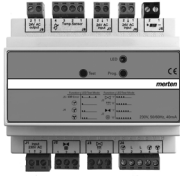


**Fan coil actuator REG-K**

**Article no.**

645093



**Function**

The fan coil actuator controls fan convectors (room air conditioning devices).

this type of device typically consists of one or two heat exchangers (heating/cooling, 4- or 2-pipe systems) that are coupled with a multi-level, controllable fan.

The flow-through quantity of the heat exchanger is controlled by electrical valves that are controlled by the fan coil actuator.

Three-point and thermal two-point valve drives can be connected to the device outputs for the valves. The power (24 V AC) is supplied by the device.

There are three floating contact outputs on the device for fans with up to three speed levels.

The fan coil actuator is activated by an external room controller via KNX, which is controlled based on a discrete time PI controller with target/actual value comparison.

In addition, there are inputs for a room temperature sensor (recording the actual temperature) on the fan coil actuator and two floating binary inputs. They can also be used indirectly for window contact and drip tray monitoring or other control functions.

All previously mentioned devices-connections are considered "local."

The fan coil actuator has a 230 V mains connection.

The KNX interface of the fan coil actuator enables communication with other KNX devices, as well as the exchange of data with a building conductor system.

In this case, KNX-enabled actuators/controllers can exchange information with the device through data objects.

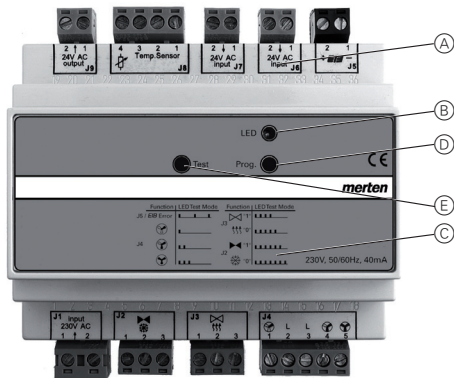
The application program enables valve activation using control commands in percentages. Correct allocation during parameterisation depends on the type of valve.

If the device is operated without a fan, the three floating outputs for the fan can be configured as KNX binary outputs (3 channels). Input objects 33, 34 and 35 are used to switch these outputs. It is also possible to connect a 1 or 2 level fan, and use the remaining outputs as KNX binary outputs.

The EIS types of the objects comply with KNX standards and enable the device to be linked to a visualisation (building conductor system).

**Display and operating elements, connections**

Figure 1:



Ⓐ Connector with screw terminal for connecting

| Terminals Description | Function                              |
|-----------------------|---------------------------------------|
| J1                    | Mains connection 2-pin 230 V AC       |
| J2                    | Valve connection 3-pin                |
| J3                    | Valve connection 3-pin                |
| J4                    | Fan 5-pin                             |
| J5                    | KNX bus 2-wire                        |
| J6                    | Binary input signalling contact 2-pin |
| J7                    | Binary input signalling contact 2-pin |
| J8                    | Binary input temperature sensor 4-pin |
| J9                    | Auxiliary voltage 24 V AC 2-pin       |

- Ⓑ LED display, normal operation off,
  - Address mode on,
  - Test mode flashing
- Ⓒ LED Test mode, LED flashes when test push-button A5 is pressed in the rhythm displayed.
- Ⓓ Prog. push-button switches between Address/Normal modes, for copying the physical address.
- Ⓔ Test push-button for actuating individual functions locally

**Installation**

The device is installed on DIN rails EN 50022 in distribution boards of the AP and UP installation types. All cable connections are placed on the screw terminals of the connector, and then fitted on the device with the connector audibly clicking into place.

- There are 2 installation types available:
1. Snapping the device onto the DIN rail as a complete unit with the connectors, or
  2. Removing the connectors from the fan coil actuator, snapping the device onto the DIN rails, and then fitting on the preassembled connector with connected cables.

Installation sequence:  
 To install the device in the DIN rail, insert the upper edge and push it in until you hear it click.  
 Pull the connector straight out manually or use a screwdriver and tilt.

Prepare the cables according to the technical data listed at "Connections" point and use screw terminals to create firm contact with the connector(s) in the terminal sockets.

Disconnect the connectors. Finally, plug them back into the device in the correctly coloured sockets, observing the mechanical connector coding. You must hear the connectors click into place.

To release the device from the DIN rail, push the locking bar downward using a screwdriver (Figure 2).

Fig. 2:



**Installation and start-up**

**Commissioning**

The device is supplied without installed program. The actuator with preferred local components functions only after the application program has been transferred (via ETS).

After activating the mains voltage, the device is immediately active and the connected valves/fans can be controlled accordingly.

The parameterised application program is transferred via KNX bus using ETS.

EIS type correlation must be observed when parameterising KNX components.

The physical address of the actuator is parameterised with ETS in compliance with the KNX standard.

**Installation note**

If the fan coil actuator is not installed in a distribution board, but instead is loose between false ceilings, double flooring or in/on heating and cooling devices, use strain reliefs to make sure that all cables are mechanically secured and free from strain. For safety, security and functional wiring, observe the recommended cable cross-sections according to the technical data.

Reverse polarity on connector J8 will destroy the temperature sensor.

**⚠ Risk of fatal injury** from electrical current.  
 The device may only be installed and connected by skilled electricians. Observe the country-specific

regulations.

The device may not be opened. In case of defects, ship it to our Service Centre.

**i** The sum of the switched currents per output must not exceed 6 A; cable protection should be applied here.

**i** The 230 V AC power supply must be secured by a cable protection switch.

**Mains failure 230 V:**

The valve outputs become de-energised and the relay contacts of the fan outputs open.

When the mains come back, the flow begins according to the selected parameters.

If the installation is restricted to locally-connected equipment, the device runs normally when the current comes back.

**KNX bus voltage failure:**

The hardware of the device is not designed for direct control of the bus voltage.

Thus, if the control value is not refreshed, an error status is generated; in addition, the device is switched to a configurable control value for heating.

When configuring the relevant KNX devices, also make sure that useful functions are secured when current comes back.

**Test functions**

The test functions described in this section can be executed with or without an installed application program. Explanation of the Test mode when test push-button A5 is pressed (flashing LED A2):

When test push-button A5 is continuously pressed for at least 4 sec., the device switches into test mode.

When the push-button is pressed again, it switches to the next test step. Flashing mode displays the respective active output.

The first test function displayed shows whether the KNX bus cable is connected and the bus coupling unit is able to function.

If the KNX bus is not able to function, this is displayed by regular flashing at a frequency of approx. 0.3 Hz.

This test is automatic without having to push a push-button.

| Terminal description | Function      | LED Flashing mode |
|----------------------|---------------|-------------------|
| J5                   | KNX bus error | x.....X.....X...  |

When test push-button A5 is continuously pressed for 4 sec. for the first time, the function of fan level I or the first speed level becomes active and is tested.

The output remains closed until the next test push-button is pressed. If no function is tested within the next minute, the device switches back to the parameterised program automatically. To reactivate Test mode, test push-button A5 has to be continuously pressed for 4 sec. again. The test begins from the beginning again.

| Terminal description | Function       | LED Flashing mode |
|----------------------|----------------|-------------------|
| J5                   | Fan level I on | x.....            |

The next test function is testing the second speed level II of the fan. The output continues to switch until a new test function is queried. It is not possible to jump test points (e.g. from J4 = level I to J4 = level III).

| Terminal description | Function     | LED Flashing mode |
|----------------------|--------------|-------------------|
| J4                   | Fan level II | x x.....          |

The same principle applies to level III.

| Terminal description | Function         | LED Flashing mode |
|----------------------|------------------|-------------------|
| J4                   | Fan level III on | x x x.....        |

For the heating and cooling valve outputs, pressing a push-button differentiates between valve "on" or "off." This means that the valve output retains its most recent function status.

The following are tested:

| Terminal description | Function          | LED Flashing mode |
|----------------------|-------------------|-------------------|
| J3                   | Heating valve on  | x x x x....       |
| J3                   | Heating valve off | x x x x x....     |
| J2                   | Cooling valve on  | x x x x x x...    |
| J2                   | Cooling valve off | x x x x x x x ..  |

Going through the Test mode completely switches all outputs on/off once, and the device automatically switches back to the parameterised program.

**Technical data**

**Power supply**

With integrated power supply unit J1, independent of KNX bus voltage, 230 V AC +/-10%, 50/60 Hz power consumption max. 5 VA

**Outputs**

- 3 floating J4 contacts  
Rated voltage 230 V AC +/-10%  
Rated current 6A
- 2 semiconductor switches J3 and J2  
Rated voltage 24 V AC  
Rated current 250 mA  
Max. permanent load per output 5 W (Ohmic load)  
Cable length 20 m
- 1 auxiliary voltage J9  
Designed for binary inputs J6 and J7  
24 V AC nominal, 5 mA

**Inputs**

- 2 binary inputs J6 and J7 for signalling contacts 24 V AC nominal
- Cable length 30 m
- KNX bus connection J5
- Temperature sensors J8  
Temperature sensor, art. no. 6450 91

**Operating elements**

- 1 programming push-button, for toggling Normal mode to Address mode
- 1 test push-button for locally toggling the individual output functions

**Display elements**

- 1 LED red for KNX bus voltage control for displaying Normal mode/Address mode, for displaying the output functions through different

flashing sequences

**Connections**

All plug-in connectors are mechanically coded and have different colours

| Terminal Colour | Function                                | Insulation strip length | Cable cross-section, single-core (mm <sup>2</sup> ) | Cable cross-section, finely-stranded (mm <sup>2</sup> ) |
|-----------------|---|-------------------------|---|---|
| J1 (gr)green    | Mains connection 2-pin.(L, N)           | 7                       | 1.0   | 1.0 ... 1.5   |
| J2 (blue)blue   | Valve connection 3-pin.                 | 7                       | 0.75 ... 1.0  | 0.75 ... 1.5  |
| J3 (rt)red      | Valve connection 3-pin.                 | 7                       | 0.75 ... 1.0  | 0.75 ... 1.5  |
| J4 (gr)green    | Fan 5-pin.                              | 7                       | 1.0   | 1.0 ... 1.5   |
| J5 (sw)black    | KNX 2-pin red +, black -                | 7                       | 0.3 ... 0.5   | -   |
| J6 (gr)green    | Binary input 2-pin. signalling contact  | 7                       | 0.5 ... 0.75  | 0.5 ... 1.5   |
| J7 (gr)green    | Binary input 2-pin. signalling contact  | 7                       | 0.5 ... 0.75  | 0.5 ... 1.5   |
| J8 (gr)green    | Binary input 4-pin. temperature sensors | 7                       | 0.5 ... 0.75  | 0.5 ... 1.5   |
| J9 (gr)green    | Aux. voltage 2-pin. 24 V AC             | 7                       | 0.5 ... 0.75  | 0.5 ... 1.5   |

**Mechanical data**

- Dimensions WxHxD: 105x107x58 mm;
- Serial built-in device
- Weight: 0.4 kg
- Installation: quick-fix to DIN rails EN 50022

**Accessories**

- Temperature sensor, art. no. 6450 91

**Electrical safety**

- Dirt and dust level 2
- Type of protection IP 20
- Bus extra-low safety voltage SELV DC 24 V

**Environmental conditions**

- Operating temperature -5°C to +50°C, not condensing
- Storage/transport temperature -25°C to +70°C

**Reliability**

- Failure rate 815 fit at 40°C

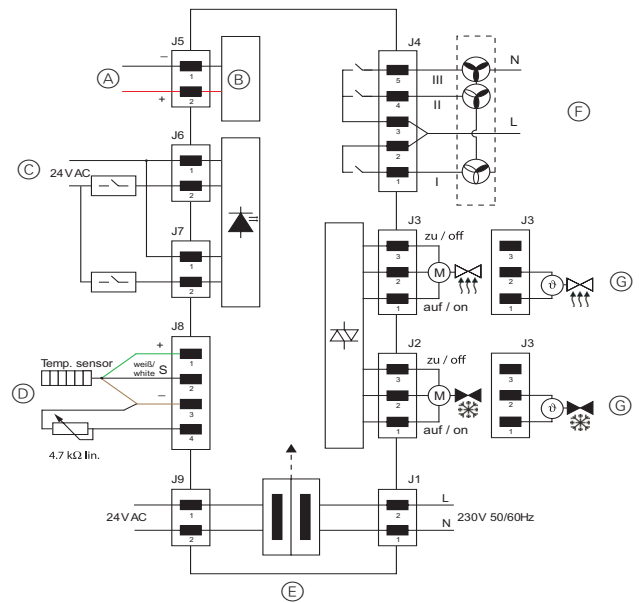
**CE mark**

According to EMC guidelines, low-voltage guideline (residential/commercial buildings)

**Certification**

KNX-certified

**Connection example:**



- Ⓐ KNX bus
- Ⓑ Bus coupler
- Ⓒ Binary input
- Ⓓ Temperature
- Ⓔ Fan coil actuator
- Ⓕ Fan
- Ⓖ Valve drives

## Settings in the KNX Tool Software (ETS)

Selection in the product database

|                 |  |
|-----------------|--|
| Program name:   | Fan coil actuator 4252/1.0             |
| Product family: | Heating, air conditioning, ventilation |
| Product type:   | Actuator                               |
| Manufacturer:   | Schneider Electric                     |
| suitable for:   |  |
| Product name:   | Fan coil actuator                      |
| Art. no.:       | MTN645093                              |

## Applications

The following applications can be selected:

| Application                | Vers. | Function |
|----------------------------|-------|----------|
| Fan coil actuator 4252/1.0 | 1.0   |          |

## Fan coil actuator 4252/1.0

### Communication objects

| Obj. | Function           | Object name  | Type   | Flag      |
|------|--------------------|--------------|--------|-----------|
| 0    | Actual temperature | Temp. sensor | 2 byte | C R W T A |

if a local temperature sensor is connected, this object serves as the output for the actual temperature as measured by the sensor. This takes into account the parameterised correction value. The parameterisation also allows cyclical sending. Type: EIS 5001.

|   |                    |                                  |       |       |
|---|--------------------|----------------------------------|-------|-------|
| 1 | Actual temperature | Error message Actual temperature | 1 bit | C R T |
|---|--------------------|----------------------------------|-------|-------|

This object allows an error message to be transmitted on the KNX bus, even if the actual temperature had not been refreshed within the parameterised time. The output of an error message can be performed once only or cyclically. Type: EIS 1.

|   |                  |                       |       |         |
|---|------------------|-----------------------|-------|---------|
| 7 | 2-wire operation | Activation of heating | 1 bit | C R W A |
|---|------------------|-----------------------|-------|---------|

Readable input object for toggling in heating between a two-pipe arrangement with common valve or general blocking / activating the heating.

This object does not appear in the ETS object list if Heating is blocked by parameterisation under "General".

It is stored as a non-volatile object. Type: EIS 1.

|   |                  |                       |       |         |
|---|------------------|-----------------------|-------|---------|
| 8 | 2-wire operation | Activation of cooling | 1 bit | C R W A |
|---|------------------|-----------------------|-------|---------|

Readable input object for toggling in cooling between a two-pipe arrangement with common valve or general blocking / activating the cooling.

This object does not appear in the ETS object list if Cooling is blocked by parameterisation under "General".

It is stored as a non-volatile object. Type: EIS 1.

|   |         |                |       |       |
|---|---------|----------------|-------|-------|
| 9 | Fan OFF | Fan manual OFF | 1 bit | C W A |
|---|---------|----------------|-------|-------|

Input object for manual control of the fan. The fan can be stopped by a KNX control unit (manual mode).

Type: EIS 1

|    |             |                    |       |       |
|----|-------------|--------------------|-------|-------|
| 10 | Fan level 1 | Fan manual Level 1 | 1 bit | C W A |
|----|-------------|--------------------|-------|-------|

Input object for manual control of the fan. The fan level 1 can be set by a KNX control unit (manual mode).

Type: EIS 1

|    |             |                    |       |       |
|----|-------------|--------------------|-------|-------|
| 11 | Fan level 2 | Fan manual Level 2 | 1 bit | C W A |
|----|-------------|--------------------|-------|-------|

Input object for manual control of the fan. The fan level 2 can be set by a KNX control unit (manual mode).

Type: EIS 1

|    |             |                    |       |       |
|----|-------------|--------------------|-------|-------|
| 12 | Fan level 3 | Fan manual Level 3 | 1 bit | C W A |
|----|-------------|--------------------|-------|-------|

Input object for manual control of the fan. The fan level 3 can be set by a KNX control unit (manual mode).

Type: EIS 1

|    |              |                     |        |       |
|----|--------------|---------------------|--------|-------|
| 15 | Fan 0 – 100% | Fan manual 0 – 100% | 1 byte | C W A |
|----|--------------|---------------------|--------|-------|

Input object for manual control of the fan. The fan can be set by a KNX control unit to a certain positive level by specifying a percentage value (manual mode).

Type: EIS 6

|    |                  |                          |       |       |
|----|------------------|--------------------------|-------|-------|
| 16 | Fan automatic On | Automatic mode manual On | 1 bit | C W A |
|----|------------------|--------------------------|-------|-------|

Input object for toggling the fan into automatic mode. This allows a KNX control unit to toggle the fan between manual mode and automatic mode. The levels are automatically taken from the setpoint.

Type: EIS 1.

|    |                           |                                  |       |       |
|----|---------------------------|----------------------------------|-------|-------|
| 17 | Status feedback Automatic | Status feedback object Automatic | 1 bit | C R T |
|----|---------------------------|----------------------------------|-------|-------|

This output object reflects the status of the fan, i.e. whether it is in manual or automatic mode.

0: Manual

1: Automatic

Type: EIS 1.

|    |                         |                                |       |     |
|----|-------------------------|--------------------------------|-------|-----|
| 18 | Status feedback Level 1 | Status feedback object Level 1 | 1 bit | K Ü |
|----|-------------------------|--------------------------------|-------|-----|

Output object for outputting the status "Fan level 1". Type: EIS 1.

|    |                         |                                |       |     |
|----|-------------------------|--------------------------------|-------|-----|
| 19 | Status feedback Level 2 | Status feedback object Level 2 | 1 bit | K Ü |
|----|-------------------------|--------------------------------|-------|-----|

Output object for outputting the status "Fan level 2". Type: EIS 1.

|    |                         |                                |       |     |
|----|-------------------------|--------------------------------|-------|-----|
| 20 | Status feedback Level 3 | Status feedback object Level 3 | 1 bit | K Ü |
|----|-------------------------|--------------------------------|-------|-----|

Output object for outputting the status "Fan level 3". Type: EIS 1.

|    |                            |                                 |        |       |
|----|----------------------------|---------------------------------|--------|-------|
| 21 | Control output for heating | Heating valve setpoint 0 – 100% | 1 byte | C W A |
|----|----------------------------|---------------------------------|--------|-------|

Input object for a KNX room temperature control unit. This allows the setpoint to act directly on the heating valve and on the fan. The opening / closing of the heating valve and the selection of the fan level depend on the parameterisation (valve adjustment, fan), proportional to the received control value in each case. When the "Control output for heating" is received, the cooling valve is closed at the same time. Type EIS 6

|    |                            |                                 |        |       |
|----|----------------------------|---------------------------------|--------|-------|
| 22 | Control output for cooling | Cooling valve setpoint 0 – 100% | 1 byte | C W A |
|----|----------------------------|---------------------------------|--------|-------|

Input object for a KNX room temperature control unit. This allows the setpoint to act directly on the cooling valve and on the fan. The opening / closing of the cooling valve and the selection of the fan level depend on the parameterisation (valve adjustment, fan), proportional to the received variable in each case. When the "Control output for cooling" is received, the heating valve is closed at the same time. Type EIS 6

|    |            |                             |        |       |
|----|------------|-----------------------------|--------|-------|
| 23 | Controller | PI controller control value | 2 byte | C W A |
|----|------------|-----------------------------|--------|-------|

Input object for the control value of a PI control unit. This object allows the actuator for heating and cooling to be addressed directly. Master / slave control with room temperature control unit 49550.

Type none EIS

|    |                |                 |       |       |
|----|----------------|-----------------|-------|-------|
| 24 | Dewpoint alarm | Dewpoint signal | 1 bit | C W A |
|----|----------------|-----------------|-------|-------|

This object can receive a dewpoint alarm from the KNX bus. When it is received, the cooling valve is closed. As soon as the signal ceases to be present, the cooling valve opens again, after a parameterised delay time.

Type: EIS 1.

|    |                              |                                     |       |       |
|----|------------------------------|-------------------------------------|-------|-------|
| 25 | Status feedback Fan On / Off | Status feedback object Fan On / Off | 1 bit | C R T |
|----|------------------------------|-------------------------------------|-------|-------|

Output object for the fan status, whether generally On or Off.

0 = Off

1 = On

Type EIS 1.

|    |                              |                                    |        |       |
|----|------------------------------|------------------------------------|--------|-------|
| 26 | Status feedback Fan On / Off | Status feedback object Fan 0 -100% | 1 byte | C R T |
|----|------------------------------|------------------------------------|--------|-------|

Output object for displaying the active fan level.

0% = Fan Off

33% = Level 1

66% = Level 2

100% = Level 3

Type EIS 6.

|    |         |         |       |       |
|----|---------|---------|-------|-------|
| 27 | Input 1 | Input 1 | 1 bit | C R T |
|----|---------|---------|-------|-------|

Output object for binary input connection **J7**.

Type: EIS 1.

|    |         |         |  |     |
|----|---------|---------|--|-----|
| 32 | Input 2 | Input 2 |  | CRT |
|----|---------|---------|--|-----|

Output object for binary input connection **J6**.

Type: EIS 1.

|    |               |                 |       |       |
|----|---------------|-----------------|-------|-------|
| 34 | Switch output | Switch output 2 | 1 bit | C W A |
|----|---------------|-----------------|-------|-------|

Input object for switch output ("Fan 2", **J4/4**)

Objects 34 and 35 are provided if fan outputs should act as universal binary outputs for the KNX bus. If the device is operated with only a single fan level, two floating outputs for the fan should be parameterised as entirely standard KNX binary outputs (2 channels). It is also possible to connect a 1-level or 2-level fan and use the remaining outputs as KNX binary outputs.

Type: EIS 1

|    |               |                 |       |       |
|----|---------------|-----------------|-------|-------|
| 35 | Switch output | Switch output 3 | 1 bit | C W A |
|----|---------------|-----------------|-------|-------|

Input object for switch output ("Fan 3", **J4/5**)

Type: EIS 1

**Description of this parameter**

| Parameter | Settings          |
|-----------|-------------------|
| Heating   | active<br>blocked |

The heating function can be selected or switched off.  
 If "blocked" is selected, some of the parameter windows listed below cease to apply.

|                     |                       |
|---------------------|-----------------------|
| Heating device type | Fan coil<br>Convector |
|---------------------|-----------------------|

*Convactor:* the device functions only as a control unit for radiators without fans

|         |                   |
|---------|-------------------|
| Cooling | active<br>blocked |
|---------|-------------------|

The cooling function can be selected or switched off.  
 If "blocked" is selected, some of the parameter windows listed below cease to apply.

|                     |                       |
|---------------------|-----------------------|
| Cooling device type | Fan coil<br>Convector |
|---------------------|-----------------------|

*Convactor:* the device functions only as a control unit for cooling units without fans

|        |   |
|--------|---|
| Valves | Heating valve / cooling valve<br>one common valve (heating and cooling) |
|--------|---|

*Heating valve / cooling valve:* Type of installation in a 4-pipe arrangement.  
*One common valve (heating and cooling):* Type of installation in a 2-pipe arrangement. One a single valve. is connected to the heating output.  
 Object 7 for activation of heating mode and object 8 for activation of cooling mode.

|  |   |
|--|---|
| Minimum change-over time between heating and cooling | Adjustment range 2 to 255 minutes<br>60 |
|--|---|

This parameter allows the pause in minutes to be set for changing over from heating to cooling and vice versa.

|  |   |
|--|---|
| Retention period after manual intervention (fan) | Adjustment range 0 to 510 minutes<br>10 |
|--|---|

If a fan level is selected by manual intervention, this setting is retained for the selected time in minutes. After that the fan control reverts to automatic mode.

If the setting is "0", the reversion to automatic mode after the manual intervention is blocked, i.e. the fan remains permanently in the last selected level; 1, 2, 3 or stop. (Reversion to automatic mode only after setting "Automatic mode" obj. 16!)

**3.1 Actual temperature**

| Parameter                                   | Settings |
|---|----------|
| Sensor for measuring the actual temperature | Local    |

The local temperature sensor is connected to the device by a 3-core cable. The temperature value is transmitted with the object 0.

|                  |  |
|------------------|--|
| Correction value | Adjustment range -3°C to +3°C<br>0,0°C |
|------------------|--|

This parameter offers the facility to correct the incoming sensor value if required.

|                                    |   |
|------------------------------------|---|
| Actual temperature monitoring time | Adjustment range 2 to 255 minutes<br>10 |
|------------------------------------|---|

The software regularly checks whether the sensor value has been refreshed within the set time.

|                               |                                    |
|-------------------------------|------------------------------------|
| Transmitting an error message | Cyclic repetition<br>No repetition |
|-------------------------------|------------------------------------|

If the actual temperature value has not been refreshed, an error message will be placed on the KNX bus; depending on the setting this may be once only or repeated cyclically. Object 1.

|                  |           |
|------------------|-----------|
| Cyclical sending | on<br>off |
|------------------|-----------|

The actual temperature can be transmitted cyclically on the KNX bus, object 0.

|                                |  |
|--------------------------------|--|
| Period for cyclic transmission | Adjustment range 2 to 255 minutes<br>2 |
|--------------------------------|--|

Determines the time at which the actual temperature value will be cyclically transmitted.

|                                     |  |
|-------------------------------------|--|
| Differential value for transmission | Adjustment range 0.1°C to 1.0°C<br>0,5 |
|-------------------------------------|--|

The actual temperature is also output when the value changes.

**3.2 Control value**

| Parameter  | Settings                                |
|--|---|
| Cycle time for monitoring receipt of the heating / cooling control value | Adjustment range 2 to 255 minutes<br>60 |

Determines the tie within which the setpoint should be transmitted at least once as a refresher

|  |                                  |
|--|----------------------------------|
| Control value (heating) in the absence of receipt of the control value | Adjustment range 0 to 100%<br>25 |
|--|----------------------------------|

If the setpoint is not refreshed within the parameterised cyclic interval, the specified control value for heating reference in the absence of a setpoint is automatically activated.

This parameter ensures absolute frost protection.

**3.3 Fan**

Effect of the setpoint on the fan and valves:

The fan and valves are influenced by the setpoint (obj. 21/22) of the external KNX controller so that in the last analysis a dependency between the settings for the valves and the fan levels also arises.

The following objects influence the fan:

- Object 9, 10, 11, 12, 15: manual operation of the fan
- Object 16: Change over into automatic mode

The following objects reflect the status:

- Object 17: Output of the fan status, i.e. manual or automatic
- Object 18, 19, 20, 25, 26: Output of the fan level

Diagram of the dependencies between the control values for the valves and the fan steps:

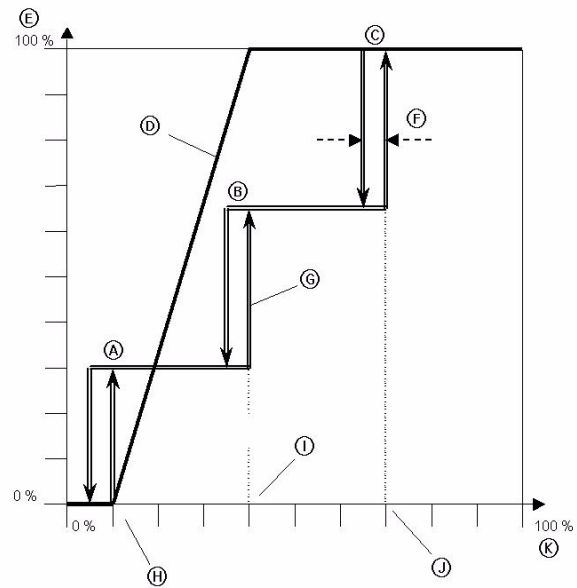


Figure 1:

- (A) Level 1
- (B) Level 2
- (C) Level 3
- (D) Valve
- (E) Valve setting / fan levels
- (F) Hysteresis
- (G) Fan
- (H) Threshold control value for switching on fan level 1
- (I) Threshold control value for switching on fan level 2
- (J) Threshold control value for switching on fan level 3
- (K) Control value (of controller)

The valve opens when fan level 1 is activated, and subsequently opens further up to 100% at the end of level 1. When fan levels 2 and 3 are activated, the valve always opens 100%.

The diagram shows the default threshold values of the controller control value on switching on the three fan levels (10%, 40%, 70%).

| Parameter | Settings              |
|-----------|-----------------------|
| Fan type  | Local (max. 3 levels) |

Different types of fans (1-level, 2-level or 3-level) can be connected to the device. The switch on / change over behaviour of the fan levels is set by this parameter.

|                      |   |
|----------------------|---|
| Number of fan levels | 3 |
|                      | 1 |
|                      | 2 |

The maximum number of fan levels is 3.

|  |                                  |
|--|----------------------------------|
| Threshold control value for switching on fan level 1 | Adjustment range 0 to 100%<br>10 |
|--|----------------------------------|

The *threshold control value* relates to the setpoint (obj. 21/22) of the external KNX controller, assigned to the fan level 1 (i.e. 10% on the X-axis in the previous dependencies diagram).

Parameter value "0" means level 1 is switched on if the value is less than the *setpoint for fan level 2* and even for setpoint ( 0%).

|  |                                  |
|--|----------------------------------|
| Threshold control value for switching on fan level 2 | Adjustment range 0 to 100%<br>40 |
|--|----------------------------------|

The *threshold control value* relates to the setpoint (obj. 21/22) of the external KNX controller, assigned to the fan level 2 (i.e. 40% on the X-axis in the previous dependencies diagram).

Parameter value "0" means level 2 is switched on if the value is less than the *setpoint for fan level 3* and even for setpoint ( 0%).

|  |                                  |
|--|----------------------------------|
| Threshold control value for switching on fan level 3 | Adjustment range 0 to 100%<br>70 |
|--|----------------------------------|

The *threshold control value* relates to the setpoint (obj. 21/22) of the external KNX controller, assigned to the fan level 3 (i.e. as the 70% default on the X-axis in the previous dependencies diagram).

Parameter value "0" means level 3 is switched on permanently even for setpoint ( 0%).

|                                |   |
|--------------------------------|---|
| Starting characteristic of fan | Switching on at level 3<br>directly switching on<br>Switching on at level 2 |
|--------------------------------|---|

So as to ensure a secure start-up of the fan motor it is often sensible to start at a speed one level higher, so as to obtain a higher starting torque.

|   |   |
|---|---|
| Minimum residence time at the switch-on level | Adjustment range 2 to 255 seconds<br>10 |
|---|---|

The start-up time of the fan is entered here; this can vary from fan to fan, depending on the moment of inertia of the rotating parts.

|                                      |   |
|--------------------------------------|---|
| Change-over delay between fan levels | Adjustment range 0.5 to 10.0 seconds<br>1,0 |
|--------------------------------------|---|

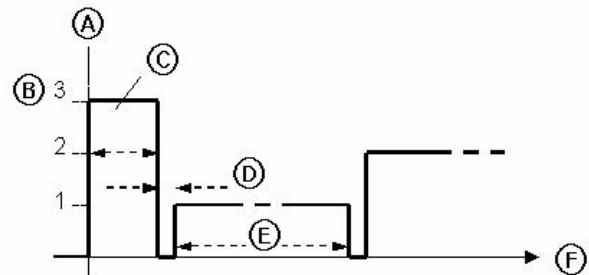
This can be selected as required to suit the size of the fan.

|   |   |
|---|---|
| Minimum residence time at the fan level | Adjustment range 2 to 255 minutes<br>10 |
|---|---|

This is intended to prevent the disconcerting experience of frequent changes

Fan starting behaviour

Relates to start-up time, residence time and change-over delay between the fan levels.



- (A) Fan levels
- (B) Level
- (C) Response time
- (D) Change-over time:
- (E) Residence time
- (F) Time

Here level 3 is selected for starting up the fan. After a start-up time and then a change-over pause, the desired level is set, here for instance level 1.

This ensures that the fan starts with a high starting torque, which better enables it to overcome the high initial friction in the bearings.

Valve actuation

| Parameter                                 | Settings                         |
|---|----------------------------------|
| Control value for the valve closure point | Adjustment range 0 to 100%<br>10 |

See below.

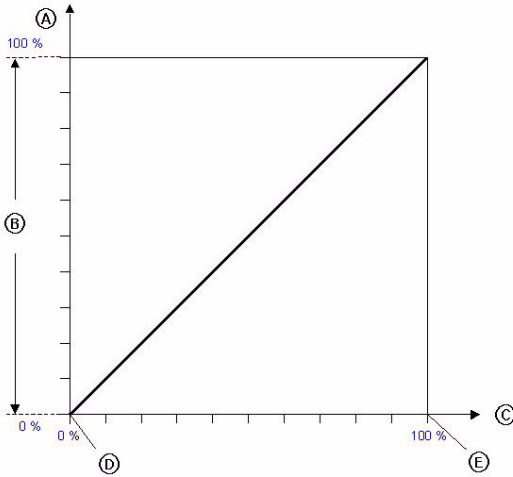
|   |                                  |
|---|----------------------------------|
| Control value for fully opening the valve | Adjustment range 0 to 100%<br>60 |
|---|----------------------------------|

These two parameters represent the valve setting range defined by the external controller on the value axis of the setpoint (obj. 21/22), i.e. they determine the controller setpoint at which the valve must open, and the controller setpoint at which the valve must open 100% (see figure 1 for the dependencies: the two end points of the oblique straight lines where they intersect the X-axis. Values in %)

Note: these default values are equal to the default values for the *Threshold control value for switching on fan level 1* and *...2* (see dependencies diagram), but can be varied independently of them

**Valve types**

An individual valve adjustment can be performed for each valve type. The properties of the parameters available for valve adjustment are shown in the following diagrams.

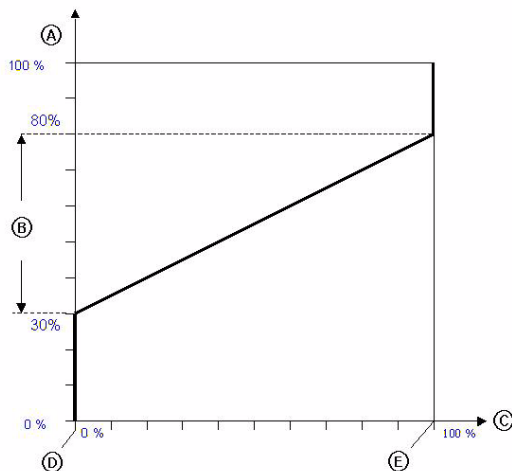


- (A) Valve position
- (B) active valve opening range
- (C) Valve control variable (output from controller)
- (D) minimum controller output at which the valve remains closed
- (E) maximum controller output for fully opened valve

For diagram: no valve adjustment, i.e. valve adjustment in the parameter list is Off (default):

In this case the valve control value range of 0 to 100% output by the controller exactly corresponds to the active valve opening range 0 to 100%.

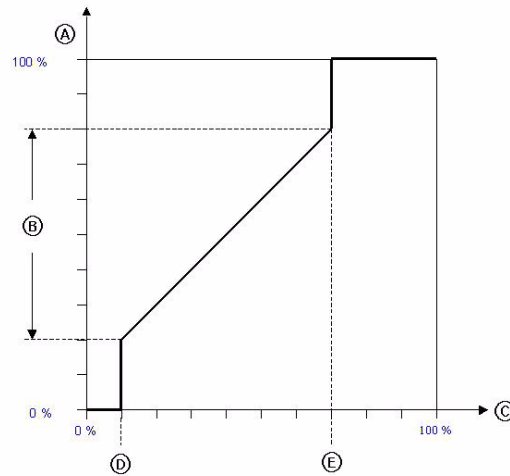
Examples of valve adjustment:



- (A) Valve position
- (B) active valve opening range
- (C) Valve control value (output from controller)
- (D) minimum controller output at which the valve remains closed
- (E) maximum controller output for fully opened valve

Example for a valve that does not open until 30% but at 80% is already fully open.

The valve control value here spans the controller range 0 to 100%.



- (A) Valve position
- (B) active valve opening range
- (C) Valve control value (output from controller)
- (D) minimum controller output at which the valve remains closed
- (E) maximum controller output for fully opened valve

Example for a valve that does not open until 20% but at 80% is already fully open.

The value range of the valve control value is however here reduced to 10% to 70%.

All inflection points in the valve characteristics can be adjusted for the individual valve types.

**Heating valves**

**Valve type 3-point, continuous**

| Parameter             | Settings  |
|-----------------------|---|
| Type of heating valve | Continuous 3-point valve<br>3-point valve, pulse range modulated<br>Thermal valve |

The devices supports 3-point and also thermal valve drives.

Default setting: **Continuous 3-point valve**

|                  |           |
|------------------|-----------|
| Valve adjustment | off<br>on |
|------------------|-----------|

The valve adjustment addresses the active valve opening range and the external controller setpoint range.

The valve adjustment can be switched On or Off as required.

|   |                                 |
|---|---------------------------------|
| minimum controller output at which the valve remains closed | Adjustment range 0 to 100%<br>0 |
|---|---------------------------------|

Displayed only when valve adjustment "On".

Sets the lower limit of the valve control value output from the controller.

|  |                                   |
|--|-----------------------------------|
| maximum controller output for fully opened valve | Adjustment range 0 to 100%<br>100 |
|--|-----------------------------------|

Displayed only when valve adjustment "On".

Sets the upper limit of the valve control value output from the controller.

|   |                                 |
|---|---------------------------------|
| Lower limit of the active valve opening range | Adjustment range 0 to 100%<br>0 |
|---|---------------------------------|

Displayed only when valve adjustment "On".  
Here the lower limit at which the valve just opens can be set.

|   |                                   |
|---|-----------------------------------|
| Upper limit of the active valve opening range | Adjustment range 0 to 100%<br>100 |
|---|-----------------------------------|

Displayed only when valve adjustment "On".  
Here the upper limit at which the valve just opens can be set.

|                               |  |
|-------------------------------|--|
| Movement time for 100% stroke | Adjustment range 60 to 3000 seconds<br>120 |
|-------------------------------|--|

Here the individual time for a complete stroke of this type of valve is set.

|                           |                                |
|---------------------------|--------------------------------|
| Valve response hysteresis | Adjustment range 1 to 10%<br>2 |
|---------------------------|--------------------------------|

The valve is then activated only if the change in the setpoint is more than this hysteresis setting (in %). Increasing this value has the effect of permanently reducing the number of movements in response to changes in the setpoint, which increases the working life of the valve.

**Valve type 3-point, pulse width modulated**

| Parameter             | Settings                             |
|-----------------------|--------------------------------------|
| Type of heating valve | 3-point valve, pulse range modulated |

(was selected)

|                  |           |
|------------------|-----------|
| Valve adjustment | off<br>on |
|------------------|-----------|

The valve adjustment addresses the active valve opening range and the external controller setpoint range.  
The valve adjustment can be switched On or Off as required.

|   |                                 |
|---|---------------------------------|
| minimum controller output at which the valve remains closed | Adjustment range 0 to 100%<br>0 |
|---|---------------------------------|

Displayed only when valve adjustment "On".  
Sets the lower limit of the valve control value output from the controller.

|  |                                   |
|--|-----------------------------------|
| maximum controller output for fully opened valve | Adjustment range 0 to 100%<br>100 |
|--|-----------------------------------|

Displayed only when valve adjustment "On".  
Sets the upper limit of the valve control value output from the controller.

|   |                                 |
|---|---------------------------------|
| Lower limit of the active valve opening range | Adjustment range 0 to 100%<br>0 |
|---|---------------------------------|

Displayed only when valve adjustment "On".  
Here the lower limit at which the valve just opens can be set.

|   |                                   |
|---|-----------------------------------|
| Upper limit of the active valve opening range | Adjustment range 0 to 100%<br>100 |
|---|-----------------------------------|

Displayed only when valve adjustment "On".  
Here the upper limit at which the valve just opens can be set.

|                          |   |
|--------------------------|---|
| Heating valve cycle time | Adjustment range 1 to 255 minutes<br>25 |
|--------------------------|---|

The controller setpoint is output to the valve as a coded pulse-pause ratio. At the end position of the valve this pulse width modulated signal is switched off.  
The cycle time is the pulse width modulated signal periodicity.

|                               |  |
|-------------------------------|--|
| Movement time for 100% stroke | Adjustment range 60 to 3000 seconds<br>120 |
|-------------------------------|--|

Here the individual time for a complete stroke of this type of valve is set.

**Thermal type valve, (pulse width modulated):**

| Parameter             | Settings      |
|-----------------------|---------------|
| Type of heating valve | Thermal valve |

(was selected)

|                  |           |
|------------------|-----------|
| Valve adjustment | off<br>on |
|------------------|-----------|

The valve adjustment addresses the active valve opening range and the external controller setpoint range.  
The valve adjustment can be switched On or Off as required.

|   |                                 |
|---|---------------------------------|
| minimum controller output at which the valve remains closed | Adjustment range 0 to 100%<br>0 |
|---|---------------------------------|

Displayed only when valve adjustment "On".  
Sets the lower limit of the valve control value output from the controller.

|  |                                   |
|--|-----------------------------------|
| maximum controller output for fully opened valve | Adjustment range 0 to 100%<br>100 |
|--|-----------------------------------|

Displayed only when valve adjustment "On".  
Sets the upper limit of the valve control value output from the controller.

|   |                                 |
|---|---------------------------------|
| Lower limit of the active valve opening range | Adjustment range 0 to 100%<br>0 |
|---|---------------------------------|

Displayed only when valve adjustment "On".  
Here the lower limit at which the valve just opens can be set.

|   |                                   |
|---|-----------------------------------|
| Upper limit of the active valve opening range | Adjustment range 0 to 100%<br>100 |
|---|-----------------------------------|

Displayed only when valve adjustment "On".  
Here the upper limit at which the valve just opens can be set.

Displayed only when valve adjustment "On".  
Defines the right hand end of the horizontal straight line in the range of the closed valve (in the diagram this is given by the coordinates 100,100, corresponding to the default value 100%)

|                          |   |
|--------------------------|---|
| Heating valve cycle time | Adjustment range 1 to 255 minutes<br>25 |
|--------------------------|---|

The controller setpoint is output to the valve as a coded pulse-pause ratio. At the end position of the valve this pulse width modulated signal is switched off.

The cycle time is the pulse width modulated signal periodicity.

Attention: Shortening the cycle time has the effect of permanently increasing the number of movement cycles, which reduces the working life of the valve.

**Cooling valves**

The parameters for cooling valves are identical to those for heating valves, with the exception of two of the default values:

Default values *Cooling valve cycle times*:

- Valve type "local" 3-point, pulse length modulated: **15** minutes
- Thermal valve type "local" 3-point, pulse length modulated: **10** minutes

**Inputs**

| Parameter | Settings                       |
|-----------|--------------------------------|
| Input 1   | Normal input<br>Inverted input |

Binary input (connection J7) e.g. for window contact or control contact etc. Object 27.

|                          |                                       |
|--------------------------|---------------------------------------|
| Debounce time input 1... | 2<br>Adjustment range 0 – 255 seconds |
|--------------------------|---------------------------------------|

Defines the contact debounce time or applies a delay time to the signal transmission, e.g. for control functions, condensation sensors etc. .

|         |                                |
|---------|--------------------------------|
| Input 2 | Normal input<br>Inverted input |
|---------|--------------------------------|

Binary input (connection J6) e.g. for window contact or control contact etc. Object 32.

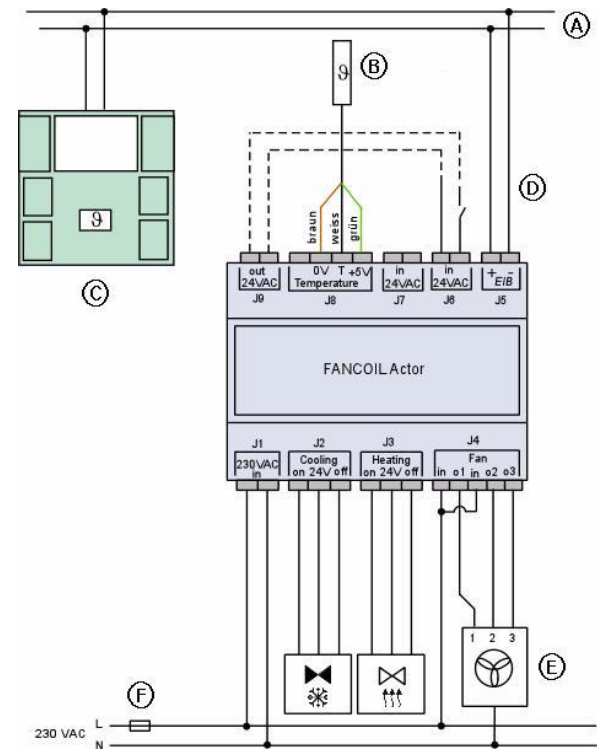
**Dewpoint sensor**

| Parameter  | Settings                               |
|--|--|
| Blocked time for cooling after the end of the dewpoint alarm | Adjustment range 0 to 255 minutes<br>5 |

The dewpoint alarm blocks the cooling function for the selected time. The dewpoint alarm is conveyed by the KNX bus, object 24

**Application examples**

**Standard application with the room temperature control unit**



- (A) KNX bus
- (B) Local temperature sensor (optional)
- (C) KNX room temperature control unit with integral temperature sensor
- (D) Window contact
- (E) Fan coil with 3 speed levels
- (F) Protection

**i** Cable and device protection: Max. 6 Amp fuse rating. (see also the fan coil manufacturer's instructions)

**Notes:**

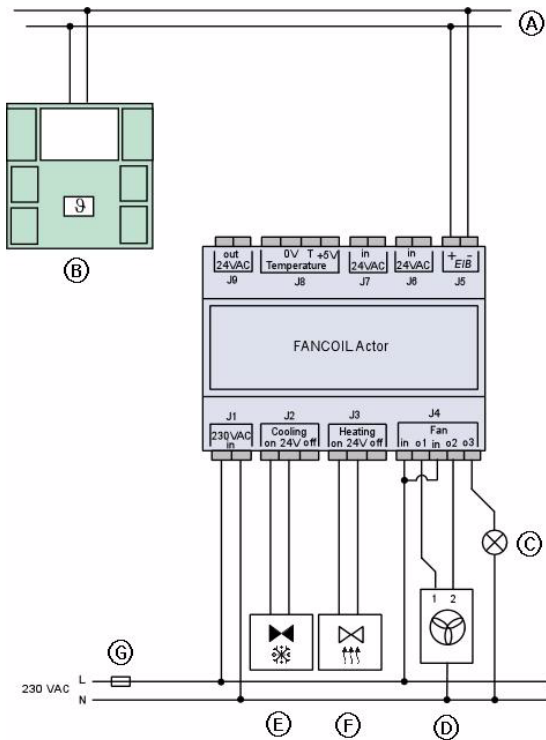
With appropriate parameterisation, commissioning can be performed using the "Default settings".

The following components are connected to the device:

- separate valves for heating and cooling, type: Continuous 3-point valve
- Fan coil with local fan with 3 speed levels
- if necessary, a window contact
- if necessary, a local temperature sensor (3 connection cores), type Woertz article no. 49570

**Lighting control**

- Local fan with 2 speed levels
- Lighting control using the KNX bus
- Thermal valves



- (A) KNX bus
- (B) KNX room temperature control unit with integral temperature sensor
- (C) Lighting
- (D) Fan coil with 2 speed levels
- (E) Cooling valves
- (F) Heating valve
- (G) Protection

**i** Cable and device protection: Max. 6 Amp fuse rating. (see also the fan coil manufacturer's instructions)

Notes: The outer conductor L is a common connection for the fan and lighting on the fan coil actuator.

**Parameter settings in the ETS**

Fan with 2 speed levels:

|  |                         |
|--|-------------------------|
| Index fan  |                         |
| Fan type   | local (max. 3 levels)   |
| Number of fan levels                                 | 2                       |
| Threshold control value for switching on fan level 1 | 10                      |
| Threshold control value for switching on fan level 1 | 40                      |
| Starting characteristic of fan                       | Switching on at level 2 |
| Minimum residence time at the starting level         | 10                      |
| Change-over delay between fan levels                 | 1,0                     |
| Minimum residence time at the fan level              | 10                      |

Select the number of fan levels as "2". Under "starting characteristic" however "Switching on at level 2" or "Direct switch on" must be selected.

Lighting:

Object 35 ("Fan level 3") for the KNX group address corresponding to the lighting control must be assigned for switching the lighting on or off.

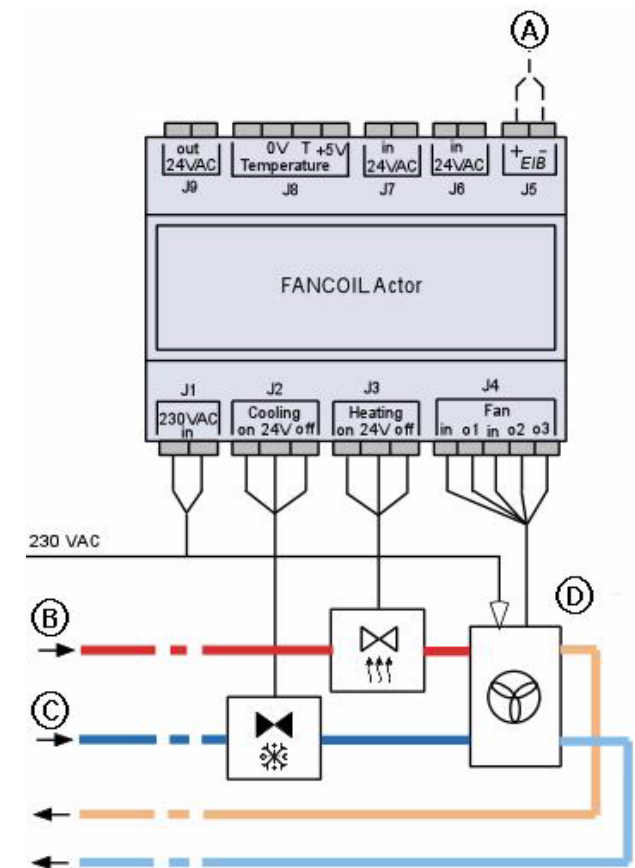
Thermal heating valve:

|                          |                                   |
|--------------------------|-----------------------------------|
| Index heating valve      |                                   |
| Type of heating valve    | Thermal valve                     |
| Number of fan levels     | normal (closed when de-energised) |
| Valve adjustment         | off                               |
| Heating valve cycle time | 25                                |

Thermal cooling valve:

|                                      |                                   |
|--------------------------------------|-----------------------------------|
| Index cooling valve:                 |                                   |
| Cooling valve type                   | Thermal valve                     |
| Cooling valve direction of operation | normal (closed when de-energised) |
| Valve adjustment                     | off                               |
| Cooling valve cycle time             | 15                                |

**Type of installation in a 4-pipe arrangement**



- (A) KNX bus
- (B) Hot water
- (C) Cold water
- (D) Fan coil

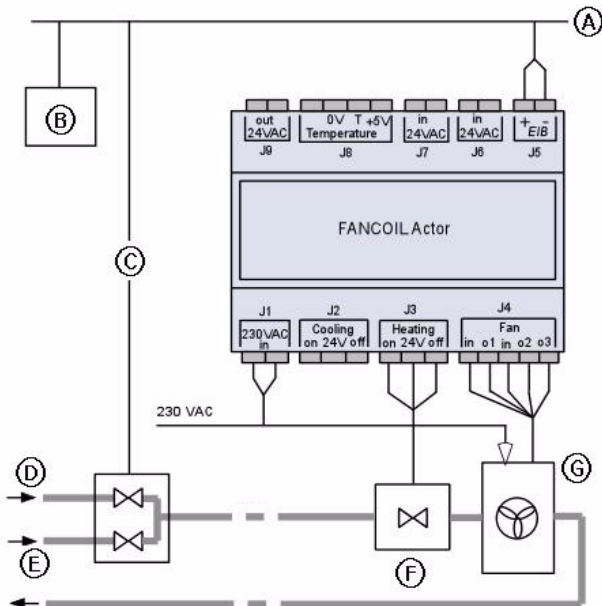
Examples 1 and 2 for installation in a 4-pipe arrangement.

**Parameter settings in the ETS:**

|                     |                               |
|---------------------|-------------------------------|
| General index       |                               |
| Heating             | active                        |
| Heating device type | Fan coil                      |
| Cooling             | active                        |
| Cooling device type | Fan coil                      |
| Valves              | Heating valve / cooling valve |

| General index  |    |
|--|----|
| Minimum change-over time between heating and cooling | 60 |
| Retention period after manual intervention (fan)     | 10 |

**Type of installation in a 2-pipe arrangement**



- (A) KNX bus
- (B) Central unit
- (C) Heating/cooling
- (D) Hot water
- (E) Cold water
- (F) Common valve
- (G) Fan coil

- The change-over between hot water and cold water is performed by a central unit.
- The common valve (3-point valve) is connected to the "Heating valve" connection

**Parameter settings in the ETS:**

| General index  |                                      |
|--|--------------------------------------|
| Heating  | active                               |
| Heating device type                                  | Fan coil                             |
| Cooling  | active                               |
| Cooling device type                                  | Fan coil                             |
| Valves   | 1 common valve (heating and cooling) |
| Minimum change-over time between heating and cooling | 60                                   |
| Retention period after manual intervention (fan)     | 10                                   |