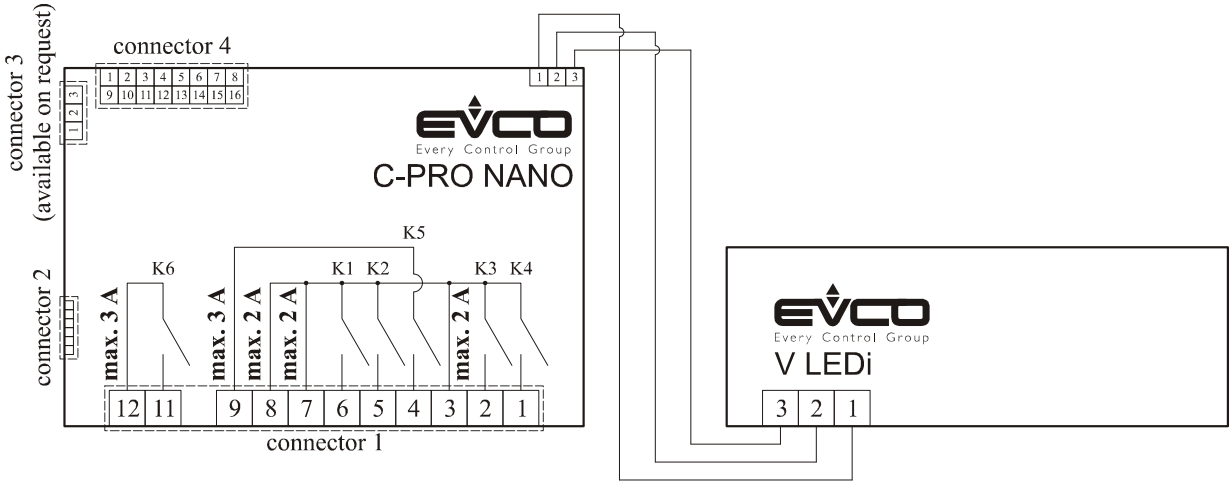
Local panel interface dimensions

Connections



Local panel interface connections

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 NANO 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.

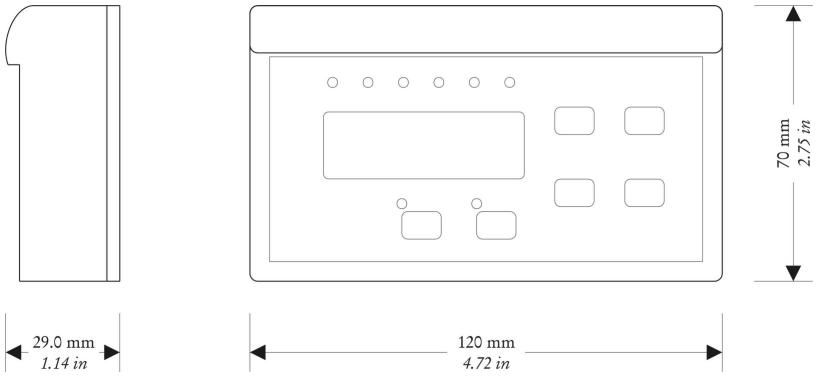
Display	Number of digits	4
	Colour	**Red**

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

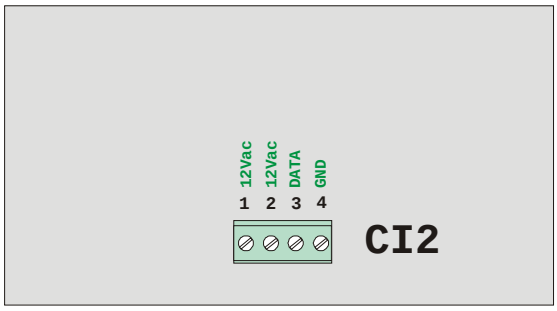
6.1.2 V WALL dimensions and installation

For wall installation, use appropriate rawplugs and screws.



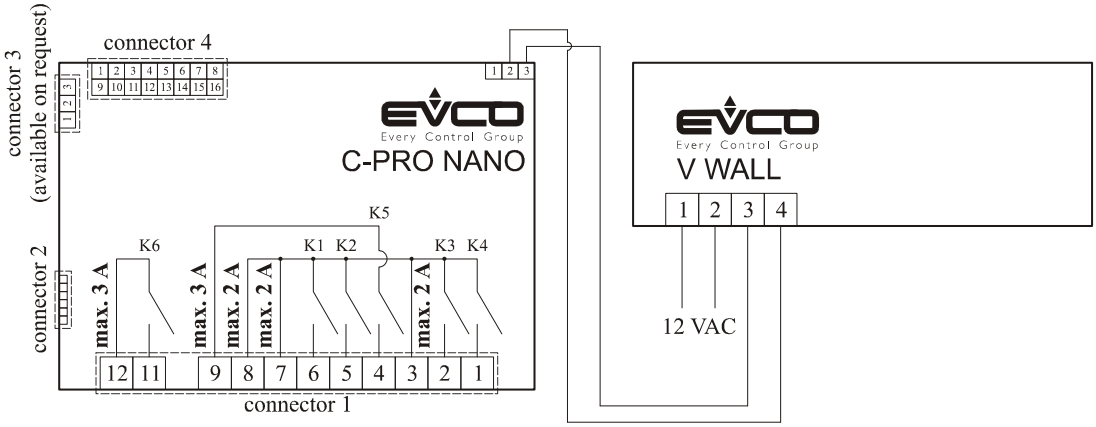
Wall-mounted version - dimensions

Connections



Wall-mounted version wiring diagram

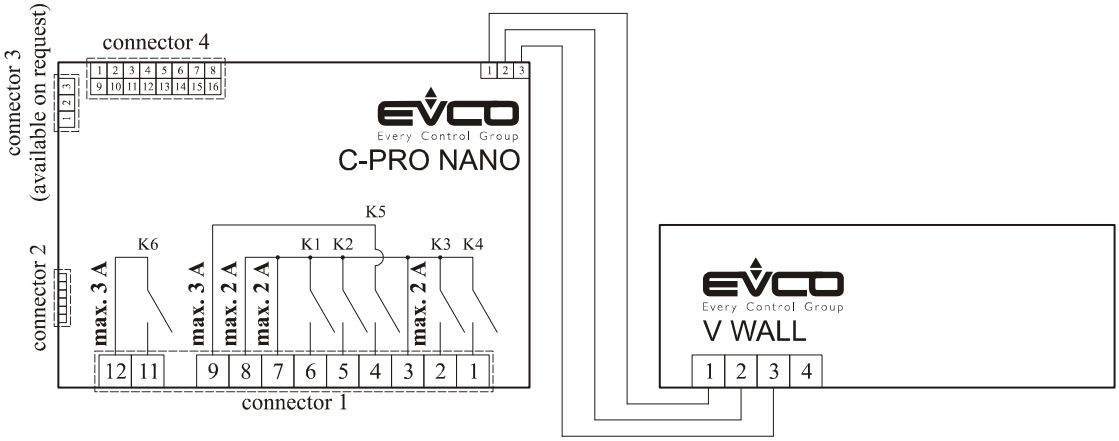
Connector CI2: Terminal connector powered by a separate transformer		
Conn.	**Abbrev.**	**Description**
CI2-1	12 V AC	Remote interface AC power supply
CI2-2	12 V AC	Remote interface AC power supply
CI2-3	DATA	EVCO powered serial connection
CI2-4	GND	Common



C-PRO NANO 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 NANO and V WALL is 30 m)

Make the C-PRO NANO – 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 NANO		
Conn.	**Abbrev.**	**Description**
CI2-1	12 V DC	Keypad DC power supply
CI2-2	GND	Common
CI2-3	DATA	EVCO powered serial connection
CI2-4	GND	Common



C-PRO NANO with V WALL wiring diagram (terminal powered by C-PRO NANO; 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 alfanumeric 4 x 20 characters LCD display) can be connected to the CAN port of the C-PRO NANO controller. On request a graphic 240 x 128 pixel LCD display (V-GRAPH) user interface is also available .

6.2.1 V-VIEW

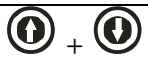
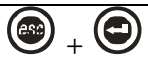
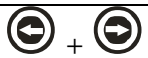
The visualized text on the LCD display, the LEDs and key functions of the user interface are realized with UNI-PRO software development system and use a “browser” technology to load the C-PRO MICRO pages and to refresh the visualized variable value. The user interface is directly interfaced with the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

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

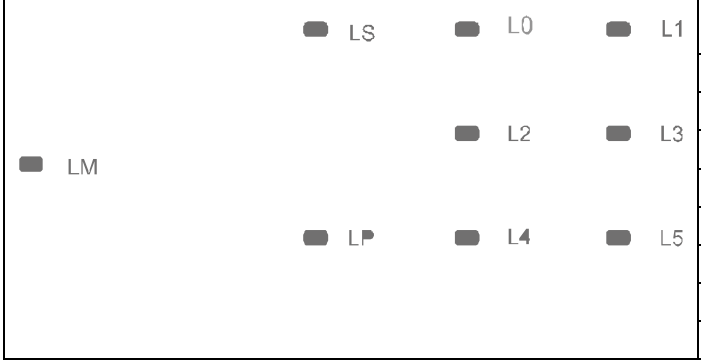
6.2.1.1 V-VIEW User Interface

V-VIEW

The following table summarizes the keyboard button meaning:

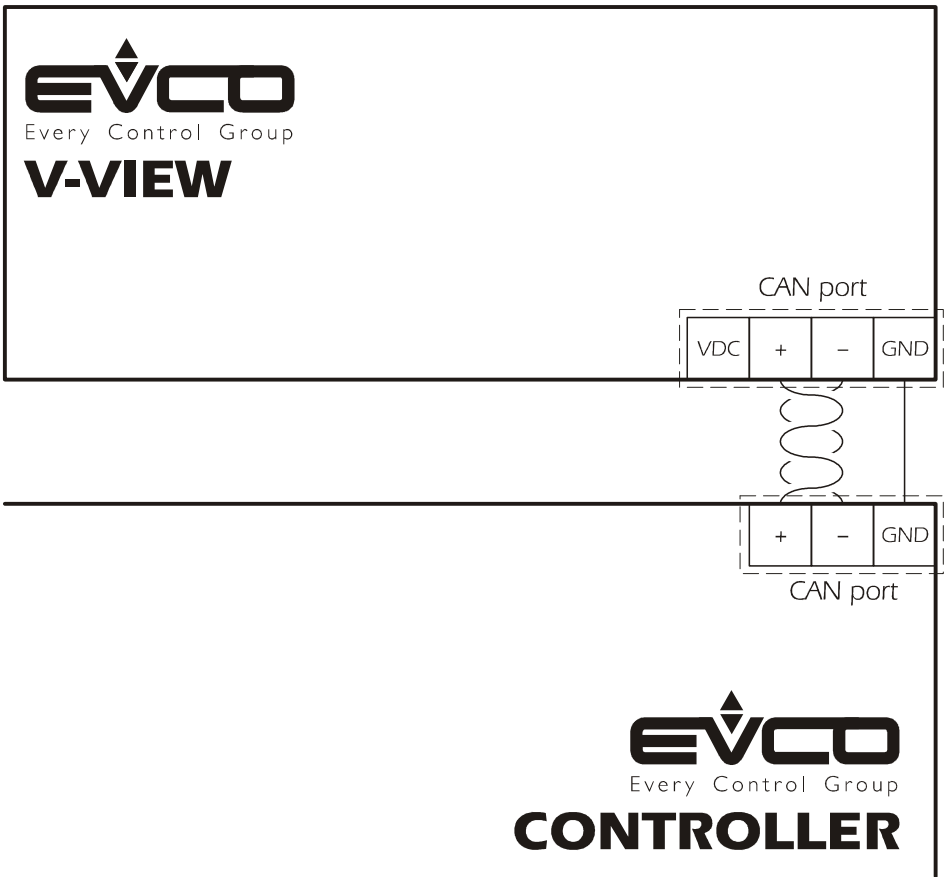
BUTTONS	MAIN FUNCTION	SECONDARY FUNCTION
	Predefined as UP	
	Predefined as DOWN	
	Predefined as LEFT	
	Predefined as RIGHT	
	Predefined as ESC	Stand-By command
	Predefined as ENTER	1° programming level command
	Programmable	Alarm reset / identification
	Programmable	
	Programmable	
	Programmable	
	Programmable	
	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 :



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**

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
	Note: baud rate can be selected by parameter *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 pairis used for feeding and common (ground)*	
Buzzer	Number	**1**
LCD Dispay	4 x 20 alfanumeric backlight	1
Keyboard	Buttons	12
	Led	9

6.3 EVDFAN1 cut-off speed regulator

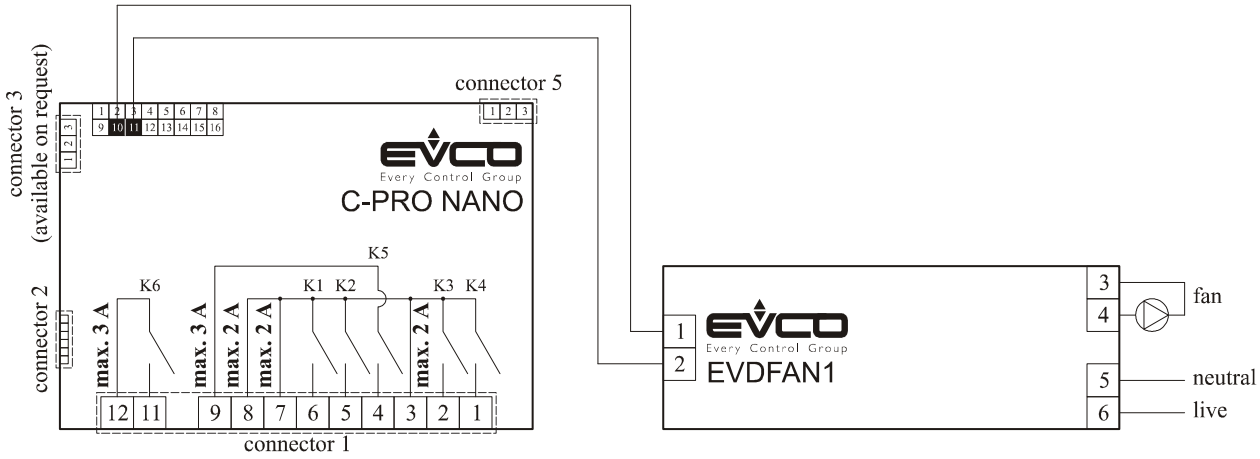
The EVDFAN1 is a cut-off speed regulator for controlling single-phase fans (fans with maximum current absorption equal to 5 A).
It is ideal for controlling the condensation/evaporation fans on a refrigeration control unit.

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 NANO 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 as that feeding the controller.
If the C-PRO NANO has a DC power supply, then it is not possible to control the fans using the EVDFAN1.

Example:
V AC = 230 V
I max = 5 A
VA (max) = 230*5 = 1150 VA
W (max) = 230*5*cosφ = 1150 Watts if cosφ=1

6.4 Accessories for supervision and monitoring

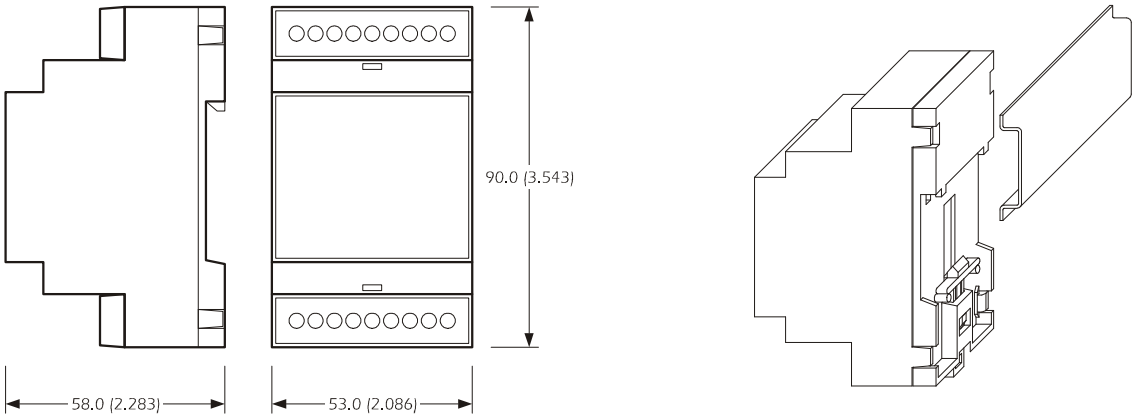
These modules allow the conversion of TTL signals to RS485 signals (with or without isolation) for supervision using the MODBUS protocol.
The modules connect to the special 6 way AMP micro-match connector on the controller; this connector is shared with the parameter programming key and with the controller flash memory programming tools.

6.4.1 Non-insulated TTL/RS485 interface

EVIF20TSX

6.4.2 Insulated TTL/RS485 interface

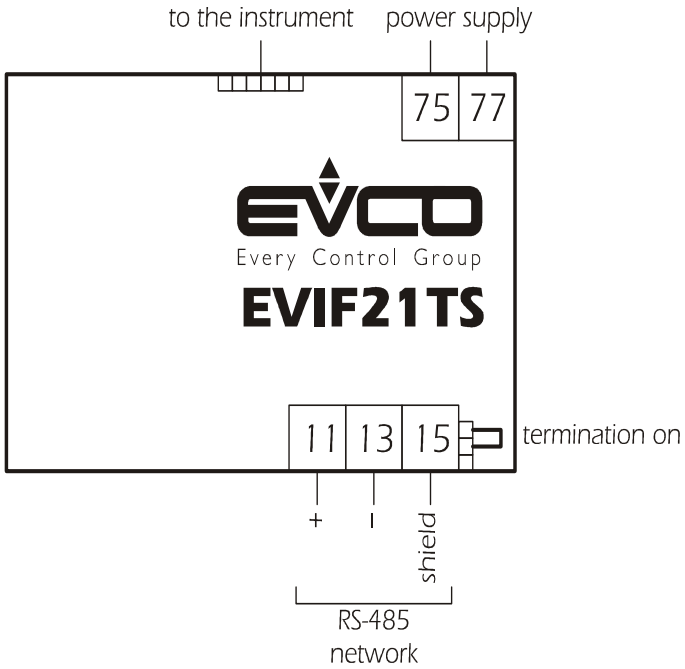
EVIF21TS7I dimensions/installation



EVIF21TS7I

Dimensions/Installation on DIN rail

EVIF21TS7I connections



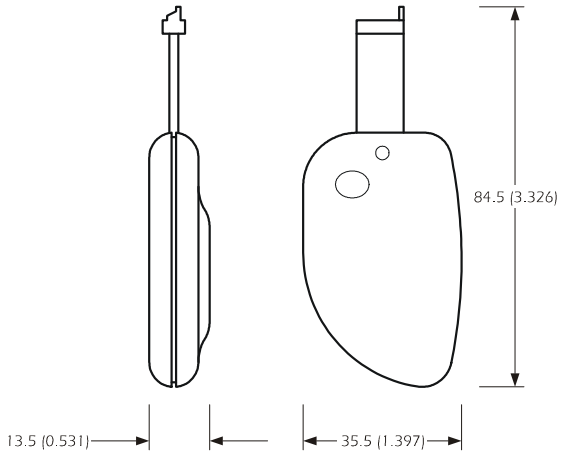
Insulated interface wiring diagram

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

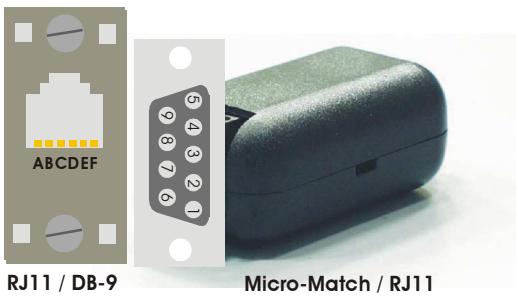
6.5.2 EVPROG programming kit

The EVPROG programming kit allows downloading programs into the flash memory of the C-PRO NANO 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:

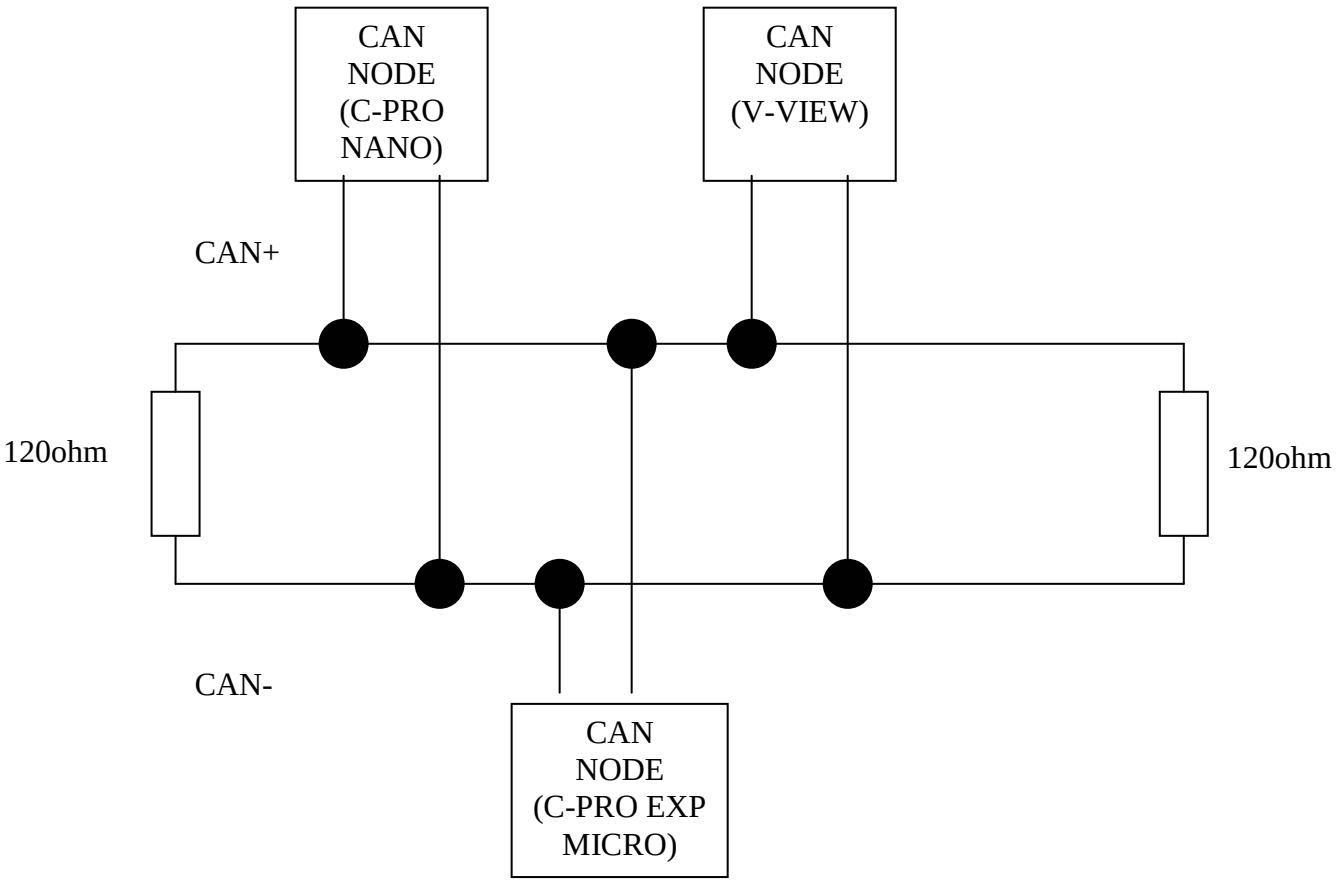
Connect the Pony Prog tray adapter to the computer serial port. Connect the EVIF20TRX interface to the controller AMP micro-match connecter. Connect one end of the ECCC506 telephone cable to the Pony Prog tray adapter, and the other end to the EVIF20TRX interface.



EVPROG

7 CAN Connection

C-PRO NANO 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 NANO	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.

C-PRO NANO hardware manual.
Version 1.03 January 2009.
CODE 114CPRNHWE03.
File 114CPRNHWE03.pdf.

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