GB OPERATING INSTRUCTIONS

Version 11/09

CE

C-Control PRO Mini-Station

Item no.: 19 87 77

Table of Contents

GB

1. Introduction

Dear Customer,

Thank you for purchasing this product.

This product meets the requirements of current statutory, European and national guidelines. To maintain this status and to ensure safe operation, you as the user must observe these operating instructions!

Please read the operating instructions completely and observe the safety and operating notices before using the product.

In case of any technical inquiries, contact or consult:

Germany: Phone: +49 9604 / 40 88 80
Fax.: +49 9604 / 40 88 48
E-mail: tkb@conrad.de
Mon. to Thur. 8.00am to 4.30pm
Fri. 8.00am to 2.00pm

2. Scope of Delivery

- C-Control PRO Mini-Station
- CD with software and operating instructions
- Cable sleeve

3. Intended Use

The "C-Control PRO Mini-Station" is a micro computer (µC) with peripheral devides in a dust and splash proof housing (IP66).

This product can be used to perform several control and regulation tasks; you need to create up the respective programmes for them.

At delivery, a small test programme is pre-installed on the "C-Control PRO Mini-Station" by default. This will activate a running light when the operational voltage is connected.

There are additional demo programmes on the included CD, which are to introduce you to programming.

When connecting external sensors and devices, observe the respective sections of these operating instructions.

Any use other than that described above is not permitted. Misuse may not only damage the device, but also leads to risks such as short circuiting, fire, electrical shocks. The "C-Control PRO Mini-Station" must not be changed or converted. The safety notes and the maximum permissible operational and ambient conditions stated in the chapter "Technical Information" must be observed at all times.

Read these operating instructions thoroughly and carefully, they contain a lot of important information for assembly, commissioning and operation.

4. Explanation of Symbols

An exclamation mark in a triangle indicates important instructions in this operating manual which must be observed.

The "hand" icon indicates special tips and notes on the operation of the device.

5. Safety Notices

The guarantee/warranty will be void if damage is incurred resulting from non-compliance with the operating instructions. We will not assume any responsibility for consequential damage!

Nor do we assume liability for damage to property or personal injury caused by improper use or the failure to observe the safety instructions! In such cases the guarantee/warranty will be void.

- For safety and licensing reasons (CE), it is not permitted to convert and/or modify this product!
- Do not use this product in hospitals or medical institutions. Do not use the product safety-relevant areas
- Ensure that all the electrical connections and connection cables between the device and any extension cables conform to the regulations and comply with the operating instructions.
- Never use the device immediately after bringing it from a cold to a warm room. The resulting condensation could destroy the device.
- In case of proper assembly, the housing is IP66-protected.

  The first "6" indicates complete protection against contact with parts under tension or inner moving parts and protection against penetration by dust. The second "6" means protection against splash water.
- When in doubt about how to connect the device correctly or if you have any questions not answered in these operating instructions regarding the operation, safety or connection of the device, please contact our technical service or a certified expert.
- If the product is used at schools, training facilities, do-it-yourself or hobby workshops, it has to be supervised by trained personnel.
- On industrial sites the accident prevention regulations of the association of the industrial workers' society for electrical equipment and utilities must be followed.
- Do not leave the packaging material lying around carelessly as it may be a danger to children.

6. Assembly

Attention!

The "C-Control PRO Mini-Station" consists of sensitive electronic components.

Improper use may destroy them. Electrostatic discharges, inducted peak voltages and different voltage potential are particularly dangerous.

Touch an electrically grounded object before working at the mini station, such as a metal computer housing.

Never touch any electronic components or conductors on the circuit board.

Before connecting or disconnecting any connection lines, always switch off the voltage supply of the "C-Control PRO Mini-Station" and any devices connected or to be connected to it.

The "C-Control PRO Mini-Station" is able to work independently once the control software is installed. Due to this, the installation site depends on its later purpose

However, we recommend that you choose a place that is easily accessibly to make wiring and updating the control software easier if this is required at a later point of time.

The electrical components of the "C-Control PRO Mini-Station" may grow hot during operation. Ensure that there is no heat build-up by providing sufficient air circulation around the device.

Do not install the housing inserted in isolating material or next to heat sources such as heating pipes, heaters or electrical products such as engines, etc.

Do not operate the "C-Control PRO Mini-Station" near any flammable objects, liquids or gasses or in explosive areas.

The product must also not be operated in or under water.

When drilling or tightening screws, ensure that no wires or lines are damaged.

During installation and connection (and later when opening the housing or copying the control software), ensure that no moisture, water, dust or dirt can get inside the housing. This will destroy the product!

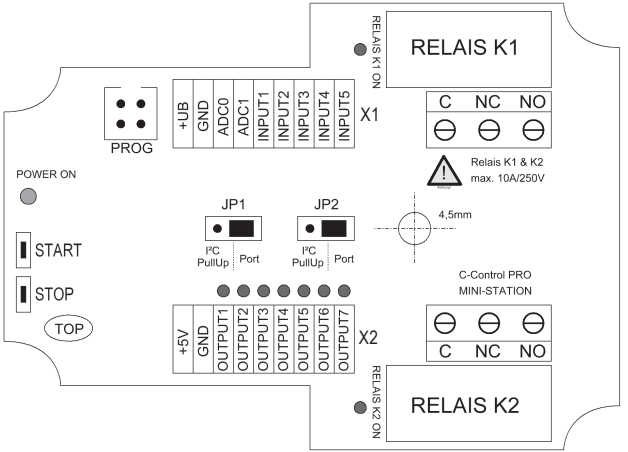
7. Control Elements, Connections

a) Cable Connections

Before you may electrically wire the "C-Control PRO Mini-Station", the four screws at the top of the housing must be loosened and the transparent lid must be removed.

To insert the wires in the terminal strip, press the small notched tappet for the respective clamp down with a small screwdriver: this will cause the clamp to open so that the wire can be inserted.

The wire thickness for terminal strips X1 and X2 should have a section of 0.2 to 0.5 mm².



b) Voltage / Current Supply Clamps (Clamps +UB" and "GND")

The "+UB" connection of the upper terminal strip and the adjacent "GND" connection serve for voltage / current supply of the "C-Control PRO Mini-Station".

The admissible supply voltage is between 9 and 16V (DC) Only use a stabilised supply voltage!

The max. current input depth is at about 200mA.

If the admissible values are exceeded, the "C-Control PRO Mini-Station" will be destroyed and any warranty/guarantee will be void!

c) "PROG" Programming Socket

The "C-Control PRO Mini-Station" is connected to a computer by a USB programming adapter, which is available as an accessory (Conrad Best.-Nr. 197339).

The programming socket with the name "PROG" is at the right, over the "START" button. The sockets are protected against polarity reversal; do not use any force when connecting them.

d) "STOP" and "START" Buttons

The "C-Control PRO Mini-Station" can be switched to different operational modes with buttons. They are on the left of the circuit board, when viewing the C-Control PRO Mini-Station from the top so that the load relays are on the right.

- **STOP** = C-Control PRO is in STOP mode; the programme is interrupted. "STOP" also switches the station into programming mode.
- **START** = If you want to start or restart your programme, use the "START" button. Also press the "START" button shortly to leave STOP mode.

e) Analogue Digital Converter ("ADC0" and "ADC1" Clamps)

The "C-Control PRO Mini-Station" has two analogue digital converters ("ADC")

A direct current (DC) of 0 to 5 V against GND (ground) can be measured at the AD converter connections. ADC resolution is at 10Bit.

f) Inputs ("INPUT1"....."INPUT5" Clamps)

The "C-Control PRO Mini-Station" has five digital inputs

The digital inputs of the "C-Control PRO Mini-Station" are designed so that a high level is recognised for a voltage area between 5 and 16Volt (DC). "Low" levels are recognised up to approx. 1V.

Observe that the input current rises with a rising voltage at the I/O connection (max. 5mA per input at 16V/DC).

In case of operation with rechargeable batteries, the voltage at the inputs should thus not be more than 5V/DC, because this causes the lowest current!

Inputs can be configured differently. For example, some inputs can also be used as counters or have IRQ-properties (refer to port table).

The included library is used to configure inputs as digital inputs in "MINI_INIT()". The user can, of course, change the library for his use.

The inputs already have integrated pull up resistors that can be activated by the software (refer to library). The resistance of the pull ups is between 20kOhm and 50kOhm.

g) Outputs ("OUTPUT1"....."OUTPUT7")

The "C-Control PRO Mini-Station" has seven outputs

The "C-Control PRO Mini-Station" outputs have several functions, similar to the inputs. They can, for example, also be configured as PWM and I²C BUS.

LEDs are used to indicate the current switching state. When the LED is "on", the output is set (+5Volt).

Each output can deliver current of no more than 10 mA in the "high" state. If more current is required, a transistor driver must be integrated behind it.

For 230V switching applications, galvanic isolation between the "Mini-Station" and consumer is required (e.g. optocouplers or coupler repays)!

h) Relays "K1" and "K2"

The two "K1" and "K2" relays can each be used for switching an external circuit. The maximum permissible switching current for each relay is at 10A (for 250V/AC) or 5A (at max. 30V/DC).

An adjacent LED indicates the switching state (LED lights up when the relay is energized). Depending on the intended use, the connection is to be used as "NC" ("normally closed" = opener) or "NO" ("normally open" = shutter), with connection "C" ("Common") being the common connection.

i) Measuring Operational Voltage

The "C-Control PRO Mini-Station" is able to measure the operational voltage connected to "+UB" and "GND" at pin PA.7 (ADC channel 7). The protective circuit is already present in the C-Control PRO Mini-Station

j) "JP1" and "JP2" Jumpers

"OUTPUT4" and d"OUTPUT5" can also be used as PC BUS.

If this is activated in the software, the "JP1" and "JP2" jumpers must be put to the left ("I²C pull up" position). This also activates the I²C-BUS-pull up resistors(4.7kOhm).

The SDA signal (data) available at the "OUTPUT4" clamp and the SCL signal (clock) at "OUTPUT5". Where no jumpers are inserted, neither the LEDs nor the pull up resistors will be active. The direct I/O pin of the micro controller + EMV protection will then be available.

k) +5V Output ("+5V" and "GND" Clamps)

The lower terminal strip "X2" +5V/DC and GND are lead through. These +5V/DC are limited to a current of no more than 30mA and may be used to supply a switch or button, etc.

I) Port Table

Inputs

	Port		PortBit	Name	Comment
ADC0	PA0	PortA.0	0	ADC0	ADC input
ADC1	PA1	PortA.1	1	ADC1	ADC input
INTERN	PA7	PortA.7	7	ADC7	Measuring operational voltage
INPUT1	PD3	PortD.3	27	INT1	Ext. IRQ1
INPUT2	PD6	PortD.6	30	ICP	Input capture pin for Pulse / period measurement
INPUT3	PB0	PortB.0	8	T0	Timer/Counter0 input
INPUT4	PB1	PortB.1	9	T1	Timer/Counter1 input
INPUT5	PB2	PortB.2	10	INT/AIN0	Ext. IRQ2

Outputs

	Port		PortBit	Name	Comment
OUTPUT1	PB3	PortB.3	11	OT0/AIN1	Output Timer0
OUTPUT2	PC3	PortC.3	19		
OUTPUT3	PC2	PortC.2	18		
OUTPUT4	PC1	PortC.1	17	SDA	USB interface
OUTPUT5	PC0	PortC.0	16	SCL	USB interface
OUTPUT6	PD5	PortD.5	29	OT1A	Output A Timer1
OUTPUT7	PD4	PortD.4	28	OT1B	Output B Timer1

m) Description of the Connection Clamps

"X1" Strip terminal

Inputs	Function	Voltage range
+UB	Supply voltage (+)	9 - 16V/DC, 200mA
GND	Supply voltage (-)	Ground
ADC0	PA.0 / analogue input / 1 wire	0 - 5V/DC
ADC1	PA.1 / analogue input / 1 wire	0 - 5V/DC
INPUT1	PD.3 / external interrupt1 / INT1	0 - 16V/DC
INPUT2	PD.6 / Input capture pin for pulse / period measurem.	0 - 16V/DC
INPUT3	PB.0 / Input Timer/Counter0 / T0	0 - 16V/DC
INPUT4	PB.1 / Input Timer/Counter1 / T1	0 - 16V/DC
INPUT5	PD.2 / external interrupt2 / INT2	0 - 16V/DC

"X2" Strip terminal

Outputs	Function	Technical Data
+5V	Output (+) e.g. for I/Os	Max. 30mA (limited)
GND	Output (-)	Ground
OUTPUT1	PB.3 / Output Timer0 / OT0	max. +5V / 10mA DC
OUTPUT2	PC.3	max. +5V / 10mA DC
OUTPUT3	PC.2	max. +5V / 10mA DC
OUTPUT4	PC.1 / I2C-Interface SDA / 1 Wire	max. +5V / 10mA DC
OUTPUT5	PC.0 / I2C-Interface SCL / 1 Wire	max. +5V / 10mA DC
OUTPUT6	PD.5 / Output A Timer1 / OT1A	max. +5V / 10mA DC
OUTPUT7	PD.4 / Output B Timer1 / OT1B	max. +5V / 10mA DC

The red LEDs at the outputs ("OUTPUT1" to "OUTPUT5") indicate the switching state of terminal strip X2. When the red LED is lit, the respective output has a high level (+5V).

"X3" Strip terminal

Outputs	Port	Technical Data
Relay K1 "Change-over contact"	PC.4	10A / 250V/AC or 5A / 30V/DC

"X4" Strip terminal

Outputs	Port	Technical Data
Relay K2 "Change-over contact"	PC.5	10A / 250V/AC or 5A / 30V/DC

8. Connection and Operation

Connect the two adjacent clamps "+UB" and "GND" of the "X1" terminal strip to the operating voltage.

The green LED "POWER ON" indicates that the "C-Control PRO Mini-Station" is supplied with voltage and in operation.

At delivery, a small test programme is pre-installed on the "C-Control PRO Mini-Station" by default.

This will activate a running light when the operational voltage is connected.

Caution:

Only perform any assembly work or wirings when the "C-Control PRO Mini-Station" is powered down. Otherwise, there is a danger of short-circuit or static discharge, which would destroy the "C-Control PRO Mini-Station and all connected devices!

Always ensure correct polarity when making connections! The "C-Control PRO Mini-Station" has no internal protection against polarity reversal! The product and any possibly connected devices will be destroyed in case of polarity reversal. Loss of warranty/guarantee!

Only a stabilised direct current between 9V/DC and 16V/DC may be used for power supply. Otherwise, the "C-Control PRO Mini-Station will be destroyed!

The "C-Control PRO Mini-Station" power input is at a maximum of approx. 200mA at an operational voltage of 12V/DC when all relays are switched on and I/O outputs are switched with a load of 10mA each.

9. The Software

There is the following content on the CD:

- **C-Control PRO IDE**

  Programming interface for C-Control PRO

  For updates and further examples, see: www.c-control.de

- **C-Control PRO Mini-Station Manual**

  Instructions for the mini station (you are currently reading them)

- **C-Control PRO manual**

  Instructions for the C-Control PRO Micro Controller

- **Mini-Station Circuit Plan**

  Graphic display of the circuit design

- **Mini-Station Datasheets**

  Datasheets of the applied components

  For more information, refer to www.conrad.com

- **Mini-Station Demos**

  Various example programs for the "C-Control PRO Mini-Station"

For installation, insert the CD in the corresponding drive of your computer.

Then start the installer ("C-ControlSetup.exe") in the CD root directory if it does not start automatically (e.g. because Windows Autostart is deactivated).

During software installation, the user must be logged in as administrator. This is not necessary during normal work with C-Control Pro.

Please observe that the directory for the demo programs is also deleted and newly written in case of re-installation.

Because of to this, always save your own programmes in another directory!

At the start, select the language for your installation.

Afterwards you can choose if the software is to be installed to the standard path or to your own target directory.

At the end of the installation process, you will be asked if the program is supposed to create a desktop icon.

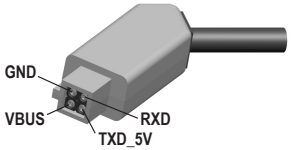
Once the installation process is completed, you can view the "ReadMe" file, a short introduction or start the "C-Control PRO" developer environment.

Please observe that only the standard demos are automatically installed!

The examples for the "C-Control PRO Mini-Station" are in a separate directly on the CD. Copy them to a directory of your choice if required.

10. Programming Cable (USB Programmer)

A data cable and software are available as accessories to connect the "C-Control PRO Mini-Station" to a computer (Conrad order number 197339).



For installing the data cable software, insert its CD into the respective drive of your computer and start the installation program (Voltcraft_USB_Programmer.exe).

Do not connect the programmer cable to the USB port on your PC until the installation is completed.

After the installation is successfully completed, a new (virtual) COM port can be seen in the device manager.

Its name (e.g. COM4) can now be selected in the "C-Control PRO" software (Options/DIE/Interfaces) to establish communication with the "C-Control PRO".

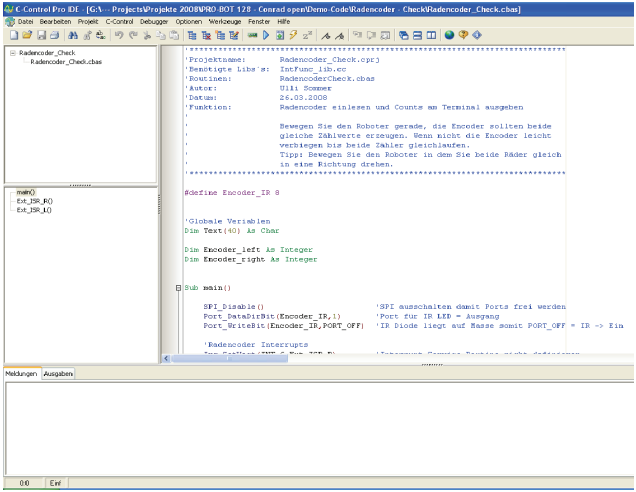
For further information about the IDE of the C-Control PRO, refer to the manual (see CD).

11. Commissioning and testing

After you have installed the software and connected the "C-Control Mini-Station" to the operational voltage, you can start trying out the demo programs.

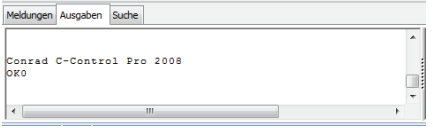
The following steps indicate the usual procedure for handling the software ("IDE") and "C-Control Mini-Station".

First copy the contents of the CD into a new directory on your hard disk. Then start the "C-Control PRO" software.



At the first start, you will have to make some adjustments. Set the programming interface for the "C-Control PRO" (COM-Port); can be found under the "Options" menu under "IDE". For "Interfaces", select the COM port that was assigned to the programming adapter by Windows.

Now press the "STOP" button at the "C-Control PRO Mini-Station". Now the "C-Control PRO" should appear in the output window.



Once this is the case, you can open a program. To do so, choose the menu item "File" and then "Open".

Select the directory to which you copied all data and load a program under "Demos", e.g. "Clock_I.cprj". The program code appears in the editor.

Compile the code with the "F9" button (or by pressing the small blue arrow to the right in the menu line).

Then you can transfer the program to the "C-Control PRO Mini-Station" and start it with the small lightning bolt or the "F10" button.

When this was performed successfully, the "C-Control PRO Mini-Station" must appear in the output window with the set time (counting seconds).

Alternatively, you may start the programme by pressing the "START" button shortly.

When starting with the "START" button, however, no output is made in the output window!

Therefore, also start the program with "F10" or via the lightning icon for debug tests.

Attention!

When the "C-Control PRO Mini-Station" is newly switched on (or when the operational voltage is switched on), this acts as a reset. In this case, all programs in the "C-Control PRO Mini-Station" start automatically!

This must be observed when evaluating tools or machines, because they must not automatically start up again after a power outage (observe applicable regulations!).

Ensure via software and where required via external hardware that a switch or button must be pressed before the tool or machine is activated.

12. C-Control PRO Mini-Station Library

To make programming the "C-Control PRO Mini-Station" easier, a library was created to address the hardware through functions created specifically for this. Thus, no long commands must be entered to switch a relay. It can be done with RELAIS_K1_ON() or RELAIS_K1_OFF().

The following sections explain the syntax and use of the library. Of course you can expand this for own applications and functions. New and changed functions can be found on the C-Control homepage under www.c-control.de.

MINI_INIT()

Initialises the C-Control PRO Mini-Station hardware. This function must always be called up first.

Example:

```
Sub main()
        MINI_INIT()
        … main program …
End sub
```

SYSTEM_CNT()

Internal interrupt counter, running on a time base of 10ms. This also includes a sub routine for the system clock.

OUTPUT1_ON() to OUTPUT7_ON()

This function switches on outputs 1 to 7. The red LED of the respective output shows if the output is switched on. When the output is switched on, the red LED is lit.

OUTPUT1_ON() Switches on output 1, +5V/DC present

OUTPUT1_OFF() to OUTPUT7_OFF()

This function switches off outputs 1 to 7. When the output is set to OFF, the red LED goes out.

OUTPUT1_OFF() Switches off output 1, 0V/DC

RELAY_K1_ON(), RELAIS_K2_ON()

Switches on relays K1 or K2. The switching state is indicated by the status LED at the respective relay (when the relay is activated, the respective red LED lights up).

RELAY_K1_OFF(), RELAIS_K2_OFF()

Switches off relays K1 or K2. The switching state is indicated by the status LED at the respective relay (when the relay is deactivated, the respective red LED is not lit).

BYTE_OUT(Val as Byte)

Because the "C-Control PRO Mini-Station" does not have a whole byte port (8Bit on a µC port), the BYTE_OUT command was programmed. This command switches the "OUTPUT1" to "OUTPUT7" outputs in binary form. Values from 0 to 127 are permissible.

When value 3 is set, the LEDs at "OUTPUT1" and "OUTPUT2" are lit; therefore, "OUTPUT1" and "OUTPUT2" have a high level (+5V/DC).

Observe the port table when using an output for another purpose, such as a PWM output.

INPUT_x(Pullup as Byte) As Byte

This function (x means the respective input 1....5) reads the digital inputs of the "C-Control PRO Mini-Station". The returned value is of the byte type.

Values 0 or 1 in the bracket can be used to activate or deactivate the internal pull-up resistor of the "C-Control PRO" controller.

Example:

INPUT_1 (0) As Byte = Pull-up for input 1 deactivated

INPUT_1 (1) As Byte = Pull-up for input 1 activated

READ_ADC0() and READ_ADC1() As Word

This function reads the "C-Control PRO Mini-Station" ADC.

The returned value is of the word type. The measured range is between 0V/DC and 5V/DC, which leads to a value range of 0 to 1023 for ADC_VREF_VCC. Resolution thus is 4.88mV per ADC converter step.

READ_UB() As Single

READ_UB() reads the operating voltage of the "C-Control PRO Mini-Station". The returned value is of the single type.

For reasons of component tolerance, the measured values must be adjusted by the software.

Volt = Volt * 3.75

The factor of "3.75" results from voltage divider ratio + corrective factor

DELAY_MS(time As Integer)

DELAY_MS(time As Integer) is a time loop (inaccurate as compared to AbsDelay), but it has the great advantage of not completely stopping the interpreter.

The time state is given in milliseconds.

Example:

DELAY_MS(1000) is about one second

READ_DS18S20(OneWirePin as Byte) as Single

This function reads a temperature sensor ("Dallas 1Wire" type, e.g. Conrad order no. 198284). The returned value is of the single type and corresponds to the temperature in degrees Celsius.

The sensor must be connected with on of the "ADC0" or "ADC1" inputs or the ports of the PC bus by the data line.

Please note:

When the OneWire sensor is connected to the PC bus pins, the PC bus cannot be used.

OneWirePin = PortBit, see port table

NEWLINE()

The serial interface is used for output of a "Carriage Return" and "Line Feed".

PRINT(ByRef serial_text As Char)

This command is used for the output of an ASCII-character chain by the serial interface. This must first be transferred to the function!

Example:

```
Dim Txt(20) As Char
Txt = "Hello World"
PRINT(txt)
```

PRINTLN(ByRef serial_text As Char)

This command has the same function as PRINT, except that CR+LF is sent at the end of the string ("CR" = Carriage Return, "LF" = Linefeed).

13. Troubleshooting

The POWER ON LED does not light up, C-Control Mini-Station does not work.

- Check the power supply for the "C-Control PRO Mini-Station"
- Is the connection cable okay?
- Cable isolation may also be caught in the clamp so that the conductor has no contact.
- There may be short circuits that happened during wiring. Is any external wiring you made okay?

The Voltcraft USB Programmer has a question or exclamation mark in the device manager.

- Probably, the programmer was plugged in before the drivers were installed and was not recognized properly.

  Remove the entry from the device manager while the USB programmer is plugged in.

  Then disconnect the programmer from the USB port.

  Insert the respective drivers CD and re-start the installation programme. Follow the instructions on the screen.

The icons for hardware version, transfer program and start program are locked in the software.

- No COM port was selected for the "USB programmer" yet in the software.

  Select it under Options\IDE\interfaces. The COM port number is automatically assigned by Windows; select the right COM port.

  When you are not sure which COM port is used by the "USB programmer", look it up in the windows device manager. When in doubt, try out the COM ports in succession.

The programme cannot be transferred from IDE to the "C-Control PRO Mini-Station"

- Ensure that the "C-Control PRO Mini-Station" is in BOOT mode and connected to sufficient power supply. Proceed as follows:

  Press the "STOP" button at the "C-Control PRO Mini-Station"

  Now the "C-Control PRO" should appear in the output window.

  Now the programme can be transferred to the "C-Control PRO" using the "transfer programme" symbol (green arrow upwards) or the SHIFT+F9 keys.

Caution:

To perform these steps, the Voltcraft USB programmer must first be installed properly!

The LEDs at the "OUTPUT4" and "OUTPUT5" outputs do not light up when the port has a HIGH signal.

- The "JP1" and "JP2" jumpers are probably set wrongly or not at all.
- The jumpers must be set in the direction of the relays in normal operation (outputs are used as output and not for I2C).

EMV impulses, electrostatic discharge = ESD, surge impulse or conductive fail-safety; the device no longer reacts or has an undefined state.

- Reset it with the "STOP" button..
- Disconnect the device from the power supply and reconnect it.

14. Maintenance and Care

The product is maintenance-free.

To clean the outside of the product, a dry, soft and clean cloth is sufficient.

When you need to open the housing (e.g. for programming or connecting more components), first switch off the operational voltage of the "C-Control PRO Mini-Station" and all connected devices. Then clean the outside of the housing before opening it.

Never use any aggressive cleaning agents or chemical solutions, because these will damage the surface of the housing (e.g. discolouring).

15. Disposal

At the end of its service life, dispose of the product according to the relevant statutory regulations.

16. Technical Data

Supply voltage:	9 -16 V/DC, stabilised
Current consumption:	Max. approx. 200mA
Power loss at 12V/DC:	approx. 1.8 W
Relay switching output:	Max. 10A/250V/AC or 5A/30V/DC
ADC reference voltage:	5V
ADC Resolution:	10Bit (0 - 1023)
Potential division of the digital port:	No
Input voltage of the digital port:	0-1V/DC = Low, 3-16V/DC = High
Output voltage of the digital port:	5V/DC +/-20%
Output current of the digital port:	10mA (max. sum 150mA)
PC bus, Pull-up resistances:	4.7 kOhm (internal)
Temperature range when in operation:	0°C to +40°C
Dimensions (L x W x H)	95 x 65 x 60 mm, without screws
Weight:	160g (without screws)
Mounting type:	Exposed installation
Distance between the mounting holes:	79 x 50mm
Type of protection:	IP66
Clamps:	0.2 to 0.5mm²

GB Legal Notice

03_1109_01