KaControl for Venkon AC/EC

▸**Installation and Operating Manual**

Keep these instructions in a safe place for future use!

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Explanation of symbols:

⚠️ **Caution! Danger!**

Non-compliance with this information can lead to serious personal injuries or damage to property.

⚡ **Danger from electrocution**

Non-compliance with this information can lead to serious personal injuries or damage to property by electrocution.

Carefully read these instructions in full prior to any assembly and installation work!

Anyone involved with the installation, commissioning and use of this product is obliged to pass these instructions on to tradespeople who are involved at the same time or subsequently, as well as to end users or operators. Retain these instructions until final decommissioning!

Content or design-related changes may be made without any prior notice!

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1. Intended Use

Kampmann KaControllers and Venkons are built in line with the state of the art and recognised safety regulations. Nevertheless, their use can result in danger to people or damage to the units or other material assets if they are not appropriately installed and operated or correctly and properly used.

Uses and applications
Only use the KaController as a room control unit in conjunction with Kampmann systems.

Only use KaControllers
- indoors (in residential and commercial properties, showrooms etc.)
  Never use KaControllers
- outdoors,
- in damp or humid areas, like swimming pools, wet areas,
- in rooms with a risk of explosion,
- in rooms with a high dust content
- in rooms with an aggressive atmosphere
Venkons are solely intended for use indoors (e.g. residential and commercial properties, showrooms etc.). They are not suitable for use in humid environments, such as swimming pools or outdoors. Protect the products from any moisture during installation. Check the intended use with the manufacturer in case of any doubt. Any use other than the use specified above is deemed not to be correct and proper.
The operator of the unit is solely responsible for any damage arising as a result of this. Intended use is deemed to include observing the installation instructions described in these instructions.

Specialist knowledge
The installation of this product requires specialist knowledge of heating, cooling, ventilation and electrical engineering. This knowledge, generally learned in vocational training in one of the fields mentioned above, is not described separately. Damage caused by improper installation is the responsibility of the operator.
The installer of these units should have adequate knowledge of the following, gained from specialist vocational training:
- Safety and accident prevention regulations
- Guidelines and recognised technical regulations e.g. VDE regulations, DIN and EN standards.

Purpose and scope of the manual
This manual contains information on the operation of the KaController. The information contained in this manual can be altered without prior notification.

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2. Important Information/Safety Information

Only allow a qualified electrician to perform installation, assembly and maintenance work on electrical units in compliance with VDE guidelines.

Wiring should comply with the applicable VDE regulations and provisions laid down by the regional electricity providers. Non-compliance with the regulations and operating instructions can result in the units malfunctioning with consequential damage and danger to people. There is a danger of fatal injury caused by wires being swapped due to incorrect wiring! Disconnect all parts of the system from the mains power supply and prevent them from being reconnected before starting any connection and maintenance work! Please read this manual in full to ensure correct and proper installation and the correct operation of the KaController and Venkon units.

Please note the following safety-related information:
Disconnect all parts of the system that are being worked on.
- Ensure that the system cannot be accidentally re-connected!
- Before commencing installation/maintenance work, wait until the fan has come to a standstill after the unit has been switched off.
- Caution! Pipes, casings and fittings can become very hot or very cold depending on the operating mode!
- Qualified personnel must have undergone training to provide them with adequate knowledge of the following:
  - Safety and accident prevention regulations
  - 7Guidelines and recognised technical regulations, such as VDE regulations
  - DIN and EN standards
  - Accident prevention regulations VBG, VBG4, VBG9a
  - DIN VDE 0100, DIN VDE 0105
  - EN 60730 (Part 1)
  - Provisions laid down by the local energy supplier

Protect the products from any moisture during installation. Check the intended use with the manufacturer in case of any doubt. Any use other than the use specified above is deemed not to be correct and proper. The operator of the unit is solely responsible for any damage arising as a result of this. Intended use is deemed to include observing the installation instructions described in this manual.

Modifications to
Never undertake any modifications or upgrades on the KaController or Venkon without discussing them with the manufacturer as they can impair the safety and operation of the unit.

Do not carry out any measures on the unit not described in this manual. Ensure that all on-site systems and cabling are suitable for connection to the intended system!

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3. Operation of the KaController

The KaController is capable of controlling a wide range of Kampmann systems. KaControllers are equipped with state of the art technology and offer users the option of adapting the air conditioning of buildings to individual needs.

Up to two switch-on and switch-off times can be configured for every day of the week so that users can set demand-led temperature control.

Product features:

- integrated temperature sensor
- large LCD multifunctional display
- LED background lighting switches automatically
- large seven-segment display for the visualisation of room setpoint temperature
- real-time clock with integrated timer programs
- 2 switch-on and 2 switch-off times per day
- alarm display
- individually alterable basic display
- press/turn button with endless turn/lock function
- one-touch operation of all functions possible
- connection of Kampmann system components using bus connection
- password-protected service level
- language-independent display, internationally usable

1.48 Venkon AC/EC

Ka*Control* for Venkon AC/EC

KaController with
functional keys
Type 3210002
Type 3210004

KaController without
functional keys
(single-button operation)
type 3210001
type 3210003
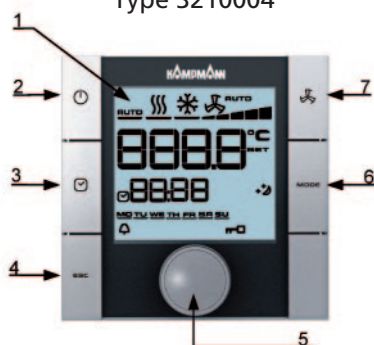
3.1 Functional Keys, Display Elements

1. Display with LED background lighting

2. ON/OFF button (depending on setting)
   - ON / OFF (factory setting)
   - Eco mode/Day mode

3. TIMER button
   - Set time
   - Set timer programs

4. ESC button
   - Back to the standard display

5. navigator dial
   - Change settings - Call up menus

6. MODE button
   - Set operating modes
     (disabled with 2-pipe uses)

7. FAN button
   - Set fan control

All menus can be selected and set using the navigator dial.

The LED background lighting is automatically switched off 5 seconds after the KaController is last used. The LED background lighting can be permanently disabled by means of a parameter setting.

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LCD display symbols
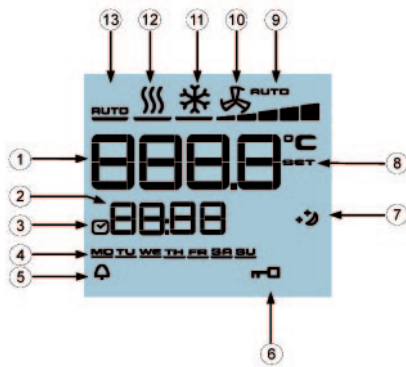
1	Room temperature setpoint display
2	Current time
3	Timer program enabled
4	Weekday
5	Alarm
6	Selected function is locked
7	Eco mode ☽
8	Setpoint setting enabled
9	Fan control Auto-0-1-2-3-4-5
10	Ventilation mode
11	Cooling mode
12	Heating mode
13	Automatic heating/cooling changeover mode

The symbols shown on the display depend on the application (2-pipe, 4-pipe etc.) and the parameters set.

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3.2 Operation

The KaController is operated using the navigator dial and the functional keys.

The functions that can be called up and set using the navigator dial are identical on both versions (with and without functional keys at the side). An illustration of the KaController with the functional keys at the side is used throughout these instructions for ease of understanding.

The navigator dial or side functional keys are also used to select the various selection menus.

Menu selection using the navigator dial

| Standard view | Press the navigator dial 1x | Fan setting | Press the navigator dial for 3 seconds | Time setting | Press the navigator dial for 3 seconds | Timer programs | Press the navigator dial for 3 seconds | Operating modes |
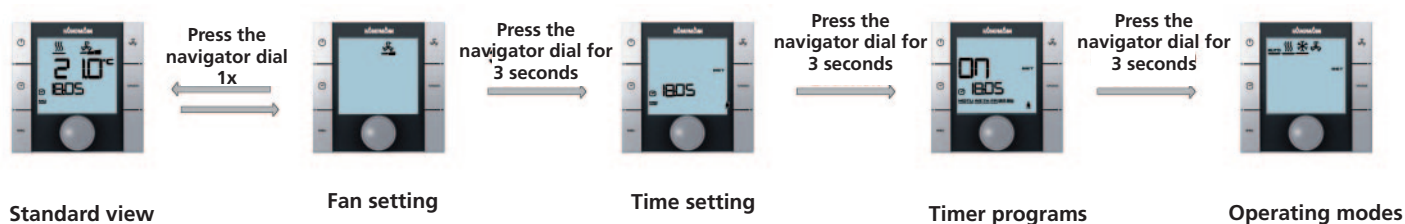
Menu selection using functional keys
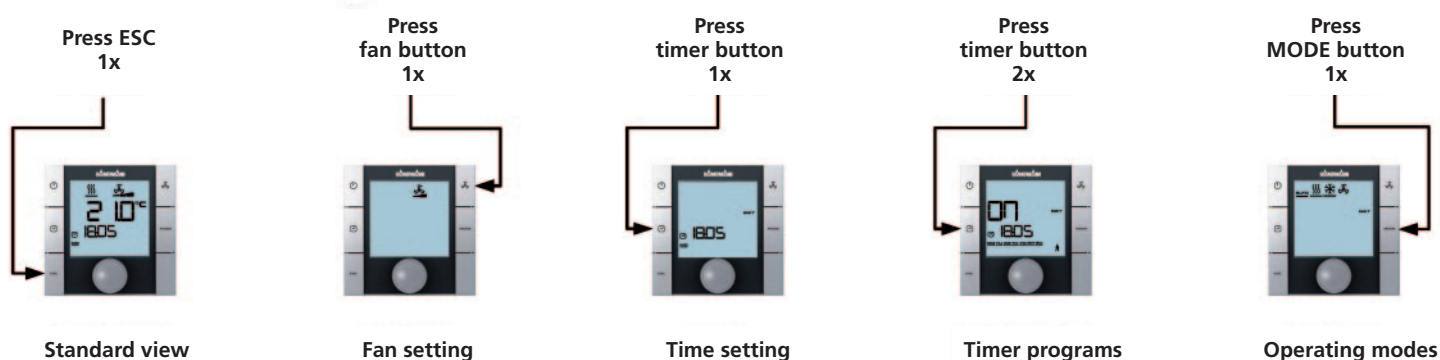
| Press ESC 1x | Press fan button 1x | Press timer button 1x | Press timer button 2x | Press MODE button 1x |
| Standard view | Fan setting | Time setting | Timer programs | Operating modes |

If no action is carried out using the navigator dial or the functional keys for longer than 3 seconds, the last change made is saved and the standard view is called up.

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3.2.1 Switching Control Off and On

When the control is switched on, the display shows the standard view with the current room temperature setpoint and the fan stage set.

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Following initial commissioning of the KaController, the time is no longer shown in the standard view (see "Time setting" selection menu).

Standard view

Switching off the control:

There are 3 options for switching off the control:

1. Press the ON/OFF button.
2. Turn the navigator dial to the left until OFF appears.
3. Press and hold down the navigator dial until OFF appears.

Standard view

Switching on the control:

There are 2 options for switching on the control:

1. Press the ON/OFF button.
2. Press the navigator dial.

Control OFF view

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3.2.2 Temperature Setting

The temperature setpoint is entered from the standard view.

To call up the standard view, press ESC or do not touch the KaController for 3 seconds.

| Standard view | Press the navigator dial 1x | Fan setting | Press the navigator dial for 3 seconds | Time setting | Press the navigator dial for 3 seconds | Timer programs | Press the navigator dial for 3 seconds | Operating modes |
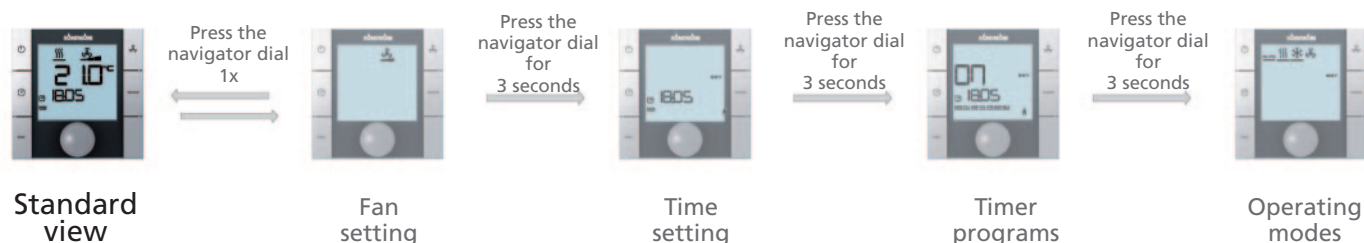
Standard view

Setting the temperature setpoint:

You can set a new temperature setpoint by turning the navigator dial in the standard view.
Apply the set value by pressing the navigator dial and calling up the standard view

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If no action is carried out using the navigator dial or the functional keys for longer than 3 seconds, the last change made is saved and the standard view is called up.

Setting the
temperature setpoint

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3.2.3 Fan Setting

Press the FAN key (quick access) or use the navigator dial to call up the "Fan setting" selection menu.

Calling up the "Fan setting" menu using the navigator dial:

Standard view		Fan setting		Time setting		Timer programs		Operating modes
	Press the navigator dial 1x		Press the navigator dial for 3 seconds		Press the navigator dial for 3 seconds		Press the navigator dial for 3 seconds	
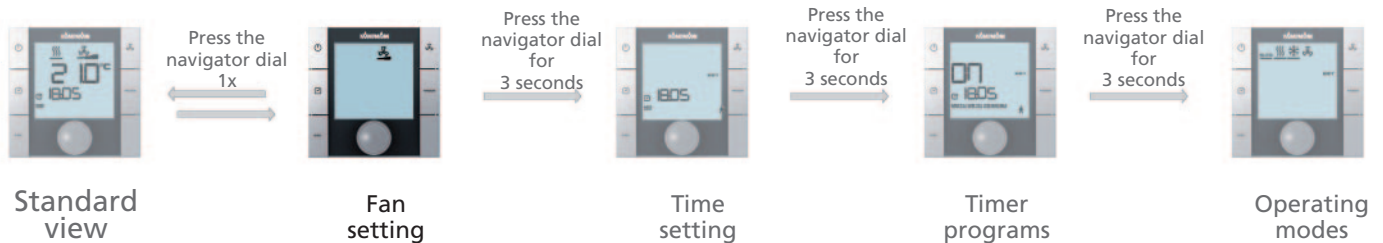
The room temperature is initially controlled with natural convection in automatic mode and then by continually adjusting the fan speed. Users also have the option of setting fan stages Auto-0-1-2-3-4-5 as required.

Fan stage 3

Pressing the navigator dial in standard view switches the display to the "Fan setting" menu.

You can turn the navigator dial to select the required fan stage Auto-0-1-2-3-4-5.

Pressing the navigator dial activates the selected fan stage.

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If no action is carried out using the navigator dial for longer than 3 seconds, the last change made is saved and the standard view is called up.

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3.2.4 Time Setting

Press the TIMER key (quick access) or use the navigator dial to call up the "Time setting" selection menu.

Calling up the "Time setting" menu using the navigator dial:

Standard view		Fan setting		Time setting		Timer programs		Operating modes
	Press the navigator dial 1x		Press the navigator dial for 3 seconds		Press the navigator dial for 3 seconds		Press the navigator dial for 3 seconds	
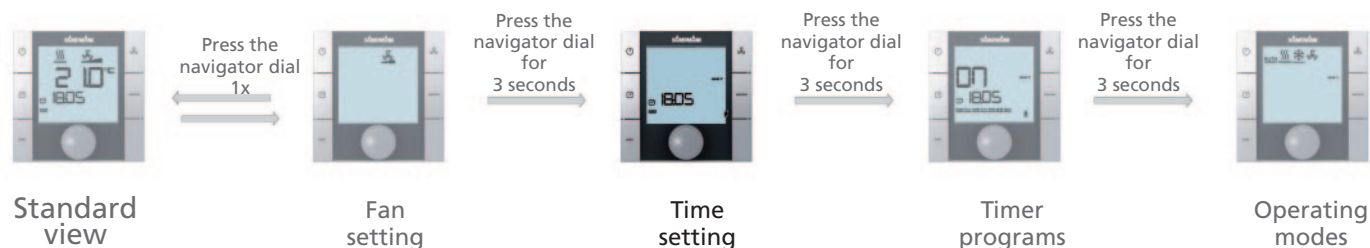
View time setting

Setting the time

Use the navigator dial to set the following:
1. Current hour
2. Current minute
3. Current day

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The "Timer programs" selection menu is automatically called up once the current day has been confirmed by pressing the navigator dial.

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If no action is carried out using the navigator dial or the functional keys for longer than 7 seconds, the last change made is saved and the standard view is called up.

Setting for fading out of the time in the standard view

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Following initial commissioning of the KaController, the time is no longer shown in the standard view.
Only when the time has been set, is the current time shown in the standard view.
If "- -: - -" is entered for hours and minutes, the real-time clock is disabled and the time is hidden in the standard view.

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3.2.5 Timer Programs

The KaController offers the option of programming switch-on and off times using a timer program if rooms are to be air conditioned only at certain times of the day. Unlike with conventional thermostatic controllers where only one switch-on and off time can be selected, two switch-on and off times can be set for each day.

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Set the time in the "Time setting" selection menu before parametrising the switch-on and off times.

Timer program matrix

	ON1	OFF1	ON2	OFF2
MO	6 : 00	18 : 00	- - : - -	- - : - -
TU	6 : 00	18 : 00	- - : - -	- - : - -
WE	6 : 00	18 : 00	- - : - -	- - : - -
TH	6 : 00	18 : 00	- - : - -	- - : - -
FR	6 : 00	18 : 00	- - : - -	- - : - -
SA	8 : 00	14 : 00	- - : - -	- - : - -
SU	- - : - -	- - : - -	- - : - -	- - : - -

Example of a
weekly timer program

The KaController can manage 2 switch-on and 2 switch-off times per day. The switch-on and off times can be entered as a block or individually for each day.

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The timer program switches the controller on and off in accordance with the timer entries. After switching off the controller using the timer program, the user then has the option of switching the controller on using the ON/OFF key or the navigator dial.

1	ON = SWITCH ON timer program OFF = SWITCH OFF timer program
2	1 = Timer program no. 1 2 = Timer program no. 2
3	Time for switch-on/switch-off
4	Weekday
5	If no switch-on or switch-off time is entered in the timer matrix, the "Clock" symbol is hidden in the standard view.

Display elements in the
"Timer programs"
selection menu

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If no switch-on or off time is entered in the timer program matrix, the "Clock" symbol is hidden in the standard view.

The diagram below shows the sequence for setting the timer program. Steps 1-4 are described in more detail in the next section.
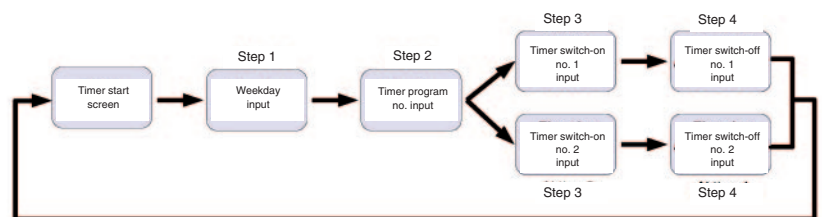
ℹ️

To exit the "Timer programs" selection menu, press and hold down the navigator dial for 3 seconds in the timer program start screen or do not use the KaController for 15 seconds.

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Press the TIMER key twice (quick access) or use the navigator dial to call up the "Timer programs" selection menu.

Use the navigator dial to call up the "Timer programs" menu.

Standard view		Fan setting		Time setting		Timer programs		Operating modes
	Press the navigator dial 1x		Press the navigator dial for 3 seconds		Press the navigator dial for 3 seconds		Press the navigator dial for 3 seconds	
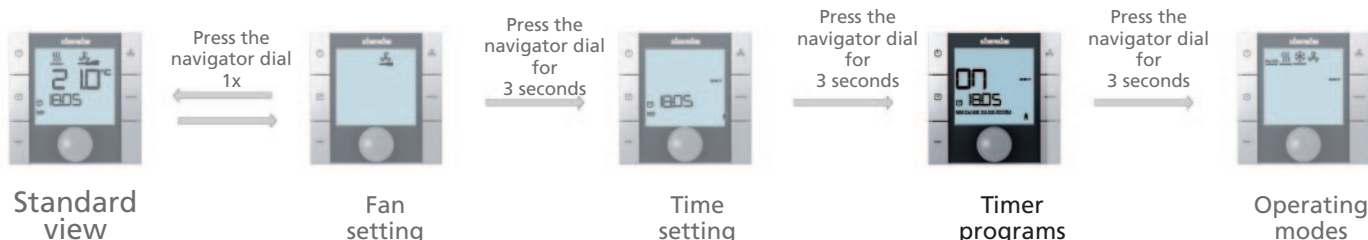
Timer start screen

Step 1:

Turn the navigator dial to select a weekday for which you wish to program a switching-on or off time.

You have the option of selecting the days of the week as a block (MO-FR, SA-SU, MO-SU) or individually.

Apply the figure by pressing the navigator dial (for instance: MO–FR) and to call up the next input screen.

Timer input screen no.

Step 2:

Turn the navigator dial to select the number of the timer program (no. 1 or no. 2).

Press the navigator dial to apply the figure (for instance: Timer program no. 1) and to call up the next input screen.

Switch-on time input screen

Step 3:

Set the switch-on time you require by turning the navigator dial.

Once the minutes have been set, the set **switch-on time** is carried over by pressing the navigator dial and the input screen for the switch-off time of the selected program no. is called up.

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Input screen for
switch-off time

Step 4:

Set the **switch-off time** you require by turning the navigator dial.

Once the minutes have been set, press the navigator dial (-> Step 1) to apply the **switch-off time** and to call up the timer start screen.

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Call up the respective weekday and associated timer program no. to delete switch-on and switch-off times entered (Step 1 + Step 2). The switch-on or switch-off time is replaced by " - -:- -" (Step 3 +Step 4).

Important note: It is not possible to delete timer entries as a block!

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You can overwrite timer entries at any time either as a block or for each day.

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Only request switch-on and off times singly for each day. It is not possible to request switch-on and off times as a block where there are differing time entries for the respective days of the week and the time is then shown by "--:--".

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To exit the "Timer programs" selection menu, press and hold down the navigator dial for 3 seconds in the timer program start screen or do not use the KaController for 15 seconds.

3.2.6 Operating Modes (Mode Key)

Press the MODE key (quick access) or use the navigator dial to call up the "Operating modes" selection menu.

Calling up the "Operating modes" menu using the navigator dial:

|				
Standard view	Fan setting	Time setting	Timer programs	Operating modes

Press the navigator dial 1x — *Press the navigator dial for 3 seconds* — *Press the navigator dial for 3 seconds* — *Press the navigator dial for 3 seconds*
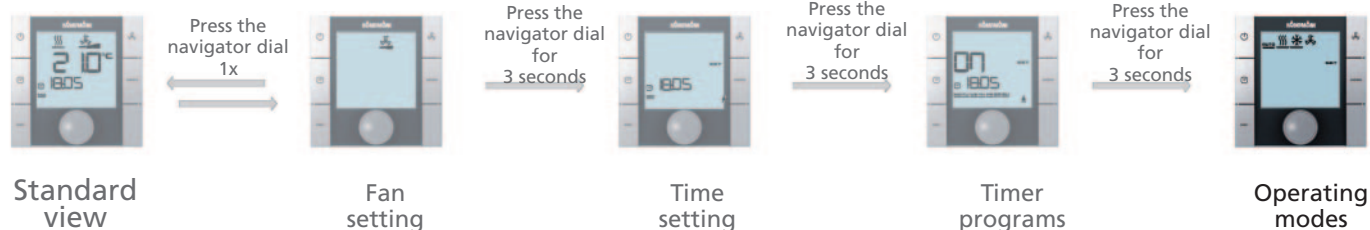
You can use the navigator dial to set the operating mode depending on the parameter setting.

Automatic mode: The control switches automatically between heating mode and cooling mode, while maintaining a neutral zone.

Heating mode: The control only works in heating mode.

Cooling mode: The control only works in cooling mode.

The operating mode required can be selected by turning the navigator dial in the 'Operating mode' selection menu.

Pressing the navigator dial activates the selected operating mode.

Setting heating operating mode

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The MODE key is locked with 2-pipe applications, as Heating and Cooling mode is specified by an external contact or clip-on sensor. As a rule, it is not possible to alter the operating mode using the KaController in 2-pipe applications.

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If no action is carried out using the navigator dial for longer than 3 seconds, the last change made is saved and the standard view is called up.

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4. Alarm Messages

The KaController displays faults using the alarm messages listed in the table below. The alarm messages are displayed according to their priority.
In the event of an alarm, note down the alarm message and contact the responsible member of staff (System Administrator or Installer/Service Technician) to fix the fault quickly.

4.1 Venkon AC/EC

Venkon AC/EC alarm table

"Motor fault"
alarm view

Code	Alarm	Priority
A11	Control sensor faulty	1
A12	Motor fault	2
A13	Room frost protection	3
A14	Condensate alarm	4
A15	General alarm	5
A16	Sensor AI1, AI2 or AI3 faulty	6
A17	Unit frost protection	7
A18	EEPROM faulty	8
A19	Offline slave in CANbus network	9

4.2 KaController Control Electronics

Alarm table for KaController control electronics

Code	Alarm
tAL1	Temperature sensor in the KaController faulty
tAL3	Real-time clock in the KaController faulty
tAL4	EEPROM in the KaController faulty
Cn	Communication fault with the ext. control board (PCB)

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Should more than one fault occur simultaneously in the KaController control electronics, the alarm messages appear alternately in the display.

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5. Frost Protection Function, Motor Protection, Condensate Alarm

5.1 Room Frost Protection Function

The room temperature is monitored at each phase in the system to a limit of 8 °C. The room frost protection function is enabled if the room temperature drops below 8°C. The heating valve opens and fan stage 1 is switched on. The room frost protection function is disabled when the room temperature rises above the limit of 8 °C

> *The limit of 8 °C is fixed for the room frost protection function and cannot be changed.*

5.2 Unit Frost Protection Function

If a clip-on sensor is fitted in the Venkon AC/EC, this clip-on sensor is monitored in every system state to a limit of 4 °C. The unit frost protection function is enabled if the temperature drops below 4 °C. The heating valve opens and fan is switched on.
The unit frost protection function is disabled when the temperature on the clip-on sensor rises above the limit of 4 °C. The room frost protection function is also enabled if the room temperature drops below 4 °C.

> *The limit of 4 °C is fixed for the unit frost protection function and cannot be changed.*

5.3 Motor Protection

A motor fault on a Venkon AC/EC is displayed on the KaController by the display "A12". The Venkon AC/EC with the motor fault shuts down automatically.

When a motor fault has occurred, check whether an impeller is blocked. To eliminate the fault, disconnect the Venkon AC/EC and remedy the cause of the fault. The Venkon AC/EC should then restart after the power supply has been reconnected and a fan stage has been selected. Contact a Service Technician should the motor fault continue to show on the display

> *A fault in the motor of a slave unit is not shown on the KaController. Only a motor fault in a master unit is shown on the KaController.*

5.4 Condensate Alarm

The condensate alarm on a Venkon AC/EC is displayed on the KaController by the display "A14". The Venkon AC/EC with a condensate alarm automatically closes the cooling valve.
Check that the condensate pump is running correctly and check the water level in the condensate tank if a condensate alarm occurs.

> *The condensate alarm of a slave unit is not shown on the KaController. The condensate alarm of a master unit is shown on the KaController.*

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6. Cabling

6.1 General Information

- Lay all low-voltage cables along the shortest route.
- Ensure that low-voltage and high-voltage cables are separated, using metal partitions in cable ducts.
- Use only shielded cables as low-voltage and bus cables.
- Lay all BUS cables in a linear pattern. Star-shaped wiring is not permitted (illustration on left).
- The KaController is connected using a BUS connection to the respective Venkon AC/EC and must be connected to the Venkon EC's control board (PCB).
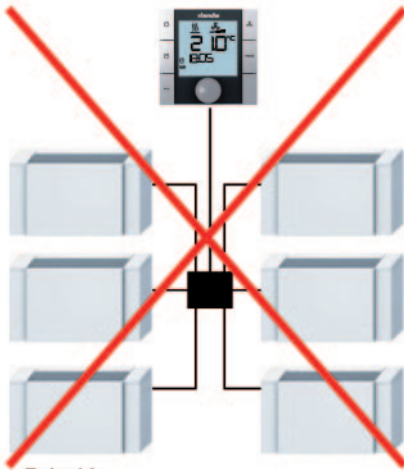
Wrong!
Star-shaped wiring of BUS lines

Use shielded, paired cables as BUS cables, for instance CAT5 (AWG23), but at least of the same value.

When laying BUS cables, avoid the formation of star points, for instance in junction boxes. Loop the cables through to the units (Venkon AC/EC)!
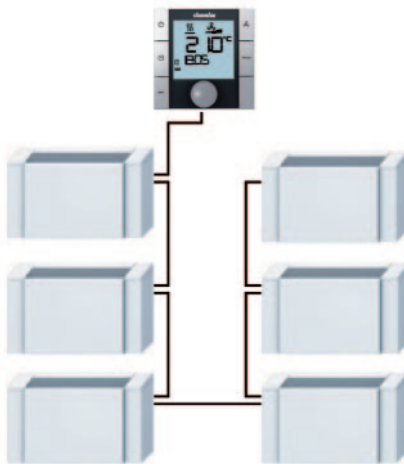
Right!
Linear wiring of BUS lines

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6.2 Single-circuit Controls of up to 6 Units

Single-circuit control of up to 6 units with wall-mounted KaController
Master unit: Control configuration -EC1
Slave unit: Control configuration -EC1

KaController
Type 3210001
Type 3210002

Optional: Room temperature sensor
Type 3250110

Optional: ext. potential-free contacts, e.g.
window contact, H/C changeover

The number of connecting wires required including fuses is given on the individual control units.
* Shielded cable (e.g. IY(ST)Y, 0.8 mm), laid separately from high-voltage cables
** Shielded, paired cables, e.g. CAT5 (AWG23), or at least of the same value, laid separately from high-voltage cables

Master unit -EC1 #1 | Slave unit -EC1 #2 | Slave unit -EC1 #3 | Slave unit -EC1 #4 | Slave unit -EC1 #5 | Slave unit -EC1 #6

Mains 230 V/50 Hz

maximum length of BUS connection: 30 m

Single-circuit control of up to 6 units with KaController built into the master unit
Master unit: Control configuration -EC2
Slave unit: Control configuration -EC1

Optional: Room temperature sensor
Type 3250110

Optional: ext. potential-free contacts, e.g.
window contact, H/C changeover

The number of connecting wires required including fuses is given on the individual control units.
* Shielded cable (e.g. IY(ST)Y, 0.8 mm), laid separately from high-voltage cables
** Shielded, paired cables, e.g. CAT5 (AWG23), or at least of the same value, laid separately from high-voltage cables

Master unit -EC2 #1 | Slave unit -EC1 #2 | Slave unit -EC1 #3 | Slave unit -EC1 #4 | Slave unit -EC1 #5 | Slave unit -EC1 #6

Mains 230 V/50 Hz

maximum length of BUS connection: 30 m

(T) An intake air sensor or an external room sensor can be used to measure the room temperature.
Important note: An intake air sensor is incorporated as standard in the -EC2 model.

Maximum permitted cable lengths	
Total length of BUS cables between Venkon units	max. 30 m
Total length of BUS cables between room control unit and master unit	max. 30 m
Total length between Venkon and the external potential-free contacts e.g. window contact etc.	max. 30 m

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6.3 Single-circuit Controls of up to 30 Units

Single-circuit control of up to 30 units with wall-mounted KaController
Master unit: Control configuration -EC1
Slave unit:　Control configuration -EC1
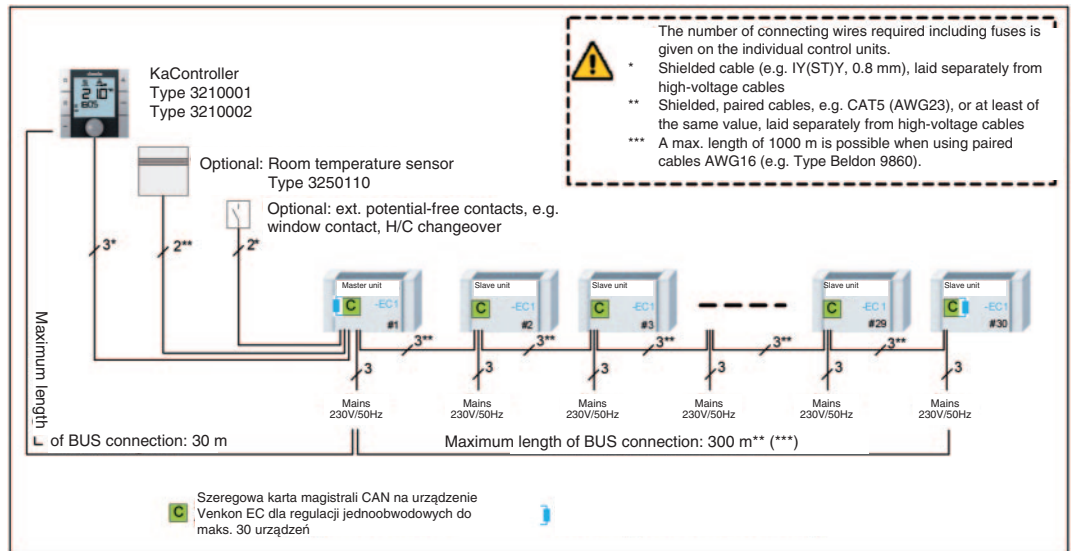
Single-circuit control of up to 30 units with KaController built into the Venkon
master unit: Control configuration - EC2
Slave unit:　Control configuration - EC1
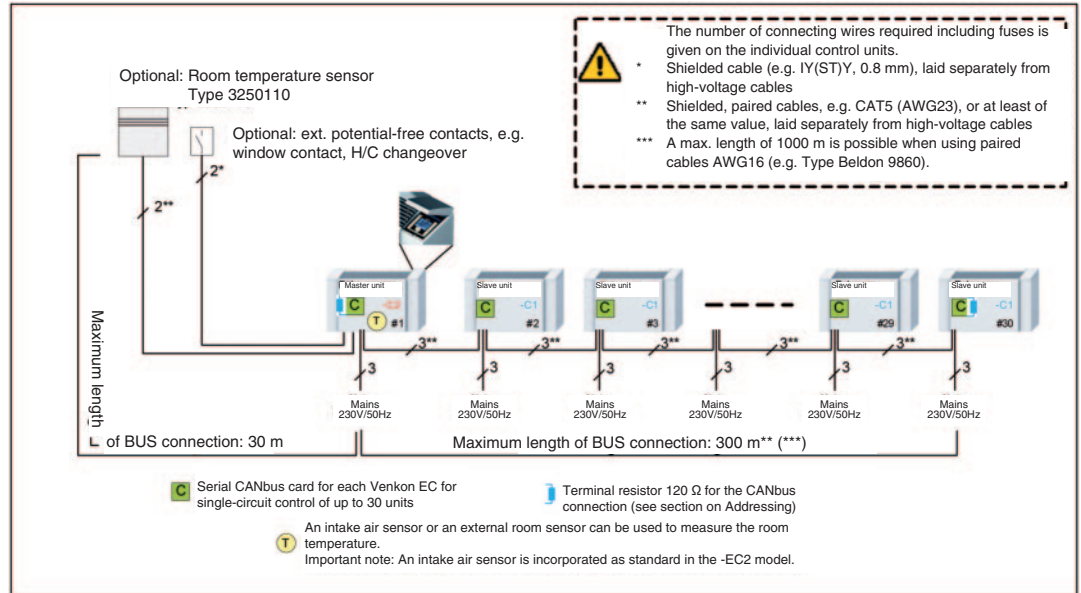
Maximum permitted cable lengths	
Total length of BUS cables between Venkon units	max. 300 m max. 1000 m (Beldon 9860)
Total length of BUS cables between the room control unit and master unit	max. 30 m
Total length between Venkon and the external potential-free contacts e.g. window contact etc.	max. 30 m

CANnus card unit #11   CANbus card unit #..

6.3.1 Terminal Resistors in a CANbus System
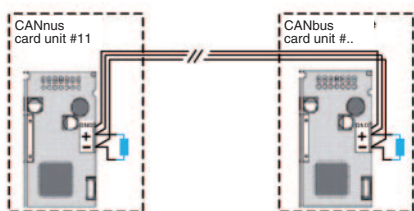
- The bus lines between the CANbus cards have to be routed in a linear manner.

- Disconnect the Venkon AC/EC before positioning the final resistors.

- Connect a terminal resistor to the first and last CANbus card in a bus line between the terminals "+" and "-".

- Resistance of terminal resistor: 120 Ohm

6.3.2 Bus Connections Between Venkon AC/EC

Single-circuit control
(maximum 30 units)
Communication between the
Venkon AC/EC using CANbus,
bus connection to the CANbus card
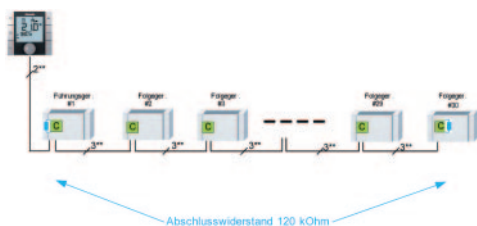
- Bus communication between the Venkons AC/EC and CANbus cards is solely using the CANbus.
The tLAN bus communication in single-circuit controls between the Venkons AC/EC is not connected.

- Refer to the technical data sheet for the CANbus cards for the connection conditions for the CANbus cards.

6.4   KaController

Flush-mounted back box

** Use shielded, paired cables, e.g. CAT5 (AWG23) of at least the same value

- A flush-mounted backbox is needed for the KaController.

- Connect the KaController to the nearest Venkon AC/EC as per the wiring diagram. The maximum bus length between the KaController and Venkon AC/EC is 30 m.

- The respective Venkon AC/EC automatically becomes a master unit in the control circuit by connecting a KaController.

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6.5 External Room Temperature Sensor

** Use shielded, paired cables, e.g. CAT5 (AWG23) of at least the same value

Master unit #1

Slave unit #2

2** 2**

2**

2**

3

3

Mains 230V/50Hz

Mains 230V/50Hz

Max. cable length = 30 m
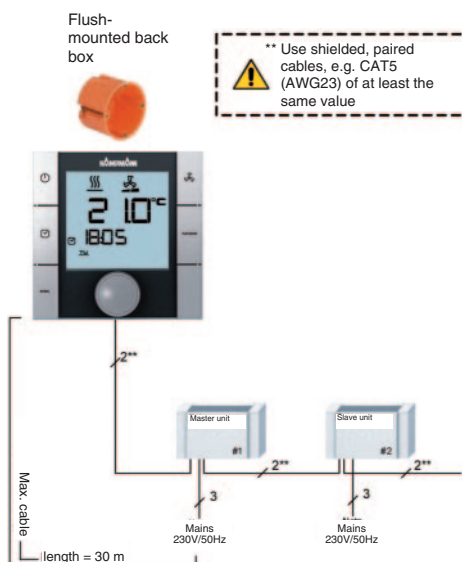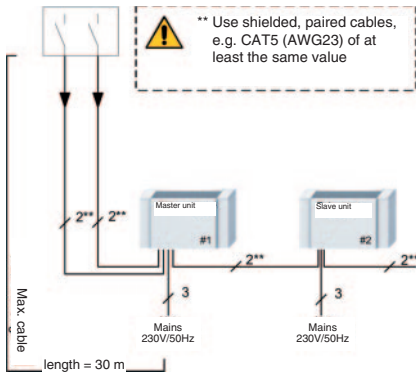
- All Venkon AC/EC master units have an analogue input for connection of an external room temperature sensor.
- Connect up the cables in accordance with the wiring diagram and use the KaController to configure the functions.
- The maximum cable length between the master unit and the room temperature sensor is 30 m.

ℹ️

It is not possible to connect an external room temperature sensor to the slave units.

Set the DIP switch no. 6 as described in section 1 when using an external room temperature sensor on a master unit.

6.6 Inputs for External Processing Contacts (e.g. window contact, card reader etc.)

** Use shielded, paired cables, e.g. CAT5 (AWG23) of at least the same value

Master unit #1

Slave unit #2

2**

2**

2**

3

3

Mains 230V/50Hz

Mains 230V/50Hz

Max. cable length = 30 m
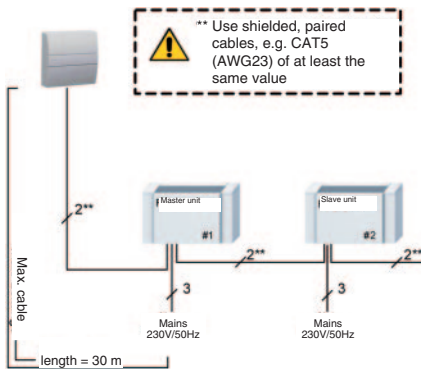
- All Venkon AC/EC master units have multifunctional inputs that can be assigned different functions during commissioning.
- Connect up the cables in accordance with the wiring diagram and use the KaController to configure the functions.
- The maximum cable length between the master unit and the external potential-free contacts is 30 m.

ℹ️

No external contacts (e.g. window contact, card reader etc.) can be connected to the slave units.

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7. Assembly, Wiring of the Venkon, Room Control Unit, Intake Air Temperature Sensor

7.1 Fan Convector

Electrical
control box
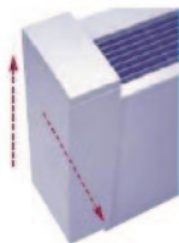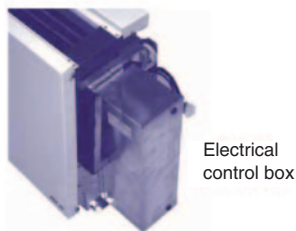
- The connection points for the electrical cables in the KaControl Venkon are located in the junction box.

- The electrical junction box is located behind one of the side mullions and is always mounted on the opposite side to the valve assemblies.

- To connect the electrical cables, open the electrical junction box, insert the cables and connect up as per the wiring diagram.

- Dismantle the side mullions as follows:
  - Open the operating panel
  - Loosen the metal screws on the inside of the side panel
  - Carefully lift the side panel approx. 20 mm until it comes loose from the bracket.
  - Loosen the side mullions towards you.
- Should a control unit (configuration -EC2) be incorporated in the casing, isolate the cable by loosening the reverse polarity protected plug
  - Keep the casing in a safe place

- Disconnect the KaControl Venkon prior to commencing "any" wiring.

⚠️ Only connect the bus lines to the KaControl Venkon when the unit is fully disconnected.

7.2 Clip-on Temperature Sensor

- The clip-on temperature sensors can be strapped to the flow (Heating/Cooling). The temperature sensor and the strap form a unit to ensure ease of assembly.

- To connect the electrical cables (cable length = 3 m), open the control unit, insert the cables and connect up as per the wiring diagram.

⚠️ Disconnect the Venkon AC/EC prior to commencing "any" wiring.

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7.3 KaController

Assembly/Dismantling
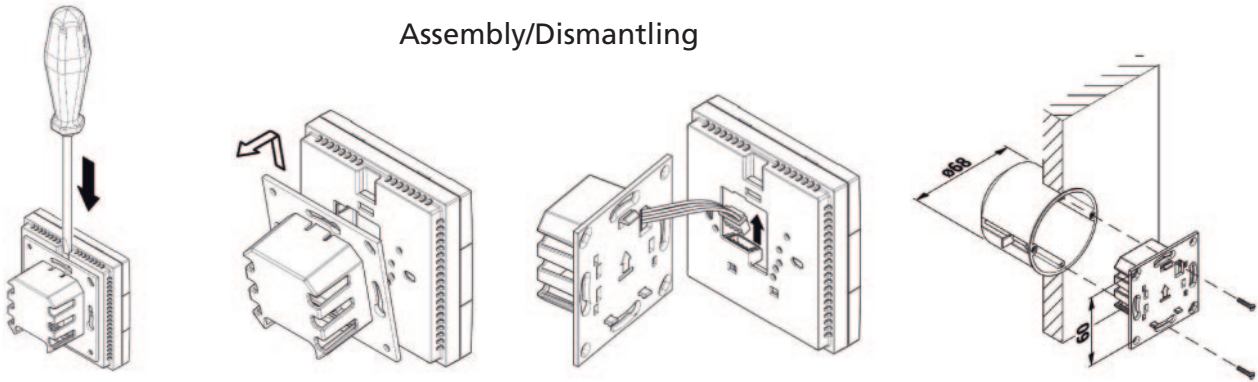
Wiring
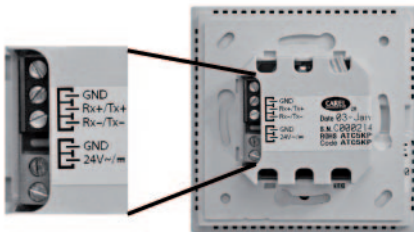
KaController terminals

- Connect the KaController to the nearest Venkon AC/EC on the wiring diagram.
  The maximum bus length between the KaController and Venkon AC/EC is 30 m.
- The respective Venkon AC/EC automatically becomes a master unit in the control circuit by connecting a KaController.

⚠️ Disconnect the Venkon AC/EC prior to commencing "any" wiring.

⚠️ The bus lines should also only be connected to the KaControl Venkon AC/EC when the unit is fully disconnected.
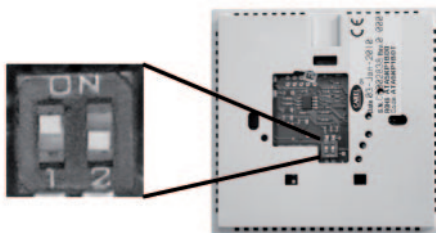
DIP switch setting

DIP switch setting
KaController
DIP switch no. 1: ON
DIP switch no. 2: OFF

- Set the DIP switches on the rear of the KaController as per the diagram at the side:

  DIP switch no. 1: ON
  DIP switch no. 2: OFF

7.3.1 Intake Air Sensor

Intake air sensor
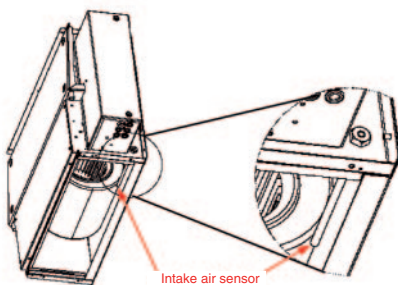
- All KaControl control boards (PCBs) have analogue inputs to register the inlet air temperature.
- An inlet air temperature sensor is incorporated as standard in control configuration -EC2.
- An inlet air temperature sensor can be subsequently fitted into the control configuration -EC1 in accordance with the diagrams.

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8. Setting the Maximum Fan Speed by Means of a Potentiometer

Set the maximum fan speed using a potentiometer on the control board (PCB).
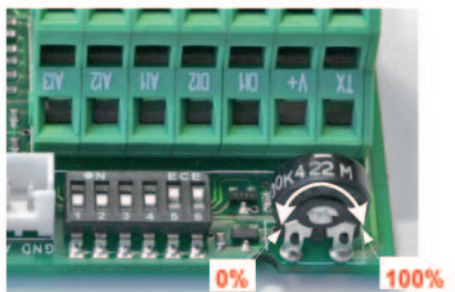
Potentiometer setting:
- Disconnect the control before setting the potentiometer.
- Remove the cover on the control unit to set the potentiometer. The potentiometer is located on the control board (PCB) right next to the DIP switches.
- Use the potentiometer to limit the maximum speed.

Potentiometer on the control board (PCB)

Parameter P50 can be used to set the maximum fan speed.

Note the information in Section 11.3.9 "Fan Actuation".

9. Addressing

9.1 Single-circuit Control

9.1.1 Maximum 6 Venkon AC/EC in a Control Zone

- Venkon AC/EC in single-circuit control configurations with a maximum of 6 units do not need to be addressed.
- Define the master unit/slave unit by connecting the KaController.
- The respective Venkon AC/EC automatically becomes the master unit in the control circuit by connecting a KaController.
- A master unit need not necessarily be arranged at the end of a bus system.
- Lay all BUS cables in a linear pattern. Star-shaped wiring is not permitted.

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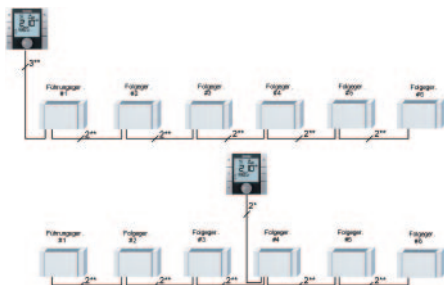
9.1.2 Maximum 30 Venkon AC/EC in a Control Zone

- Venkon AC/EC in single-circuit control configurations with more than 6 units need to be addressed.

- They are addressed by means of DIP switch settings on the CANbus card.

- Define the master unit/slave unit by connecting the KaController.

- The respective Venkon AC/EC automatically becomes the master unit in the control circuit by connecting a KaController.

CANbus card

Front view   Rear view

All CANbus cards are given the same CAN address and work identically in a control zone with the configuration described below.
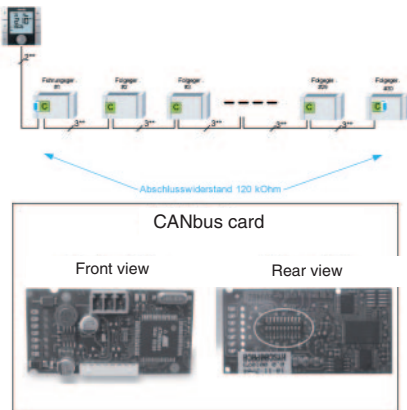
DIP switch on the rear side of the CANbus card
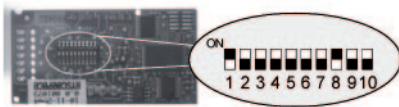
DIP1	=	ON
DIP2	=	OFF
DIP3	=	OFF
DIP4	=	OFF
DIP5	=	OFF
DIP6	=	OFF
DIP7	=	OFF
DIP8	=	ON
DIP9	=	OFF
DIP10	=	OFF

Configuration of the CANbus card by means of DIP switch settings (identical for all CANbus cards):

1. Disconnect the Venkon AC/EC.
2. Remove the CANbus card from the base board.
3. Set the DIP switch as per the diagram.
4. Refit the CANbus card to the base board.
5. Connect the bus cable.
6. Re-connect the Venkon AC/EC.

- Set the DIP switches on all CANbus cards in a control circuit identically!

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10. Setting Unit Configuration Using DIP Switches
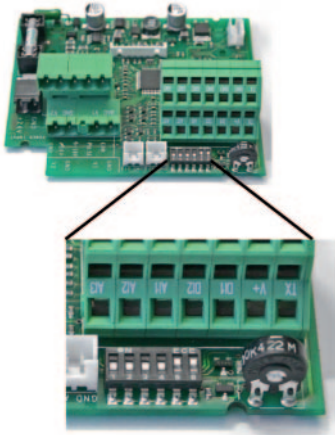
The DIP switch on the control board (PCB) is used to set the configuration of a Venkon AC/EC.

Once the DIP switch has been set, all the basic functions of the configuration have been parametrised and the Venkon AC/EC can be operated immediately.
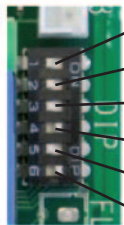
Special setting options, such as lowering the temperature setpoint during Eco mode, have to be parametrised in the Service menu. This parametrisation is possible using the KaController.

The DIP switches are factory-set in accordance with the unit configuration!

⚠️ Disconnect the control before starting to adjust the DIP switches.

Functional table of DIP switch settings on the PCB

DIP1	OFF = --- ON = 0..10 V actuation by on-site MSR
DIP2	OFF = --- ON = Actuation by 0..100 kOhm potentiometer
DIP3	OFF = Clip-on sensor not fitted ON = Clip-on sensor fitted
DIP4	OFF = --- ON = Heating/Cooling changeover using DI2
DIP5	OFF = 2-pipe system ON = 4-pipe system
DIP6	OFF = Room control on ext. room sensor/air intake sensor ON = Room control on sensor in the KaController

ℹ️

Set DIP switch no.6 to ON with slave units!

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DIP switch no. 1
Set DIP switch no. 1 to ON to actuate a Venkon AC/EC by means of 0…10 V signals within a building management system (provided by others).
The parameter settings required are described in Section 11.3.17.

Factory setting:
DIP1 = OFF

DIP switch no. 2
It is essential that DIP switch no. 2 is set to OFF.

Factory setting:
DIP2 = OFF

DIP switch no. 3
Optionally install a clip-on sensor to monitor the water temperature. The following functions can be triggered by a clip-on sensor:

1. Actuation of the fan stages when the hot or cold water is registered on the heating element (Auto-Eco function, see section 11.3.10).
2. Heating/cooling changeover function in a 2-pipe system (see section 11.3.7)
3. Unit frost protection (see section 5.2)

If a clip-on sensor is fitted, DIP switch no. 3 must be set to ON
Venkon AC/EC are delivered as standard without a clip-on sensor and the DIP switch no.3 is set to DIP3 = OFF

Factory setting:
DIP3 = OFF

DIP switch no. 4
In a 2-pipe system, changeover between heating and cooling is activated as standard by the switching of the digital input DI2, with the following operating modes being executed depending on the external contact:
DIP4 = ON + ext. contact open → heating mode
DIP4 = ON + ext. contact closed → cooling mode

Factory setting:
2-pipe system → DIP4=ON
4-pipe system → DIP4=OFF

The heating/cooling changeover in a 2-pipe system can alternatively be performed by a clip-on sensor. In this version, set DIP switch no. 4 to DIP4=OFF (see section 11.3.7).

DIP switch no. 5
The convector configuration (2-pipe/ 4-pipe) is set by means of DIP switch no. 5

Factory setting:
2-pipe system → DIP5 = OFF
4-pipe system → DIP5 = ON

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DIP switch no. 6

There is an option of using the internal sensor of the KaController, an external room temperature sensor or an intake air sensor for room temperature control.

DIP switch no. 6 = OFF → Room temperature control on an external room temperature sensor/intake air sensor

DIP switch no. 6 = ON → Room temperature control on the internal sensor of the KaController

Factory setting:
DIP 6 = ON

DIP switch factory settings on Venkon AC/EC 2-pipe system
Control configuration -EC1

DIP switch factory setting
Venkon AC/EC 2-pipe
Control configuration -**EC1**

DIP	2-pipe EC1	Functions
DIP1	OFF	OFF = ---- ON = 0..10 V actuation by on-site MSR
DIP2	OFF	OFF = ---- ON = Actuation using 0..100 kOhm potentiometer
DIP3	OFF	**OFF = Clip-on sensor not fitted** ON = Clip-on sensor fitted
DIP4	ON	OFF = ---- **ON = Heating/cooling changeover using DI2**
DIP5	OFF	**OFF = 2-pipe system** ON = 4-pipe system
DIP6	ON	OFF = Room control on ext. room sensor/air intake sensor **ON = Room control on sensor in the KaController**

Set DIP switch no.6 to ON with slave units!

DIP switch factory settings on Venkon AC/EC 4-pipe system
Control configuration -EC1

DIP switch factory setting
Venkon AC/EC 4-pipe
Control configuration -**C1**

DIP	4-pipe EC1	Functions
DIP1	OFF	OFF = ---- ON = 0..10 V actuation by on-site MSR
DIP2	OFF	OFF = ---- ON = Actuation using 0..100 kOhm potentiometer
DIP3	OFF	**OFF = Clip-on sensor not fitted** ON = Clip-on sensor fitted
DIP4	OFF	OFF = ---- ON = Heating/Cooling changeover using DI2
DIP5	ON	OFF = 2-pipe system **ON = 4-pipe system**
DIP6	ON	OFF = Room control on ext. room sensor/air intake sensor **ON = Room control on sensor in the KaController**

Set DIP switch no. 6 to ON with slave units!

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11. Parameter Settings

11.1 General

Configure special system requirements using parameter settings in the Service menu.

Special system requirements may include:
• Display: Room temperature or setpoint temperature
• Locking operating functions
• Setting the absolute setpoint temperature or ± 3 K
• Setting parameters in Eco/Day mode
• Sensor configuration
The necessary settings can be made on the KaController.

Calling Up the Service Menu

The following steps are needed to set the parameters:

1. Switch off the Venkon AC/EC by:
   • Pressing the ON/OFF button
   or
   • Pressing the navigator dial for min. 5 seconds
   or
   • Turn the navigator dial to the left until OFF is displayed
2. Press the navigator dial for a minimum of 10 seconds to call up the Service menu. The display shows "Para" and then "CODE" with the value 000 in sequence.
3. Select the password (code) 22 by turning the navigator dial and confirm by pressing the navigator dial. You are now in Service level 1 and the display shows the current software version (P000=...).
4. Setting parameters is now possible using the navigator dial

5. Setting parameters:
   • Turn the navigator dial to select the parameter.
   • Press the navigator dial to call up Edit mode.
   • Set the required value by turning the navigator dial.
   • Press the navigator dial to save the new value.

6. There are 3 options for exiting the Service menu and calling up the standard view:
   • If no action is carried out using the navigator dial for longer than 2 minutes.
   • Hold down the navigator dial for 5 seconds.
   • Turn the navigator dial, select "ESC" on the display and confirm the selection by pressing the navigator dial.

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11.3   Parameter Settings

11.3.1 Display of Setpoint Temperature/Room Temperature

Parameter P37
Different values can be displayed using the large seven-segment display

Function	P37=0	P37=1	P37=2	P37=3	P37=4	P37=5	P37=6
No display	X						
Room temperature setpoint		X					
Current room temperature			X				
Temperature measurement at AI1				X			
Temperature measurement at AI2					X		
Temperature measurement at AI3						X	
Fan control 0..100 %							X

X = value is displayed, **factory setting P37=1**

Parameter P36=0
Setting of "absolute"
setpoint temperature

Parameter P36=1
Setting of
setpoint temperature ± 3 K

11.3.2 Setting of setpoint temperature ± 3 K

Parameter P36
It may be necessary in office or hotel applications for the system operator to specify a base setpoint. The user has the option of changing the setpoint temperature by ± 3 K to even out any different perception of room temperature.
Alternatively set the setpoint in absolute values.

Parameter P36 is used to configure the setpoint setting.

	Function	Standard	Min	Max	Unit
P36	Setpoint setting 0 = Setpoint setting (absolute) 1 = Setpoint setting ± 3 K	0	0	1	

Use parameter P01 to configure the base setpoint for the "Setpoint setting +3 K".

	Function	Standard	Min	Max	nit
P01	Base setpoint for setting setpoint ± 3 K	22	8	35	°C

ℹ

When setting the parameters
P37 = 1 → Display of setpoint temperature
P36 = 1 → Setpoint setting ± 3 K
no setpoint is displayed in the standard view!

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11.3.3 Locking Operating Functions

Parameter P117
It may be necessary with office or hotel applications for certain functions and setting options to be locked to ensure simple and energy-optimised operation of the system.

Function	P117=0	P117=1	P117=2	P117=3	P117=4	P117=5	P117=6
ON/OFF (Day/Eco) button					X		X
Fan setting						X	X
Time functions		X		X	X	X	X
Specification of operating modes (Mode)			X	X	X	X	X

X = Function is locked, **factory setting P117 = 0**
Example:
Set parameter P117 to 1 to lock the timer function.

ℹ

Set parameter P38 to use the Eco/Day functions with the KaController's timer programs.

11.3.4 ON/OFF, Eco/Day Functions

Parameter P38
Parameter P38 determines the function of the ON/OFF button and the timer programs.
Use the ON/OFF button and the timer programs to switch the unit ON and OFF or between Eco and Day mode.

Option 1:
se the ON/OFF button and the timer programs to switch between Eco mode and Day mode.

Option 2:
Use the ON/OFF button and the timer programs to switch the Venkon on and off.

Parameter P38 can also be set for the "Heating/Cooling changeover using clip-on sensor" function (Section 11.3.7).

	Function	Standard	Min	Max	Unit

P38	8 = Eco/Day mode changeover
	26 = Eco/Day mode changeover + Heating/Cooling
	    changeover using clip-on sensor (2-pipe system)
	72 = ON/OFF changeover
	90 = On/OFF changeover + Heating/Cooling changeover
	    using clip-on sensor (2-pipe system)
		72	0	255	

ℹ

Alternatively the Venkon AC/EC can be switched on and off or between Eco mode and Day mode using an external potential-free contact. The configuration is described in Section 11.3.14.

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11.3.5 Setpoint Changeover to Base Setpoint

With office and hotel applications it makes sense to reset the setpoints to a base setpoint at the start of an operating phase for energy-saving operation.
This function ensures that no unnecessarily high heating or low cooling setpoint is carried over into every operating phase. Parameter P57 allows users to set the temperature setpoint to be reset to the base setpoint (see P01) each time the operating phase changes.

Changes of operating phase include:
On → Off
Off → On
Eco → Day
Day → Eco

	Function	Standard	Min	Max	Unit
P57	temperature setpoint to base setpoint after changing operating phase 0 = Function is disabled 1 = Function is enabled	0	0	1	

11.3.6 Temperature Setpoint in Eco Mode

Parameter P18, P19
Parameter P18 is used to raise the temperature in cooling mode during Eco mode.

Parameter P19 is used to lower the temperature in heating mode during Eco mode eingestellt.

	Function	Standard	Min	Max	Unit
P18	Temperature rise of cooling setpoint in Eco mode	30	0	255	°C/10
P19	Temperature drop of heating setpoint in Eco mode	30	0	255	°C/10

The cooling setpoint is raised by 3.0 °C during Eco mode.
The heating setpoint is lowered by 3.0 °C during Eco mode.

Parameter P38 is used to set the Eco/Day function using the timer program in the KaController (ON/OFF, Eco/Day function).

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11.3.7 Heating/Cooling Changeover using Clip-on Sensor in 2-Pipe Systems

The changeover between heating and cooling is performed as standard in 2-pipe systems using an external contact and the digital input DI2.
If there is no external contact for heating/cooling changeover, the changeover can be made using a clip-on sensor.
Order the clip-on sensor separately and, after installation, wire it to the analogue input AI2 of the control board (PCB) (as per the wiring diagram). The configuration is documented in the following description.

The slave units in one control zone have to be fitted with a clip-on sensor to provide the function of "Heating/cooling changeover using clip-on sensor".

11.3.7.1 Setting DIP Switch No. 3, DIP Switch No. 4

If Heating/Cooling changeover is actuated by a clip-on sensor, then the following settings need to be ensured:
> **DIP switch no. 3 = ON**
> **DIP switch no. 4 = OFF.**

The functions of the DIP switches are described in Section 10 "Adjustment of Unit Configuration by Means of a Dip Switch".

11.3.7.2 Setting of Automatic Heating/Cooling Changeover Mode

Parameter P38
Parameter P38 is used to set Automatic mode, as Heating and Cooling modes can only be specified using the clip-on sensor.

Parameter P38 can also be set for the "ON/OFF and Eco/Day" function (see Section 11.3.4)

The following table shows the settings of parameter P38

	Function	Standard	Min	Max	Unit

P38	8 = Eco/Day mode changeover
	26 = Eco/Day mode changeover + Heating/Cooling
	     changeover using clip-on sensor (2-pipe system)
	72 = ON/OFF changeover
	90 = On/OFF changeover + Heating/Cooling changeover
	     using clip-on sensor (2-pipe system)
		72	0	255	

If changeover is using a clip-on sensor in a 2-pipe system, set parameter P38 to 26 or P38 to 90 to meet requirements.

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11.3.7.3 Heating Mode Limit

Parameter P10, P11, P12

Parameters P10, P11, P12 are used to set the limits for switching on the fan stages in heating mode.

	Function	Standard	Min	Max	Unit
P10	Limit temperature to actuate fan stages 1 and 2 in heating mode	26	0	255	°C
P11	Limit temperature to actuate fan stages 3 and 4 in heating mode	28	0	255	°C
P12	Limit temperature to actuate fan stage 5 in heating mode	30	0	255	°C

The controller permanently monitors the water temperature and only activates heating mode and the fan stages when the water temperature has exceeded the set limits.
If the limit temperature as per P10 is not reached after at most 5 minutes, the valve is closed and then reopened for 5 minutes after 4 hours (see Cyclic Opening and Shutting of the Valve).
The heating symbol flashes on the display if heating mode cannot be switched on because of the water temperature.

11.3.7.4 Cooling Mode Limit

Parameter P14

Parameter P14 is used to set the limit for switching on the fan stages in cooling mode.

	Function	Standard	Min	Max	Unit
P14	Limit temperature to actuate the fan stages in cooling mode	18	0	255	°C

The controller permanently monitors the water temperature and only activates cooling mode and the fan stages when the water temperature has fallen below the set limit values. If the temperature as per P14 has not fallen below the limit value temperature after at most 5 minutes, the valve is closed and then reopened for 5 minutes after 4 hours (see Cyclic Opening and Closing of the Valve).
The cooling symbol flashes on the display if Cooling mode cannot be switched on because of the water temperature.

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11.3.7.5 Cyclic Opening and Closing of the Valve

Parameter P107, P108
The clip-on sensor can only measure the water temperature correctly in 2-pipe systems with a straight valve if the valve cyclically opens.
Parameters P107 and P108 are used to cyclically open and close the valve to check the water temperature.

	Function	Standard	Min	Max	Unit
P107	Time valve open to check water temperature	5	0	255	Minutes
P108	Time valve closed	240	35	255	Minutes

If the heating/cooling changeover is actuated by a clip-on sensor in a 2-pipe system, then parameters P107=5 and P108=240 have to be set!
This setting opens the valve every 4 hours for 5 minutes to be able to measure the water temperature correctly in the pipe system.

11.3.8   Sensor Configuration

Parameter P58, P61, P62, P64

Parameters P58, P61, P62 and P64 are used to calibrate the sensor. Calibrate the temperature sensor during initial commissioning and at every service.

	Function	Standard	Min	Max	Unit
P58	Offset analogue input AI1 (ext. room temperature sensor)	0	-99	127	°C/10
P61	Offset sensor in KaController	0	-99	127	°C/10
P62	Offset analogue input AI2 (clip-on sensor)	0	-99	127	°C/10
P64	Offset analogue input AI3 (clip-on sensor)	0	-99	127	°C/10

The temperature setpoint is shown as standard in the display. The measured room temperature must be displayed to calibrate the sensor.
Parameter P37=2 must be set so that the room temperature can be displayed (Room temperature shown in the display, see Section 11.3.1).

11.3.9 Fan Actuation

Fan actuation can be adapted to the user's needs using various parameter settings

11.3.9.1 Maximum Fan Speed using Parameter P50

Parameter P50
Parameter P50 is used to set and limit the maximum fan speed.

	Function	Standard	Min	Max	Unit
P50	Maximum fan speed	100	0	100	%

ℹ

Alternatively, set the maximum fan speed using the potentiometer on the control board (PCB). Execute the minimum set value from P50 and the potentiometer as the maximum fan speed!
Example:
P50 = 80 %
Potentiometer = 50 %
Maximum fan speed = 50 %

11.3.9.2 Maximum Fan Speed using Potentiometer

The maximum fan speed can alternatively be prescribed by setting the potentiometer. The potentiometer setting is set by default to 100%.
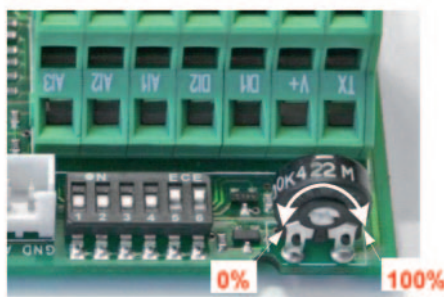
Potentiometer setting on the control PCB

Potentiometer setting:

- Disconnect the control before setting the potentiometer.
- Remove the cover on the control unit to set the potentiometer. The potentiometer is located on the control board (PCB) right next to the DIP switches.
- Use the potentiometer to limit the maximum fan speed (refer to parameter P50!).

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11.3.9.3 Minimum Fan Speed

Parameter P51
Parameter P51 is used to set and limit the minimum fan speed.

	Function	Standard	Min	Max	Unit
P51	Minimum fan speed	0	0	100	%

11.3.9.4 Speed Limitation in Automatic and Manual Fan Mode

Parameter P52
Parameter P52 is used to limit the fan speed only for automatic fan mode or also for manual fan mode

	Function	Standard	Min	Max	Unit

P52	Fan speed limit
	0 = Fan speed limit is enabled in automatic and manual fan
	    mode
	1 = Fan speed limit is only enabled in
	    automatic fan mode
		0	0	1	

11.3.9.5 Maximum Duration of Manual Fan Mode

Parameter P27
Parameter P27 is used to set the maximum duration of manual fan mode.
If manual fan mode is selected, the control switches back to automatic fan mode at latest on expiry of the time set in parameter P27.

	Function	Standard	Min	Max	Unit
P27	Maximum duration of manual fan mode 0 = Function is disabled	0	0	255	Minutes

ℹ️

Select the Fan menu using the KaController and set automatic fan mode in order to end the manual fan mode ahead of schedule.

11.3.9.6 Continuous Fan Mode

Parameter P29 can be used to actuate continuous fan mode. In continuous fan mode, the fan remains switched on at the pre-set fan stage, even if the room temperature has reached the setpoint (in Automatic fan mode Stage 1 remains enabled).

Parameter P27
Parameter P29 is used to set continuous fan mode

	Function	Standard	Min	Max	Unit
P29	0 = Continuous fan mode disabled 1 = Continuous fan mode enabled	0	0	1	

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11.3.9.7 Locking Fan Stages

Parameter P42
Parameter P42 can be used to lock individual fan stages (0, 1, 2, 3, 4, 5, AUTO). Locked fan stages cannot be selected manually using the KaController

	Function	Standard	Min	Max	Unit
P42	Parameter for locking fan stages	0	0	127	

Each fan stage is allocated a defined value.

Fan stage	Value	
Automatic fan mode	1	
Stage 0 (OFF)	2	
Stage 1	4	
Stage 2	8	
Stage 3	16	
Stage 4	32	
Stage 5	64	

Add the values of the locked fan stages together and assign them to parameter P42.

Fan stage	Value	
Automatic fan mode	1	
Stage 0 (OFF)	2	
Stage 1	4	
Stage 2	8	
Stage 3	16	
Stage 4	32	32
Stage 5	64	64
Parameter P42 setting: (Example)	**96**	

Example:
Locking fan stages 4 and 5

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11.3.10   Auto-Eco Function

The fan stages can be locked using the clip-on sensor depending on the water temperature. This application enables the central raising or lowering of the water temperatures in the building to be detected and managed at the respective Venkon AC/EC.

ℹ️

When a clip-on sensor is used, set DIP switch no. 3 to ON (see Section 10 "Setting Unit Configuration by Means of DIP Switches").

Slave units have to be equipped with a clip-on sensor to implement the function.

11.3.10.1 Water Temperature Limit in Heating Mode

Parameters P10, P11, P12
Parameters P10, P11 and P12 are used to set the limits for switching on the fan stages in heating mode.

	Function	Standard	Min	Max	Unit
P10	Limit temperature to actuate fan stages 1 and 2 in heating mode	26	0	255	°C
P11	Limit temperature to actuate fan stages 3 and 4 in heating mode	28	0	255	°C
P12	Limit temperature to actuate fan stage 5 in heating mode	30	0	255	°C

11.3.10.2 Water Temperature Limit in Cooling Mode

Parameter P14
Parameter P14 is used to set the limit for switching on the fan stages
in cooling mode.

	Function	Standard	Min	Max	Unit
P14	Limit temperature to actuate the fan stages in cooling mode	18	0	255	°C

11.3.11   Display: Heating/Cooling Symbols

Parameter P55
Parameter P55 is used to switch on and off the display of the heating and cooling symbol in Automatic mode

	Function	Standard	Min	Max	Unit
P55	0 = Heating and cooling symbols are continuously hidden 1 = Heating and cooling symbols are shown depending on the requirement	1	0	1	

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11.3.12 Setting Automatic Temperature Mode

Parameters can be used to set automatic temperature mode.

Parameter setting for automatic temperature mode.
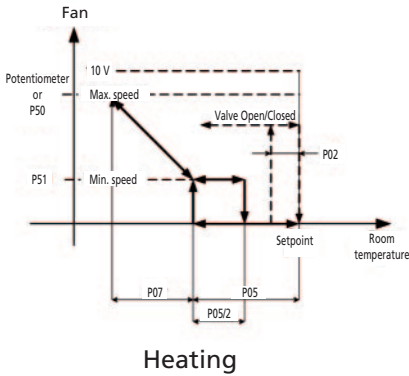
	Function	Standard	Min	Max	Unit
P02	Valve OPEN/CLOSED hysteresis	1	0	255	°C/10
P04	Natural convection, cooling	0	0	255	°C/10
P05	Natural convection, heating	3	0	255	°C/10
P07	P-band, heating	17	0	255	°C/10
P08	P-band, cooling	20	0	255	°C/10
P50**	Maximum fan speed	100	0	255	%
P51	Minimum fan speed	0	0	255	%

** Please note that the maximum fan speed is determined by the potentiometer setting or parameter P50 (min. selection)!

Heating

Cooling
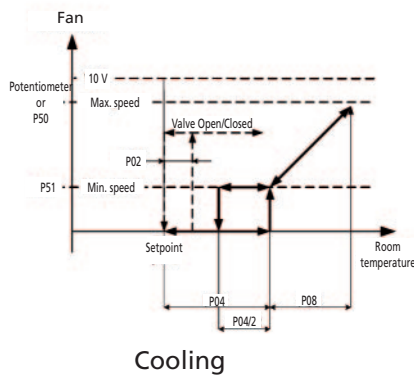
Parameter setting of PI controller
As an alternative to the P controller, a PI controller can be used to actuate the fan in automatic fan mode using parameter P41 for special applications. The PI controller is only enabled in automatic fan mode.

To prevent the PI controller from oscillating, adjust the P-band (heating (P07), the P-band (cooling) (P08) and the reset time (P41) to the behaviour of the control zone.

	Function	Standard	Min	Max	Unit
P41	Reset time for PI controller When P41=0, a P controller is enabled. Recommended reset time when using a PI controller: Reset time = 13 minutes	0	0	20	Minutes

11.3.13 Automatic Mode Settings in 4-Pipe Systems

In 4-pipe systems, the controller automatically specifies the operating mode in automatic mode depending on the room temperature and the setpoint. Automatic mode can be set using parameters P02 and P03.

Automatic mode in
4-pipe systems
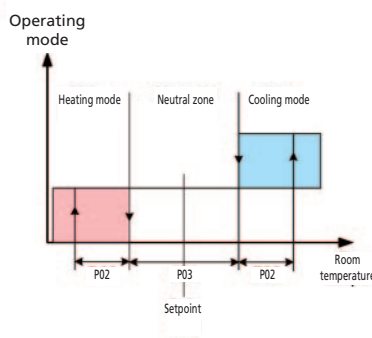
	Function	Standard	Min	Max	Unit
P02	see diagram	1	0	255	°C/10
P03	see diagram	3	0	255	°C/10

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11.3.14   Function of Digital Inputs DI1 and DI2

Parameter settings can be used to configure the function of digital inputs DI1 and DI2.

11.3.14.1 Function of DI1

Parameter P43
Parameter P43 is used to set the function of the digital input DI1.

	Function		Standard	Min	Max	Unit
P43	Function DI1		5	0	14	
	0 = no function					
	1 = ON/OFF	(Contact open → ON)				
	2 = heating/cooling changeover	(Contact open → heating)				
	3 = Eco/Day mode	(Contact open → day)				
	4 = no function	(Contact open → no function)				
	5 = condensate alarm	(Contact open → no condensate)				
	6 = general alarm	(Contact open → no alarm)				
	7 = ext. frost protection monitor	(Contact open → no frost)				
	8 = ON/OFF	(Contact closed → ON)				
	9 = heating/cooling changeover	(Contact closed → heating)				
	10 = Eco/Day mode	(Contact closed → day)				
	11 = no function	(Contact closed → no function)				
	12 = condensate alarm	(Contact closed → no condensate)				
	13 = general alarm	(Contact closed → no alarm)				
	14 = ext. Frost control monitor	(Contact closed → no frost)				

11.3.14.2 Function of DI2

The digital input DI1 is predominantly used to execute specific functions. If the use of the digital input DI2 is needed, then the following settings have to be made:
1. Set DIP switch no. 4 to OFF.
2. Configuration of the digital input DI2 using parameter settings P44.

ℹ️

If DIP switch no. 4 is set to ON, digital input DI2 changes over from heating to cooling in a 2-pipe system.

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Parameter P44

Parameter P44 is used to set the function of the digital input DI2 when
DIP switch no. 4 = OFF.

	Function		Standard	Min	Max	Unit
P44	Function DI2		0	0	14	
	0 = no function					
	1 = ON/OFF	(Contact open → ON)				
	2 = heating/cooling changeover	(Contact open → heating)				
	3 = Eco/Day mode	(Contact open → day)				
	4 = no function	(Contact open → no function)				
	5 = condensate alarm	(Contact open → no condensate)				
	6 = general alarm	(Contact open → no alarm)				
	7 = ext. frost protection monitor	(Contact open → no frost)				
	8 = ON/OFF	(Contact closed → ON)				
	9 = heating/cooling changeover	(Contact closed → heating)				
	10 = Eco/Day mode	(Contact closed → day)				
	11 = no function	(Contact closed → no function)				
	12 = condensate alarm	(Contact closed → no condensate)				
	13 = general alarm	(Contact closed → no alarm)				
	14 = ext. Frost control monitor	(Contact closed → no frost)				

Parameter P56

The polarity of digital input DI2 is set using parameter P56 when DIP switch no. 4
is set to ON.

	Function		Standard	Min	Max	Unit
P56	Polarity of the DI2 when DIP4 = ON (Heating/cooling changeover using DI2)		1	0	2	
	0 = Contact closed	→ heating				
	Contact open	→ cooling				
	1 = Contact open	→ heating				
	Contact closed	→ cooling				

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11.3.15   Function of Digital Inputs V1 and V2

The function of digital inputs V1 and V2 can be configured using parameter settings.

11.3.15.1 Digital Output V1

The digital output V1 is used for the following function, depending on the application;
2-pipe system → V1 = heating/cooling valve
4-pipe system → V1 = cooling valve

11.3.15.2 Digital output V2

The digital output V2 is used to actuate the heating valve in a 4-pipe system.

The digital output V2 can be configured using parameter P39 in a 2-pipe system.

	Function	Standard	Min	Max	Unit
P39	Function V2 in a 2-pipe system 0 = no function 1 = heat requirement 2 = cooling requirement 3 = unit alarm	0	0	3	

ℹ️

24 V DC is connected to digital output V2. The digital output is not a potential-free contact and can only be used with appropriate wiring!

11.3.15.3 Valve Control using PWM

Valve control can be provided by parameters with pulse width modulation (PWM) to set output to intermediate values with natural convection. PWM actuation is not enabled by default.

	Function	Standard	Min	Max	Unit
P40	Valve actuation using pulse width modulation 0 = Function is disabled 1 = Function is enabled	0	0	1	
P53	Valve switch cycle	15	10	30	minutes
P101	P-band for controller valve actuation using PWM in heating mode	15	0	100	°C/10
P102	P-band for controller valve actuation using PWM in cooling mode	15	0	100	°C/10
P103	Reset time for PI controller valve actuation using PWM If P103 = 0, a P controller is enabled. Recommended reset time when using a PI controller: Reset time =13 minutes	0	0	20	minutes
P104	Minimum switch-on time for valves in PWM mode	3	0	20	minutes

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11.3.16 Function of Multifunctional Inputs AI1, AI2, AI3

The function of the multifunctional inputs AI1, AI2 and AI3 can be configured using parameter settings

11.3.16.1 Function of AI1

Parameter P15
Parameter P15 is used to set the function of the multifunctional input AI1

ℹ️

The multifunctional input AI1 can only be set using parameter P15 if DIP switch no. 6 is set to ON! The setting of DIP switches is described in section 10.

	Function	Standard	Min	Max	Unit
P15	Function DI2 0 = not used (input disabled) 1 = NTC outdoor air sensor 2 = NTC cold/warm water sensor (clip-on sensor) 3 = NTC cold water sensor (clip-on sensor) 4 = NTC warm water sensor 5 = NTC ext. room temperature sensor/suction sensor 6 = 0..100 kOhm fan control 7 = 0..100 kOhm temperature setpoint 8 = 0..100 V BMS control heating/cooling 9 = 0..100 V BMS control heating 10 = Eco/Day mode ---------------------- Contact open →Day 11 = no function ------------------------- Contact open →no function 12 = Condensate alarm ----------------- Contact open →no condensate 13 = General alarm ----------------------- contact open →no alarm 14 = ext. frost protection monitor--- contact open →no frost 15 = Eco/Day mode ---------------------- contact closed →Day 16 = no function ------------------------- contact closed →no function 17 = Condensate alarm ----------------- contact closed →no condensate 18 = General alarm ---------------------- contact closed →no alarm 19 = ext. frost protection monitor----contact closed --> no frost	0	0	19	

11.3.16.2 Function of AI2

Parameter P16
Parameter PI6 is used to set the function of the multifunctional input AI2.

ℹ️

The multifunctional input AI2 can only be set using parameter P16 if DIP switch no. 3 is set to OFF! The setting of DIP switches is described in section 10.

	Function	Standard	Min	Max	Unit
P16	Function of AI2: see P15	0	0	19	

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11.3.16.3 Function of AI3

Parameter P17

Parameter PI7 is used to set the function of the multifunctional input AI3.

ℹ️

The multifunctional input AI3 can only be set using parameter P17 if DIP switch no. 3 is set to OFF! The setting of DIP switches is described in section 10.

ℹ️

The multifunctional input AI3 can only process analogue signals unlike inputs AI1 and AI2.

	Function	Standard	Min	Max	Unit
P17	Function of AI3 0 = not used (input disabled) 1 = NTC outdoor air sensor 2 = NTC cold/warm water sensor (clip-on sensor) 3 = NTC cold water sensor (clip-on sensor) 4 = NTC warm water sensor 5 = NTC ext. room temperature sensor/intake sensor 6 = 0..100 kOhm fan actuation 7 = 0..100 kOhm temperature setpoint 8 = 0..100 V BMS control of heating/cooling 9 = 0..100 V BMS control of heating	0	0	9	

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11.3.17 External Actuation using 0..10 Volt

The analogue inputs AI2 and AI3 offer the option of actuating the valves and the EC fan by means of 0..10 volt signals.

Set the DIP switches as per the diagram for actuation using 0...10 volt signals.

Connect the control signals 0...10 V to the analogue inputs AI2 and AI3
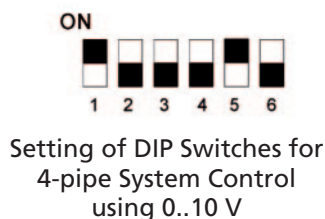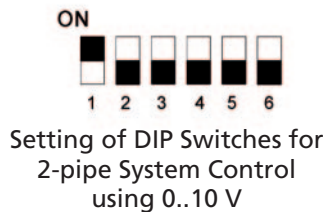
2-pipe system:
Heating/cooling 0..10 V → Analogue input AI2

4-pipe system:
Cooling 0..10 V → Analogue input AI2
Heating 0..10 V → Analogue input AI3

Setting of DIP Switches for 2-pipe System Control using 0..10 V

Setting of DIP Switches for 4-pipe System Control using 0..10 V

Parameter setting for actuation of the Venkon AC/EC using an on-site 0..10 volt signal.

	Function	Standard	Min	Max	Unit
P98	Valve switch-on limit	30	0	100	V/10
P99	Starting point of fan speed (min)	40	0	100	V/10
P100	End point of fan speed (max)	90	0	100	V/10

Function of standard setting:
0 V...3 V   Valve CLOSED, fan OFF
3 V...9 V   Valve OPEN
4 V...9 V   Valve OPEN, fan speed

Actuation of cooling valve

Actuation of heating valve

Valve actuation
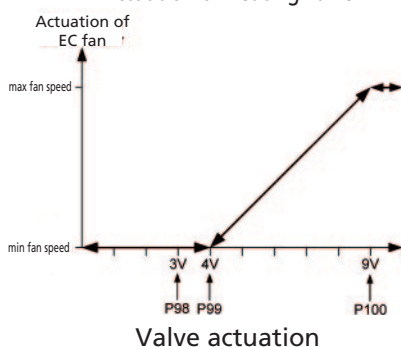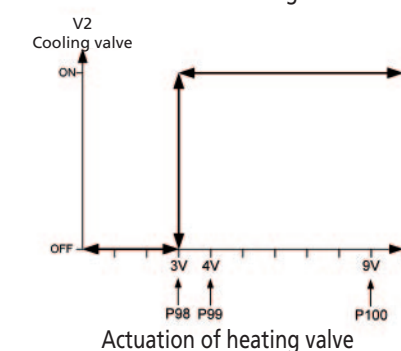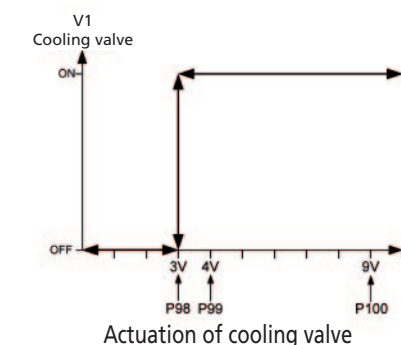
11.3.18 Locking Operating Options or Functions, Parameter 38

Parameter P38 can be used to lock individual operating options or functions. Parameter P38 has to be set for
• the ON/OFF function, Eco/Day in accordance with section 11.3.4
• the function Heating/cooling changeover in a 2-wire system in accordance with section 11.3.7

	Function	Standard	Min	Max	Unit
P38	Locking operating options or functions	72	0	255	

Every operating option or function is allocated a defined value.

	Value	
Automatic mode	1	
Cooling-only mode	2	
Real-time clock	4	
Ventilation-only mode	8	
Heating-only mode	16	
Automatic fan function	32	
Eco/Day function	64	
Timer programs	128	

The values of the locked operating options or functions must be added together and assigned to parameter P38.

Example: Lock
• *Eco/Day function*
• *Ventilation-only mode*

	Value	
Automatic mode	1	-
Cooling-only mode	2	-
Real-time clock	4	-
Ventilation-only mode	8	8
Heating-only mode	16	-
Automatic fan function	32	-
Eco/Day function	64	64
Timer programs	128	-
Setting of parameter P38: (Example)	**72**	

Example: Lock
• *Eco/Day function*
• *Ventilation-only mode*
• *Cooling-only mode*
• *Heating-only mode*

	Value	
Automatic mode	1	-
Cooling-only mode	2	2
Real-time clock	4	-
Ventilation-only mode	8	8
Heating-only mode	16	16
Automatic fan function	32	-
Eco/Day function	64	64
Timer programs	128	-
Setting of parameter P38: (Example)	**90**	

If Eco/Day function is locked, the ON/OFF function is automatically enabled (see section 11.3.4).
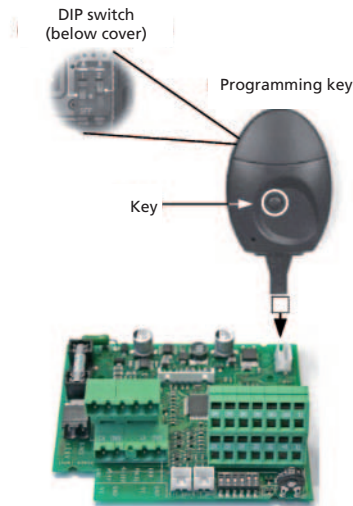
11.4 Programming Key

DIP switch
(below cover)

Programming key

Key

Important note:
Disconnect Venkon AC/EC
KaControl board before
connecting the
programming key.

The parameters
are loaded from
the PCB onto
the key.

OFF

DIP1=OFF
DIP2=OFF

The parameters
are loaded from
the key onto
the PCB.

OFF
ON

DIP1=OFF
DIP2=ON

After the parameters have been set, the set-up can be simply copied to other Venkon AC/EC control boards (PCBs) with the help of the programming key. Please follow the following steps to copy set-up:

1. Disconnect the previously programmed Venkon AC/EC control board.

Read parameters
2. Set the DIP switch for the programming key to Read mode (DIP1 = OFF, DIP2 = OFF).
   The DIP switches are located underneath the cover!
3. Plug the key into the 4-pin plug on the Venkon AC/EC board.
4. Press the button on the programming key.
   If the copy is successful, the red LED will light up followed by the green LED.

Upload parameters
5. Remove the programming key and set the internal DIP switches for the programming key to Write mode (DIP1 = OFF, DIP2 = ON)
6. Repeat steps 3 and 4 to write the parameters to the new Venkon AC/EC board.

Important note:
Disconnect the new Venkon AC/EC circuit board as well before writing the parameters.

ℹ️
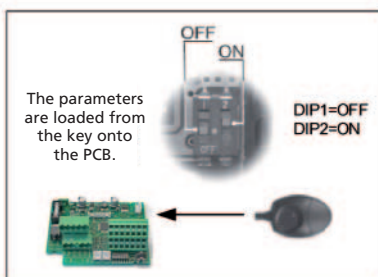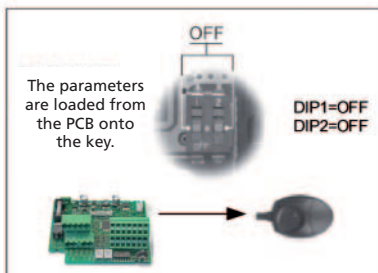
The programming key is not supplied as standard with the unit and can be ordered from Kampmann Customer Service as a non-standard accessory.

ℹ️

The software versions of the control circuit boards must be identical when reading and writing the parameter sets (see parameter P000).
It is not possible to read the parameters from a control board using software version "P000=10", for instance, and then write the parameters to a control board using software version "P000=15".

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12. Parameter List for the Control Board (PCB)

The parameters can be called up in the Service menu and adjusted to meet the needs of the system.
The steps to call up the Service menu are described in section 11.2.

	Function	Standard	Min	Max	Unit	Remark
P000	Software version (read-only)		0	255	-	
P001	Base setpoint for setpoint input ± 3 K	22	8	32	°C	page 34
P002	Valve on and off hysteresis	1	0	255	°C/10	page 44
P003	Neutral zone in a 4-pipe system	3	0	255	°C/10	page 44
P004	Cooling without fan assistance	0	0	255	°C/10	page 44
P005	Heating without fan assistance	3	0	255	°C/10	page 44
P006	Fan On/Off hysteresis (only in ventilation mode)	5	0	255	°C/10	
P007	P-band for heating	17	0	100	°C/10	page 44
P008	P-band for cooling	20	0	100	°C/10	page 44
P009	Shift from base setpoint for setpoint input ± 3 K	3	0	10	°C	
P010	Clip-on sensor: Limit temperature for actuation of fan stages 1 and 2 in heating mode	26	0	255	°C	page 38, 43
P011	Clip-on sensor: Limit temperature for actuation of fan stages 3 and 4 in heating mode	28	0	255	°C	page 38, 43
P012	Clip-on sensor: Limit temperature for actuation of fan stage 5 in heating mode	30	0	255	°C	page 38, 43
P013	Clip-on sensor: Hysteresis for limit temperatures P010, P011, P012, P014	10	0	255	°C/10	
P014	Clip-on sensor: Limit temperature for actuation of fan stages in cooling mode	18	0	255	°C	page 38, 43
P015	Function of input AI1	0	0	19	-	page 48
P016	Function of input AI2	0	0	19	-	page 48
P017	Function of input AI3	0	0	9	-	page 49
P018	Temperature rise of cooling setpoint in Eco mode	30	0	255	°C/10	page 36
P019	Temperature drop of heating setpoint in Eco mode	30	0	255	°C/10	page 36
P020	Setting of default value is mandatory	6	0	15	-	
P021	Setting of default value is mandatory	6	0	15	-	
P022	Setting of default value is mandatory	0	0	1	-	
P023	Setting of default value is mandatory	0	-99	127	°C/10	
P024	Setting of default value is mandatory	0	-20	20	1/10	
P025	Setting of default value is mandatory	0	-99	127	°C/10	
P026	Setting of default value is mandatory	0	-20	20	1/10	
P027	Fan setting: Maximum duration of manual fan operation	0	0	255	minutes	page 41

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	Function	Standard	Min	Max	Unit	Remark
P028	Rinsing function: Activation during the rinsing function	2	1	5	-	
P029	Activation of continuous fan mode	0	0	1	-	page 41
P030	Setting of default value is mandatory	12	0	255	°C	
P031	Setting of default value is mandatory	27	0	255	°C	
P032	Rinsing function: Maximum idle time of fan	15	0	255	Min	
P033	Rinsing function: Duration of rinsing function	240	0	255	s	

P034	Rinsing function: Activation in operating modes
	0 = Rinsing function disabled
	1 = Rinsing function is enabled in: - Cooling mode
	                                         - Automatic mode
	2 = Rinsing function is enabled in: - Heating mode
	                                         - Automatic mode
	3 = Rinsing function is enabled in: - Cooling mode
	                                         - Heating mode
	                                         - Automatic mode
		0	0	3	-	

P035	Setting of default value is mandatory	0	0	255	s	
P036	Setpoint setting 0 = Absolute setpoint setting 1 = Setpoint setting ± 3 K	0	0	1	-	page 34
P037	Display: 0 = No display 1 = Setpoint temperature display 2 = Room temperature display 3 = Sensor AI1 display 4 = Sensor AI2 display 5 = Sensor AI3 display 6 = Fan speed display in %	1	0	6	-	page 34
P038	8 = Eco/Day mode changeover 26 = Eco/Day mode changeover + Heating/cooling changeover using clip-on sensor (2-pipe system) 72 = ON/OFF changeover 90 = ON/OFF changeover + heating/cooling changeover using clip-on sensor (2-pipe system)	72	0	255	-	page 35, 37, 51
P039	Digital output V2: 0 = No function 1 = Heating requirement 2 = Cooling requirement 3 = Unit alarm	0	0	3	-	page 47
P040	Valve actuation using pulse width modulation 0 = Function is disabled 1 = Function is enabled	0	0	1	-	page 47
P041	Reset time for PI controller to actuate fan in automatic fan mode When P41 = 0, a P controller is enabled. Recommended reset time when using a PI controller: Reset time = 13 minutes	0	0	20	min	page 44

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	Function	Standard	Min	Max	Unit	Remark
P042	Fan setting: Locking and releasing fan stages	0	0	127	-	page 42
P043	Digital input DI1	5	0	14	-	page 45
P044	Digital input DI2	0	0	14	-	page 45
P045	Setting of default value is mandatory	10	0	100	kOhm	
P046	Setting of default value is mandatory	18	12	34	°C	
P047	Setting of default value is mandatory	24	13	35	°C	
P048	Setting of default value is mandatory	10	0	100	kOhm	
P049	Setting of default value is mandatory	90	0	100	kOhm	
P050	Fan setting: Max. fan speed	100	0	90	%	page 28, 40
P052	Fan setting: Speed limit 0 = Fan speed limitation is enabled in automatic fan mode and in manual fan mode 1 = Fan speed limitation is only enabled in automatic fan mode	0	0	1	-	page 41
P053	Valve actuation using pulse width modulation of valve switch cycle	15	10	30	Min	page 47
P055	Heating/cooling display symbols: in automatic mode 0 = Heating/cooling symbols disabled in automatic mode 1 = Heating/cooling symbols enabled in automatic mode	1	0	1	-	page 43
P056	DI2 setting: when DIP4 = ON 0 = Contact closed → Heating Contact open → Cooling 1 = Contact closed → Cooling Contact open → Heating	1	0	1	-	page 45, 46
P057	Setpoint set to the value of P01 after switching from Eco/Day or ON/OFF: 0 = Function is disabled 1 = Function is enabled	0	0	1	-	page 36
P058	Sensor calibration: Sensor AI1					
P061	Sensor calibration: Sensor in the KaController					
P062	Sensor calibration: Sensor AI2					
P064	Sensor calibration: Sensor AI3					
P093	Setting of default value is mandatory					
P094	Setting of default value is mandatory					
P095	Setting of default value is mandatory					

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	Function	Standard	Min	Max	Unit	Remark
P097	Read DIP switch (read-only): Display the DIP switch settings as a decimal number. The decimal number must be converted to a binary number. Example: Display: 37 (decimal) Calculation: 100101 (binary) DIP switch position: DIP1 = ON DIP2 = OFF DIP3 = OFF DIP4 = ON DIP5 = OFF DIP6 = ON	--	0	63	-	
P098	0..10 V actuation: Valve switch-on limit	30	0	100	V/10	page 50
P099	0..10 V actuation: Min. fan speed switch-on limit	40	0	100	V/10	page 50
P100	0..10 V actuation: Max. fan speed switch-on limit	90	0	100	V/10	page 50
P101	Valve actuation using pulse width modulation of P-band in heating mode	15	0	100	°C/10	page 47
P102	Valve actuation using pulse width modulation of P-band in cooling mode	15	0	100	°C/10	
P103	Valve actuation using pulse width modulation Reset time of PI controller When P103 = 0, a P controller is enabled. Recommended reset time when using a PI controller: Reset time = 13 minutes	0	0	20	Min	page 47
P104	Valve actuation using pulse width modulation Minimum switch-on time for valves in PWM mode	3	0	20	Min	page 47
P105	Setting of default value is mandatory	20	0	--	-	
P106	Setting of default value is mandatory	26	0	-	-	
P107	Setting of default value is mandatory	5	0	255	Min	
P108	Setting of default value is mandatory	240	35	255	Min	
P117	Functional keys: Locking and releasing	0	0	7	-	page 35

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13. Functional testing of the connected assemblies

The KaController provides the option of checking the function of the external units connected independently of the software application. The function of individual assemblies, such as the EC fan, can be directly enabled and checked by means of inputs on the KaController

The functional checks of the connected assemblies are called up and performed by the following operating steps:

1. Switch off the Venkon AC/EC by:
   • Pressing the ON/OFF button
   or
   • Pressing the navigator dial for min. 5 seconds
   or
   • Turning the navigator dial to the left until OFF is displayed.
2. Call up the Parameter menu by pressing the navigator dial for a minimum of 10 seconds. The display shows "Para" and then "CODE" with the value 000 in sequence.
3. Select the password (code) 77 by turning the navigator dial and confirm by pressing the navigator dial.
4. "L01" is shown on the display and the functional testing of the connected assemblies can start.

Important note:
The individual test steps are called up by pressing the navigator dial. The standard view with an "OFF" on-screen display is shown once the testing has been completed (L08).

Step	Input/Output	Display flashing	Display not flashing
L01*	Input AI1	Sensor faulty	Sensor OK
L02*	Input AI2	Sensor faulty	Sensor OK
L03*	Input AI3	Sensor faulty	Sensor OK
L04	Input DI1	Contact open	Contact closed
L05	Input DI2	Contact open	Contact closed
L06	Fan speed 0..10 V	--	Rising actuation of fan 0V→10V
L07	Valve output 1	--	Output V1 enabled
L08	Valve output 2	--	Output V2 enabled

*The control automatically detects the requisite sensors on the analogue inputs AI1-AI3 using the DIP switch settings. The respective display (L01-L03) flashes if sensors are faulty or not connected.

Observe hardware-related locks during functional testing (refer to the respective wiring diagram!)

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14. KaController Parameters

14.1 General

Specific user requirements can be enabled and disabled by means of parameter settings in the KaController, for instance the minimum and maximum setpoint temperature can be set using parameters in the KaController.

14.2 Calling Up the Parameter Menu

The following steps are needed to set the parameters:
1. Switch off the Venkon AC/EC by:
    • Pressing the ON/OFF button
      or
    • Pressing the navigator dial for min. 5 seconds
      or
    • Turning the navigator dial to the left until OFF is displayed.
2. Call up the Parameter menu by pressing the navigator dial for a minimum of 10 seconds. The display shows "Para" and then "CODE" with the value 000 in sequence.
3. Select the password (code) 11 by turning the navigator dial and confirm by pressing the navigator dial. You are now in the KaController's Parameter menu,
4. Setting parameters is now possible using the navigator dial.

Setting parameters:
• Turn the navigator dial to select the parameter.
• Press the navigator dial to call up Edit mode.
• Set the required value by turning the navigator dial.
• Press the navigator dial to save the new value.

There are 3 options to exit the Parameter menu and call up the standard view:
• If no action has been carried out using the navigator dial for longer than 2 minutes.
• Hold down the navigator dial for 5 seconds.
• Turn the navigator dial, select "ESC" on the display and confirm the selection by pressing the navigator dial.

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14.3 Parameter List KaController

	Function	Standard	Min	Max	Unit	Remark
t001	Serial address	1	0	207	-	
t002	Baud rate 0 = Baud rate 4800 1 = Baud rate 9600 2 = Baud rate 19200	2	0	2	-	
t003	Background lighting mode 0 = slow fade in, fast fade out 1 = slow fade in, slow fade out 2 = fast fade in, fast fade out	0	0	2	-	
t004	Strong background lighting	4	0	5	-	
t005	Calibration of sensor in KaController	0	-60	60	°C	
t006	LCD display contrast	15	0	15	-	
t007	BEEP setting 0 = BEEP ON 1 = BEEP OFF	0	0	1	-	
t008	Password for KaController parameter menu	11	0	999	-	
t009	Minimum settable setpoint temperature	8	0	20	°C	
t010	Maximum settable setpoint temperature	35	10	40	°C	

t011	Setpoint setting increment
	0 = automatic setting depending on control board
	  (PCB) (parameterisable, freely programmable)
	1 = 1 °C increment
	  (parameterisable PCBs)
	2 = 0.5 °C increment
	  (freely programmable PCBs)
		0	0	2	-	

t012	Date/time setting: Year	9	0	99	-	
t013	Date/Time setting: Month	1	1	12	-	
t014	Date/time setting: Day of month	1	1	31	-	
t015	Date/time setting: Day	1	1	7	-	
t016	Date/time setting: Hour	0	0	23	-	
t017	Date/time setting: Minute	0	0	59	-	

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