

# SIEMENS



## **Touchscreen flush-mount room thermostats with KNX communications RDF800KN..., RDD810KN/NF**

### **Basic documentation**



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# 1. About this document

## 1.1 Revision history

Edition	Date	Changes	Section	Pages
02	2015-06-08	Minor changes and corrections	all	-
01	2014-11-20	First edition	-	-

## 1.2 Reference documents

Subject	Ref	Doc no.	Description
Touchscreen flush-mount room thermostats with KNX communications	[1]	CE1B3174.1xx CE1B3174.2xx	RDF800KN.. and RDD810KN/NF User Manuals
	[2]	CE1N3174	RDF800KN.. Data Sheet
	[3]	CE1N3175	RDD810KN.. Data Sheet
KNX Manual	[4]	Handbook for Home and Building Control – Basic Principles ( <a href="http://www.knx.org/knx-en/training/books-documentation/knx-association-books/index.php">http://www.knx.org/knx-en/training/books-documentation/knx-association-books/index.php</a> )	
Synco and KNX (see <a href="http://www.siemens.com/synco">www.siemens.com/synco</a> )	[5]	CE1N3127	KNX bus, Data Sheet
	[6]	CE1P3127	Communication via the KNX bus for Synco 700, 900 and RXB/RXL, Basic Documentation
	[7]	XLS template in HIT	Planning and commissioning protocol, communication Synco 700
	[8]	CE1N3121	RMB795B central control unit, Data Sheet
	[9]	CE1Y3110	KNX S-mode data points
	[10]	--	Product data for ETS
	[11]	CE1J3110	ETS product data compatibility list
	[12]	0-92168en	Synco Application Manual
Desigo Engineering Documents	[13]	CM1Y9775	Desigo RXB integration – S-mode
	[14]	CM1Y9776	Desigo RXB/RXL integration – Individual Addressing
	[15]	CM1Y9777	Third-party integration
	[16]	CM1Y9778	Synco integration
	[17]	CM1Y9779	Working with ETS



## 1.3 Before you start

### 1.3.1 Copyright

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### 1.3.2 Quality assurance

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## 1.4 Target audience, prerequisites

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This document assumes that users of the RDF800KN../RDD810KN.. thermostats are familiar with the ETS and/or Synco ACS tools and can use them.

It is also assumed that these users are aware of the specific conditions associated with KNX.

In most countries, specific KNX know-how is conveyed through training centers certified by the KNX Association (see [www.knx.org/](http://www.knx.org/)).

For reference documentation, see section 1.2.

## 1.5 Conventions used in this document

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Throughout this document, parameters are specified as **P[parameter number]**. For example, P30.

## 1.6 Glossary

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The inputs, outputs and parameters of an application can be influenced in various ways. These are identified by the following symbols in this document:



**ETS**

Parameters identified by this symbol are set using ETS.



**ACS**

Parameters identified by this symbol are set using ACS.



**Note!**

**The setting of RDF800KN../RDD810KN.. parameters is only supported by the following tool versions:**

- ETS4 or higher
- ACS version 8.28 or higher



Inputs and outputs identified by this symbol communicate with other KNX devices. They are called communication objects (CO).

The communication objects of the RDF800KN../RDD810KN.. room thermostats work partly in S-mode, partly in LTE mode, and partly in both. These objects are described accordingly.

A list of the parameters is shown in section 3.14.



## 2. Summary

### 2.1 Types

Product no.	Stock no.	Application	Operating voltage	Control outputs		Suitable for
				On/Off	3-pos	
RDF800KN	S55770-T350	Fan coil, universal heat pump	AC 230 V	2 <sup>1)</sup>	1 <sup>1)</sup>	Round or square conduit boxes
RDF800KN/NF <sup>2)</sup>	S55770-T335	Fan coil, universal heat pump		2 <sup>1)</sup>	1 <sup>1)</sup>	Square conduit boxes <sup>2)</sup>
RDD810KN/NF <sup>2)</sup>	S55770-T336	Heating		1 <sup>3)</sup>	-	

<sup>1)</sup> Select: On/Off or 3-position.

<sup>2)</sup> Mounting frames are not included and must be ordered separately. See section 2.7.

<sup>3)</sup> On/Off output with potential free input from AC 24...230 V

### 2.2 Ordering

- When ordering, please indicate product no., SSN no. and name:  
For example: RDF800KN (S55770-T350) room thermostat.
- Separate mounting frames must be ordered for RDF800KN/NF and RDD810KN/NF installation (see section 2.7).
- Order valve actuators separately.

### 2.3 Functions

#### Use of RDF800KN..

**Fan coil units** using On/Off or modulating control outputs:

- 2-pipe system
- 2-pipe system with electric heater
- 4-pipe system

**Chilled or heated ceilings (or radiators)** using On/Off or modulating control outputs:

- Chilled or heated ceiling
- Chilled or heated ceiling and radiator/floor heating

**Compressors** using On/Off control outputs:

- 1-stage compressors in DX- type equipment
- 1-stage compressors in DX- type equipment with electric heater

The room thermostats are delivered with a fixed set of applications.

The relevant application is selected and activated during commissioning using one of the following tools:

- Synco ACS
- ETS
- Local DIP switch and the HMI

#### Use of RDD810KN/NF

**Heating** using On/Off control outputs:

- Floor heating/radiators
- Wall-hung boilers



## Features

- Operating modes: Comfort, Economy and Protection
- Backlit display
- AC 230 V operating voltage

In addition for RDF800KN...:

- On/Off or 3-position control outputs (relay)
- Output for 1- or 3-speed fan
- Automatic or manual heating/cooling changeover

In addition for RDD810KN/NF:

- Potential-free contact (SPDT) for heating

## Type of mounting/ suitable conduit boxes

- RDF800KN: Round CEE/VDE conduit boxes, with minimum 60 mm diameter or recessed square conduit boxes with 60.3 mm fixing centers, minimum 40 mm depth
- RDF800KN/NF and RDD810KN/NF: Recessed square conduit boxes with 60.3 mm fixing centers, minimum 40 mm depth

## Functions

- Room temperature control via built-in temperature sensor or external room temperature or return air temperature sensor
- Operating mode selected using touchscreen
- Temporary Comfort mode extension
- Display of current room temperature or setpoint in °C or °F
- Minimum and maximum limitation of room temperature setpoint
- "Screen lock" function: Unlock, total lock and setpoint
- Two multifunctional inputs, selectable for:
  - Window contact
  - Presence detector
  - External room temperature or return air temperature sensor
  - Fault input
  - Monitor input for temperature sensor or switch state
  - Sensor for automatic heating or cooling changeover (RDF..)
  - Dew point sensor (RDF..)
  - Electric heater enable (RDF..)
- Floor heating temperature limitation (P51)
- Reload factory settings for commissioning and control parameters
- Wizard function for easy commissioning using the HMI

In addition for RDF800KN...:

- Changeover between heating and cooling mode (automatic using local sensor or bus or manually)
- Selection of applications using the DIP switches or the tool
- 1- or 3-speed fan control (automatic or manually)
- Advanced fan control function, for example, fan kick, fan start, selectable fan operation (enable, disable or depending on heating or cooling mode)
- Purge function with 2-port valve in a 2-pipe changeover system
- Reminder to clean fan filters (P62)

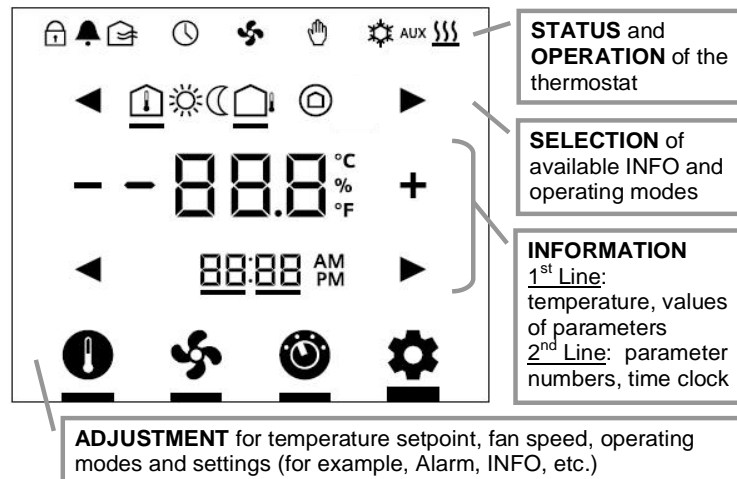


## 2.4 User interface

### Touchscreen display

The RDF800KN.. and RDD810KN/NF room thermostats have a touchscreen (segment type) user interface. The thermostat displays only the room temperature value or any alarm in Screen Saver mode.

To start any operation or change settings, touch the screen to display all available operating icons available in Selection Screen mode. Ten seconds after the last operation, the thermostat returns to Screen Saver mode.



Status icons:			
	Screen lock		Manual override
	Alarm/Service reminder		Cooling active
	Scheduler via bus		Heating active
	Fan active		Auxiliary heat active
Selection icons:			
	Room temperature		Comfort mode
	Outdoor temperature		Economy mode
			Protection mode

Operating icons:	
	Increment, decrement OR selection
	Selection OR move to next items
	Temperature OR parameter values, and etc.
	Time clock (12/24 hour), parameter number OR password, etc.
	Setpoint mode (room temperature only)
	Fan mode OR fan speed mode
	Operating mode
	Setting mode

### Touch operation

Operations	Function
Touch	to select setpoint mode; adjust temperature value using +/-.
Touch	to select fan mode; adjust fan speed using +/-.
Touch	to select operating mode; select <b>ON/ECO/OFF</b> using +/-.
Touch	to select the INFO screen, display room and outdoor temperatures using </> if available. to select the desired H/C control sequence using +/- if manual H/C changeover (P01 = 2) is selected. to display alarms if the  icon is displayed; use </> icon to select different alarms for viewing.
Touch  for 5 seconds	to select programming mode (KNX).
Touch  for 5 seconds	to select parameter mode (Service/Expert level).



## 2.5 Integration with KNX bus

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The touchscreen room thermostats can be integrated as follows:

- Into Synco living using group addressing (ETS)
- Into Designo using group addressing (ETS) or individual addressing
- Into third-party systems using group addressing (ETS)
- With Synco 700 system using LTE mode (easy engineering)

The following KNX functions are available:

- Central time program and setpoints. For example, when using the RMB795B central control unit.
- Outdoor temperature or time of day displayed on thermostat using the bus
- Remote operation and monitoring. For example, using the RMZ792-B bus operator unit.
- Remote operation and monitoring with web browser using the OZW772 web server.
- Maximum energy efficiency due to exchange of relevant energy information. For example, with Synco 700 controllers, heating demand, cooling demand.
- Alarming (such as, external fault contact, condensation, or clean filter).
- Monitoring input for temperature sensor or switch.

Engineering and commissioning can be done using...

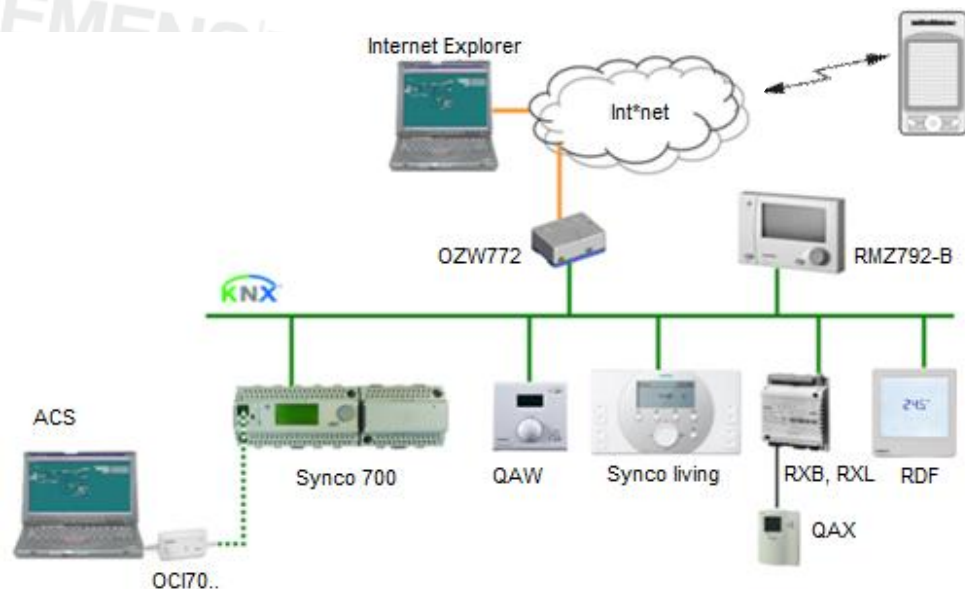
- local DIP switches/HMI
- Synco ACS service tool
- ETS

Synco 700

The touchscreen room thermostats are tailored for interoperability with the Synco 700 system and operate together in LTE mode. This extends the field of use of Synco for individual room control in conjunction with fan coil units, heating units, chilled ceilings and radiators.



## Synco topology


















Legend	Synco 700	Building automation and control system (BACS)
	Synco living	Room automation and control system
	RDF800KN..	Room thermostats
	RDD810KN/NF	
	OZW772	Web server
	RMZ792-B	Bus operator unit
	QAW..	Room unit
	ACS	Engineering and Service tool
	OCI700, OCI702	Interface for ACS
	RXB, RXL	Room controllers
	QAX	Room unit for RXB/RXL room controllers

## Design and third-party systems

The KNX communicating devices can be integrated into the Siemens building automation and control systems (BACS) Design or third-party systems. For integration, you can use either S-mode (group addressing) or individual addressing.



## 2.6 Equipment combinations




Description		Product no.	Data Sheet
Cable temperature sensor or changeover sensor, cable length 2.5 m NTC (3 kΩ at 25 °C)		<b>QAH11.1</b>	1840
Room temperature sensor NTC (3 kΩ at 25 °C)		<b>QAA32</b>	1747
Cable temperature sensor, cable length 4 m NTC (3 kΩ at 25 °C)		<b>QAP1030/UFH</b>	1854
Condensation/dew point monitor		<b>QXA2601/ QXA2602/ QXA2603/ AQX2604</b>	3302
Electromotoric On/Off actuator		<b>SFA21..</b>	4863
Electromotoric On/Off valve and actuator (only available in AP, UAE, SA and IN)		<b>MVI../MXI..</b>	4867
Zone valve actuator (only available in AP, UAE, SA and IN)		<b>SUA..</b>	4832
Thermal actuator (for radiator valve)		<b>STA23..</b>	4884
Thermal actuator (for small valves 2.5 mm)		<b>STP23..</b>	4884
Electrical actuator, 3-position (for radiator valve)		<b>SSA31..</b>	4893
Electrical actuator, 3-position (for small valve 2.5 mm)		<b>SSP31..</b>	4864
Electrical actuator, 3-position (for small valve 5.5 mm)		<b>SSB31..</b>	4891
Electrical actuator, 3-position (for 2- and 3-port valves/V..P45)		<b>SSC31..</b>	4895
Electrical actuator, 3-position (for small valve 5.5 mm)		<b>SSD31..</b>	4861
Electromotoric actuator, 3-position (for small valves 5.5 mm)		<b>SQS35..</b>	4573

**Notes:** For the maximal number of actuators operating in parallel, refer to information in the Data Sheets of the selected actuators and the following information, depending on which value is lower:

- Parallel operation of max 6 SS.. actuators (3-position) is possible.
- Parallel operation of max 10 On/Off actuators is possible.
- Parallel operation of SQS35 is not possible.



## 2.7 Accessories

Description		Product no./SSN no.	Data Sheet
Changeover mounting kit (50 pcs per package)		<b>ARG86.3</b>	N3009
Plastic mounting spacer for RDF800KN to increase the headroom in the conduit box by 10 mm		<b>ARG70.3</b>	N3009
Conduit box for RDF800KN/NF and RDD810KN/NF		<b>ARG71/S55770-T137</b>	N3009
Single mounting frame <sup>*)</sup> , ivory white (for RDF800KN/NF and RDD810KN/NF only)		<b>ARG800.1/ S55770-T370</b>	--
KNX power supply 160 mA		<b>5WG1 125-1AB02</b>	--
KNX power supply 320 mA		<b>5WG1 125-1AB12</b>	--
KNX power supply 640 mA		<b>5WG1 125-1AB22</b>	--

<sup>\*)</sup> See the dimensions of mounting frame on page 89.



## 3. Functions

### 3.1 Room temperature control

#### General note: Parameters

Information for setting the control parameters (e.g. P01) is described in section 3.14.

#### Room temperature control

The thermostat acquires the room temperature using its built-in sensor, external room temperature sensor (QAA32), or external return air temperature sensor (QAH11.1), and maintains the setpoint by delivering actuator control commands to the heating and/or cooling equipment. The following control outputs are available:

- On/Off control (2-position)
- Modulating PI/P control with 3-position control output (only for RDF.. types, 2-pipe applications)

The switching differential or proportional band is 2 K for heating mode and 1 K for cooling mode (adjustable via P30 and P31).

The integral action time for modulating PI control is 45 minutes (RDF..), adjustable via P35.

#### Display

The display shows the acquired room temperature or the Comfort setpoint, which is selected using P06. The factory setting displays the current room temperature. Use P04 to change the room temperature display from °C to °F as needed.



Room temperature



The acquired room temperature (built-in or external sensor) is also available as information on the bus.

- With automatic changeover or continuous heating/cooling, the icons on the top line of the screen indicate that the system currently operates in heating or cooling mode (heating or cooling output activated).
- With manual changeover (P01 = 2), **H** or **C** displays on the INFO page and indicates that the system currently operates in heating or cooling mode. For more information, refer to section 4.3.2.



Outdoor temperature  
using the bus

If the outdoor temperature is available, press the icon on the INFO page shown below, and then use ◀ and ▶ to select the outdoor temperature. This temperature value has only information character.



In LTE mode, the outdoor temperature can only be received in outdoor temperature zone 31.

In S-mode, the corresponding communication object needs to be bound with a KNX sensor device.





Time of day via bus

Time of day via bus can be displayed on the 2<sup>nd</sup> line of the LCD display on the thermostat by setting P07 to either 3 or 4. The display is either in 12- or 24-hour format.

The information can be received from a Synco controller with time master functionality or any other KNX device if the corresponding communication object is bound.

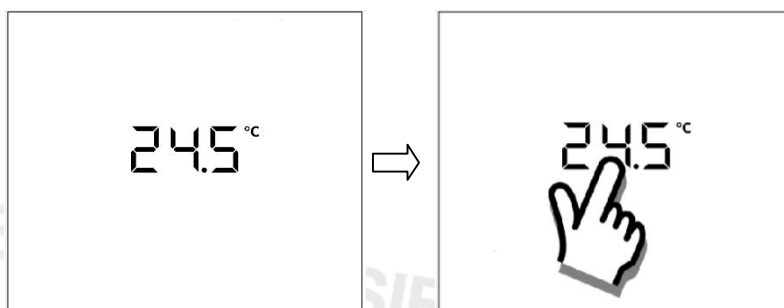
**Note:** When an application program is downloaded to the Synco devices using ETS, the correct group addresses must be downloaded as well to display the time of day on the thermostat. (see Synco Knowledge Base - KB771).

## 3.2 Operating modes

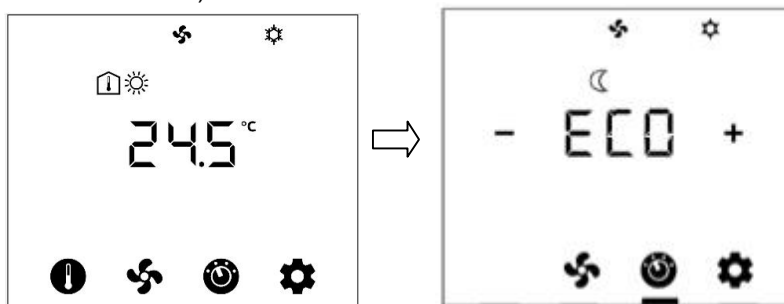
The thermostat's operating modes can be influenced in different ways (see below). Specific heating and cooling setpoints are assigned to each operating mode.


### Comfort and Economy modes

In Comfort or Economy mode, the Screen Saver mode normally displays the room temperature as follows:



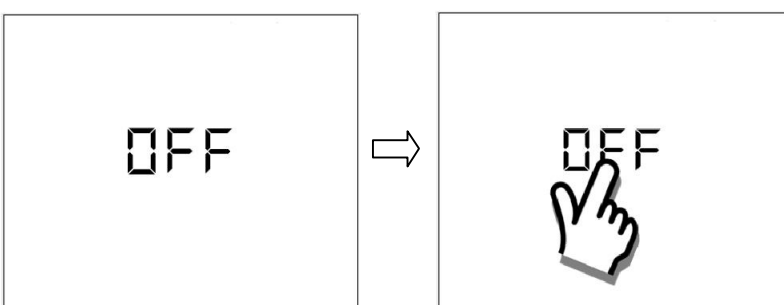
When you touch the temperature display, the Selection Screen displays (see figure on the left side below).



Touch the  icon to display the current operating mode. Use +/- to change the operating mode between Comfort (**ON**), Economy (**ECO**) or Protection (**OFF**).

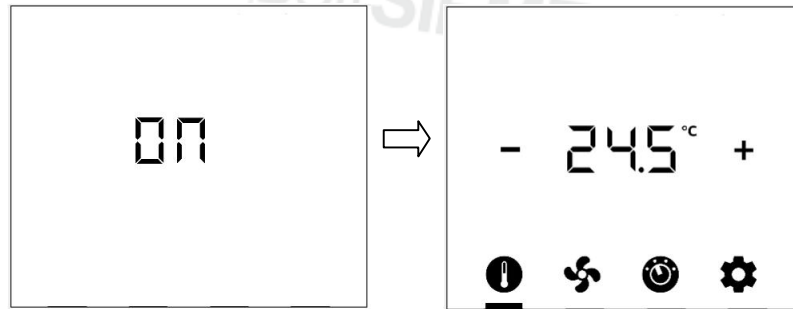
### Protection mode

In Protection mode, the Screen Saver mode displays **OFF**:





When you touch **OFF**, the thermostat changes to **ON** first and then returns to Comfort or Economy mode. Then it displays the setpoint adjustment screen.



Touch +/- to adjust the room temperature setpoint.

- Notes:**
- In Economy mode, the thermometer icon does not display since the setpoint is not adjustable.
  - In Protection mode, both the thermometer icon and fan icon do not display since both setpoint and fan speed are not adjustable.
  - On universal applications (P52 = 0), the fan icon does not display.



Room operating mode:  
State

The thermostat sends the effective room operating mode on the bus.

The following operating modes are available:

#### Auto Timer



In Auto Timer mode, the operating mode is set using the bus only.  
If no time scheduler is present, Auto Timer is replaced by Comfort.

#### Comfort



In Comfort mode, the thermostat maintains the Comfort setpoint.  
This setpoint can be defined using P08, P09 and P10. It also can be locally adjusted using +/- after touching the thermometer icon or using the bus.  
In Comfort mode, touch the fan icon to set the fan speed to either automatic (A - AUTO) or manual fan speed (1/2/3).



Presence detector

The thermostat switches to Comfort mode when the presence detector (local or on KNX) is active (room is occupied). See note<sup>\*)</sup>.

#### Economy



In Economy mode, the setpoints (less heating or cooling than in Comfort mode) can be defined using P11 and P12.

The thermostat switches to Economy mode when...

- you touch the sun/moon icon to go to the operating mode page and use +/- to select **ECO** (only if P02 is set to 2)
- Economy is sent using the bus
- presence detection is not active (room unoccupied)

#### Protection



In Protection mode, the system is protected against...

- frost (factory setting 8 °C, can be disabled or changed using P65)
- overheating (factory setting OFF, can be enabled or changed using P66)

No other operating mode can be selected locally if Protection mode is commanded using the bus. **OFF** is displayed.



Room operating mode:  
Window state

The thermostat switches to Protection mode when...

- **OFF** is selected using +/- after touching the sun/moon icon
- Protection is sent using the bus



- the window contact is active (open window)
- "Window state" is sent using the bus, e.g. from a KNX switch. See note<sup>\*)</sup>.

**Note:** <sup>\*)</sup> Refer to section 3.2.1 for details regarding the window contact and presence detector.



### 3.2.1 Influencing the operating mode



#### Source for change of operating mode



ACS

The operating mode can be influenced in different ways.





The source of the effective room operating mode state can be monitored using the "Cause" diagnostic data point in the ACS tool, bus operator unit RMZ792-B or web server OZW772.

Source	Description	Value of DP "Cause"
Local operation using operating mode 	• Operating mode is not Auto Timer	Room operating mode selector (preselection)
	• No time scheduler using the bus	
	• Temporary Comfort extension is active (P68 >0)	Timer function
	• Window contact	Window switch
Bus command  Room operating mode	• Presence detector	Presence detector
	• "Window state" sent using the bus	Window switch
	• "Presence detector" sent using the bus	Presence detector
	• Time scheduler available using the bus → local operating mode is set to Auto Timer • Time scheduler sends Protection mode using the bus → operating mode cannot be changed locally	Time switch

#### Priority of operating mode interventions

The following table shows the priorities of different interventions.

A lower number means a higher priority.

Priority	Description	Remark
①	Commissioning	In parameter setting mode (highest priority), you can command an operating mode independent of all other settings or intervention using bus and local input.
②	Protection mode using the bus from time scheduler	Protection mode is, sent by a time scheduler It cannot be overridden by the user, or by the window contact or presence detector.
③	Window contact	If the contact is closed (i.e. window open), the operating mode changes to Protection. This overrides the operating mode on the thermostat.
③	"Window state" using the bus	"Window state" has the same effect as the local window contact.
		<b>Note:</b> Only one input source must be used, either local input X1/X2 or KNX bus.
④	Presence detector	If the contact is closed (room occupied), the operating mode changes to Comfort. This overrides the operating mode on the thermostat. When the contact (room unoccupied) is open, the thermostat is set back to Economy mode.
④	Presence detector using bus	"Presence detector" has the same effect as the local presence detector.
④	Operating mode icon 	Touch the  icon to select the operating mode using +/-.
④	Operating mode using the bus	The operating mode can be changed using the bus.
④	Temporarily extended Comfort mode using operating mode icon 	Touch the  icon to set operating mode from Economy to Comfort temporarily if... – Economy was sent using bus – Extended Comfort period > 0 (P68) The last option selected is always used, either locally or using bus.
④	Time scheduler using the bus	The operating mode sent using the bus can be overridden by all other interventions. <b>Exception:</b> Protection mode has priority 2. <b>Note:</b> If the time scheduler switches from Comfort to Economy mode, but the presence detector is still active (room occupied), the thermostat continues to work in Comfort mode for the period of occupancy.



### Auto Timer mode with time scheduler using the bus



If a time scheduler is available, e.g. from the central control unit, Auto Timer mode is active. The thermostat automatically changes between Comfort and Economy mode according to the time scheduler using the bus.

The display shows the Auto Timer mode icon

Touch the operating mode icon to change to another operating mode.

**Note:** When you are in the Auto Timer mode, and you change the operating mode, the icon (manual override) displays in place of the icon, indicating that a schedule being overridden.  
Default fan speed in Auto Timer mode is automatic.

### Behavior when bus sends new operating mode

Each time the time scheduler sends a new operating mode (switching event), the thermostat's operating mode is set back to Auto Timer. This ensures that the room temperature is maintained according to the time schedule.

### Precomfort using the bus

If the time scheduler sends the Precomfort mode, it will be switched to Economy (factory setting) or Comfort (selectable via P88).

### Behavior when bus sends Protection

If Protection mode is set by the time scheduler, no intervention is possible neither by users, window contact or presence detector. The screen displays **OFF**.

**Note:** You can still access the INFO page.

### Availability of Economy mode

Touch the operating mode icon to select the operating mode using +/-.  
The behavior of the operating mode icon (user profile) can be defined using P02, factory setting is P02 = 1 (auto-protection).

P02	Without time scheduler	With time scheduler using bus	Description
1	→	→  Auto Timer mode = Comfort	<ul style="list-style-type: none"> <li>Select Comfort or Protection mode when there is no time schedule from the bus.</li> <li>Economy mode is not available</li> <li>If the time schedule from the bus is Protection mode, the operating mode cannot be changed.</li> <li>Suited for hotel guest rooms and commercial buildings.</li> </ul>
2	→  →	→  →  If Auto Timer mode = Comfort  →  If Auto Timer mode = Economy	<ul style="list-style-type: none"> <li>Select Comfort, Economy or Protection mode when there is no time schedule from the bus</li> <li>Economy mode is available</li> <li>If the time schedule from the bus is Protection mode, the operating mode cannot be changed.</li> <li>If the time schedule from the bus is Comfort mode, you can select Economy or Protection mode.</li> <li>If time schedule from bus is Economy and P68 is greater than 0, Comfort mode can be temporarily extended.</li> </ul>

### Window contact

The thermostat can be forced into Protection mode when the window is opened. The contact can be connected to a multifunctional input X1, X2. Set P38 or P40 to **3**. User operations are ineffective and **OFF** is displayed if the window contact is active.





Room operating mode:  
Window state

The "window contact" function is also available using the KNX signal "Window state", e.g. from a KNX switch.

**Note:** Only one input source can be used, either a local input X1/X2 or the KNX bus. User operations are ineffective and **OFF** is displayed if the operating mode "window contact" is active, or if "Window state" is sent using the bus.



Presence detector

The operating mode can be changed to Comfort and back to Economy depending on the room occupancy (room occupied/unoccupied, using the presence detector or the keycard).

Behavior without time scheduler:

- Whenever the presence detector is activated, the thermostat's operating mode of the thermostat changes to Comfort.
- Whenever the presence detector is deactivated, the operating mode changes to Economy.


Behavior with time scheduler using bus:

- When the time switch is on Protection:
  - Presence detector has no influence on the operating mode.
- When the time switch is on Economy:
  - When the presence detector is activated, the operating mode changes to Comfort.
  - When the presence detector is deactivated, the operating mode goes to (Auto) Economy.
- When the time switch is on Comfort:
  - and the presence detector is activated or deactivated, Comfort mode is maintained.

**Important:** When the time switch goes to Economy mode, and the presence detector is still active, Comfort mode is maintained until the presence detector becomes inactive, that is, back to (Auto) Economy mode

**Note:** The contact (e.g. a card reader) can be connected to a multifunctional input X1/X2 (set P38 or P40 to 10) or the occupancy signal can be sent using the bus from a KNX presence detector: Only one input source must be used, either a local input X1/X2 or the KNX bus.

### Temporary timer to extend the Comfort mode


Comfort mode can be temporarily extended (e.g. working after business hours or on weekends) when the thermostat is in Economy mode. The operating mode icon  switches the operating mode back to Comfort for the period preset via P68.


Touch the  icon again to stop the timer.

The following conditions must be fulfilled:

- Time scheduler using the bus is Economy mode.
- P68 (extend Comfort period) is greater than 0.

During the temporary Comfort mode extension, the  icon appears.

If P68 (extend Comfort period) = 0, extended Comfort cannot be activated. Touch the  icon to switch the thermostat to Protection.

If the window contact is active, touch the  icon and **OFF** flashes on the LCD.



### 3.2.2 Communication example

---

The following example shows a typical application of a central time scheduler in conjunction with local control of the room operating mode.

The room operating mode in the room of a building is determined by the time scheduler. Window contact and presence detector are fitted in this room.

The following condition exists:

- The rooms are used and controlled by the time scheduler as follows:
  - Night setback from 17:00 to 08:00 (Economy)
  - Protection from 20:00 to 06:00

**Example:** Application with "Window contact", "Presence detector" and time scheduler from the central control unit.

In room operating mode, Comfort is possible between 6:00 and 20:00, based on the time scheduler or occupancy period. Outside this timeframe, Protection mode is maintained.

1. At 6:00 the central control unit sets the operating mode to Economy. (1)
2. In the morning, as soon as the presence is detected (8:00 – 12:00), the operating mode switches to Comfort. (2)
3. When the user briefly opens the window, the operating mode switches to Protection. (3)
4. In the afternoon the time scheduler sets the Comfort mode from 13:00 to 17:00. (4)
5. After 17:00 the room is still occupied and the operating mode remains in Comfort (occupancy with presence detector). (5)
6. Later, people open the window and leave the room for a short time. The operating mode switches to Protection as long as the window is open. (6)
7. As soon as the room is unoccupied the thermostat switches to Economy. (7)
8. At 20:00 the room is set to Protection according to the time scheduler. (8)
9. After this time, the occupancy detected by presence detector has no effect, as the central time switch sets the thermostat to Protection. (9)






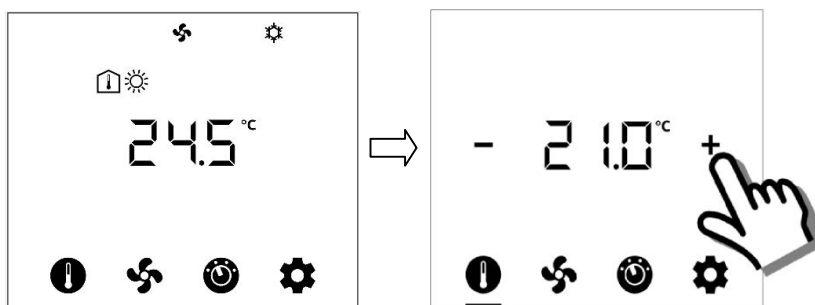


## 3.3 Room temperature setpoints

### 3.3.1 Description

#### Setpoint mode

Touch the  icon when it is available on the display and press +/- to adjust the desired room temperature setpoint.



#### Comfort mode

The factory setting for the Comfort basic setpoint is **21 °C**. It can be changed in the thermostat's EEPROM using P08 or the bus with the communication object "Comfort basic setpoint". The last option selected is always used.

The Comfort setpoint can be adjusted using +/-, or the bus from a remote device such as a touchpanel, or operating unit. The last option selected is always used.

#### Temporary setpoint

If the "Temporary setpoint" function is enabled using P69, the Comfort setpoint is set back to the Comfort basic setpoint stored in P08 when the operating mode changes.

#### Setpoint limitation

For comfort or energy saving purposes, the setpoint setting range can be limited to a minimum (P09) and maximum (P10).

#### P09 < P10 (Comfort concept)

- If the minimum limit P09 is set lower than the maximum limit P10, both heating and cooling are adjustable between these two limits.
- The customer adjusts the desired setpoint and the thermostat controls the room temperature accordingly.
- For 4-pipe applications, the selected comfort setpoint is in the middle of the dead zone (P33). The unit stops energizing the heating/cooling outputs as soon as the room temperature reaches the dead zone.



#### P09 ≥ P10 (energy saving concept)

- If the minimum limit P09 is set higher than the limit P10, then...
  - the setting range of the cooling setpoint is from **P09...40 °C** in place of 5...40 °C
  - the setting range of the heating setpoint is from **5...P10 °C** in place of 5...40 °C.

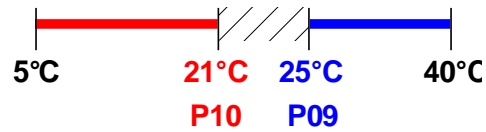
This allows the user to limit the maximum heating setpoint and the minimum cooling setpoint. This concept helps save energy costs.

- For 4-pipe applications:
  - The thermostat runs with the setpoint of the active sequence:  
In heating mode, the heating setpoint is active and adjustable using +/-;  
In cooling mode, the cooling setpoint is active and adjustable using +/-.
  - Switching from the heating setpoint to the cooling setpoint and vice-versa occurs when the room temperature reaches the adjusted limitation (P09 or



P10) of the **inactive** sequence. For example, the thermostat is in the heating sequence and runs with the heating setpoint. When the room temperature reaches P09, the thermostat switches to cooling mode and runs with the cooling setpoint, as long as the room temperature does not drop below P10.

Example



Cooling setpoint adjustable: 25...40 °C  
Heating setpoint adjustable: 5...21 °C

**Economy mode**



Use P11 and P12 to adjust the Economy mode setpoints.  
The heating setpoint is factory-set to **15 °C**, and the cooling setpoint to **30 °C**.

**Protection mode**



Use P65 and P66 to adjust the Protection mode setpoints.  
The heating setpoint is factory-set to **8 °C** (frost protection) and to **OFF** for cooling.

**Caution**

If a setpoint (Economy or Protection) is set to OFF, the thermostat does not control the room temperature in the corresponding mode (heating or cooling). This means that there is no protective heating or cooling function and there exists a risk of frost in heating mode or of overtemperature in cooling mode!

The Economy setpoints are accessible at the Service level (P11 or P12) or via tools (ACS or ETS). The Protection setpoints are accessible at the Expert level (P65 or P66).



### 3.3.2 Setting and adjusting setpoints

Room temperature setpoints can be

- set during commissioning
- adjusted during operation



**Comfort basic setpoint**  
**Comfort setpoint**  
**Economy heating setpoint**  
**Economy cooling setpoint**

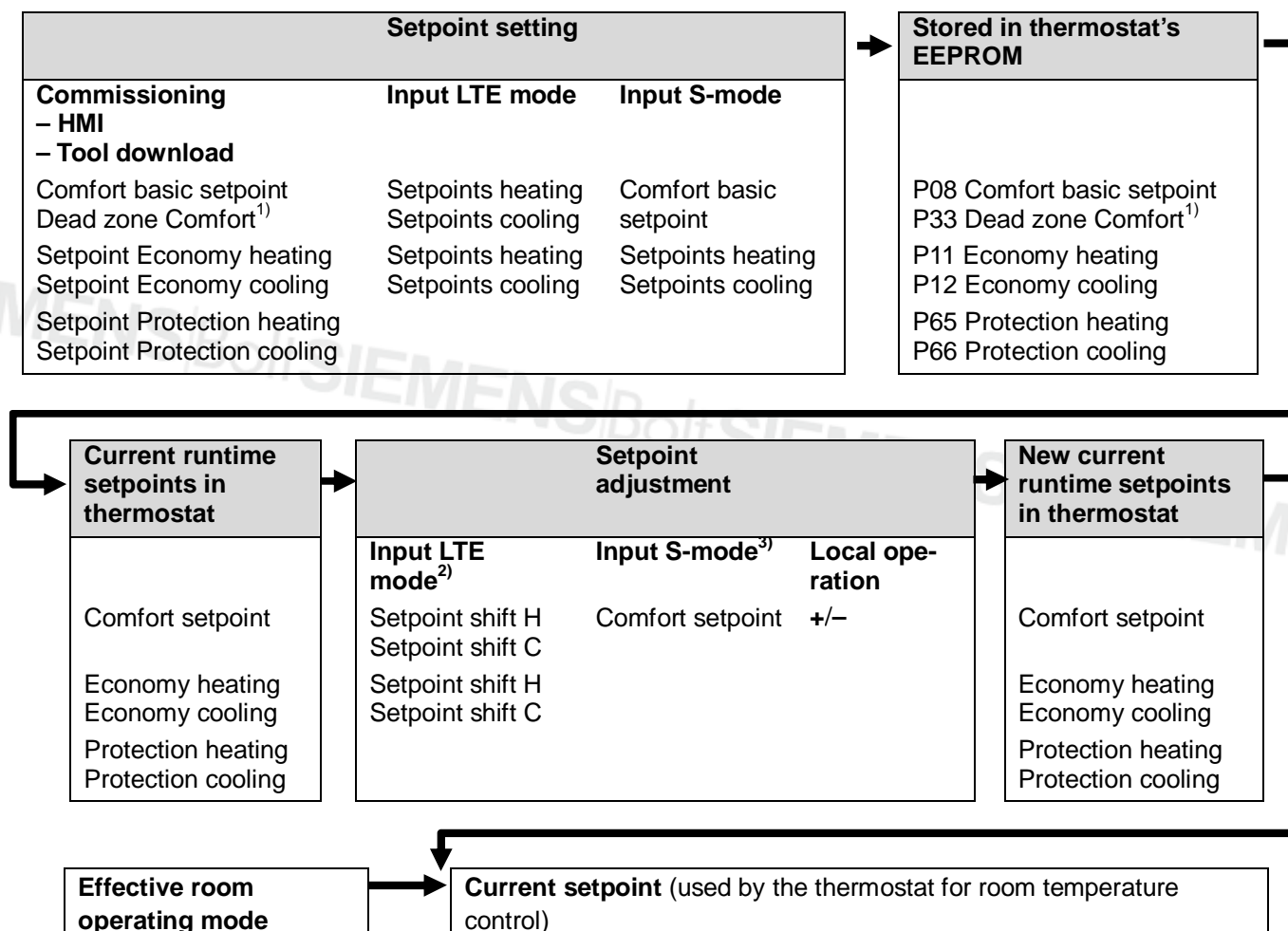
The source can be

- the local HMI
- a tool
- a central control unit

The thermostat stores the setpoints...

- in EEPROM in the form of parameters
- in the runtime memory

The table below shows the interrelations:



<sup>1)</sup> Only required for heating and cooling applications (see section 3.6.8).

<sup>2)</sup> LTE mode: **shift is added** to the local shift.

<sup>3)</sup> S-mode: the last option selected is always used, either S-mode input or local operation.



**Current setpoint**  
**General notes:**

The current setpoint (used by the thermostat for room temperature control) is available on the bus for use by the central control unit.

- The supported communication objects are different in LTE mode and S-mode.
- Making changes using the local HMI or tool have the same priority.



## Notes on setpoint adjustment (LTE mode with Synco only)

Setpoint priority,  
Setpoint Master RMB

- Setting the Comfort basic setpoint resets the runtime Comfort setpoint to the basic setpoint.
- Central setpoint shift is used for summer or winter compensation.
- Setpoint shift does not affect the parameter setpoints in P08, P11, P12 and P33.
- Local shift and central shift are added together.
- Only applies to Comfort and Economy setpoints. Protection setpoints are not shifted centrally.
- The current setpoints for heating and cooling are limited by the Protection setpoint. If the Protection setpoint is OFF, min. 5 °C and max. 40 °C are used.
- The setpoints for cooling and heating of the same operating mode have a minimum distance of 0.5 K between them.
- The result of local and central shift, together with the room operating mode, is used by the thermostat for room temperature control (current setpoint).
- The room thermostat always adopts the received setpoints from the controller RMB795B. Thus the Comfort setpoints locally adjusted on the thermostats are overwritten by the Comfort setpoints of the room group (e.g. every 15 minutes).

On the RMB795B central control unit (software version 2.0 or higher), you can define the conditions required for the unit to forward the setpoints:

- Always (every 15 minutes)
- Not in Comfort mode
- Only when changed

See "Setpoint priority" and "Setpoint master" functions on the RMB795B.

## 3.4 Applications overview

### Local configuration RDF800KN.. only

The thermostats support the following applications, which can be configured using the DIP switches inside the front panel of the unit or a commissioning tool.

1. Set applications via DIP switches.



2. After the thermostat is first powered up, the display depends on the selected application.

→ Go to the setting mode and configure the basic control parameters


Display	Applications
APP 2P	2-pipe
APP 2PEH	2-pipe with electric heater
APP 4P	4-pipe
APP 2P3P	2-pipe with 3-position output

**Note:** For RDD810KN/NF, **APP H** displays after powering up.



## Remote configuration RDF800KN.. only

All DIP switches must be set to OFF (remote configuration, factory setting) in order to select an application using the commissioning tool.

<b>Remote configuration</b> , using one of the following tools (factory set) <ul style="list-style-type: none"><li>• Synco ACS</li><li>• ETS4</li></ul>	<b>DIP switches</b> 
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For more information, see the following sections:

- Section 3.4.1 “Applications for fan coil systems (RDF800KN.. only)”;
- Section 3.4.2 “Applications for universal systems (RDF800KN.. only)”;
- Section 3.4.3 “Applications for heat pump systems (RDF800KN.. only)”;
- Section 3.6.6 “Chilled/heated ceiling and radiator applications (RDF800KN.. only)”.

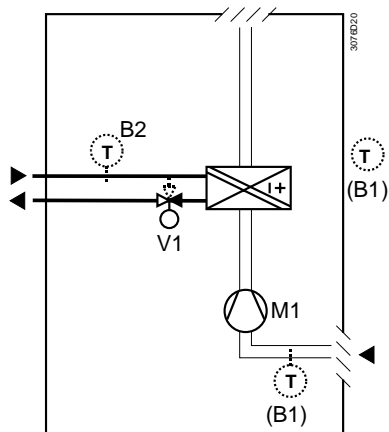
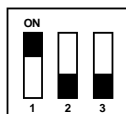


### 3.4.1 Applications for fan coil systems (RDF800KN.. only)

#### Application and output signal, DIP switches, diagram

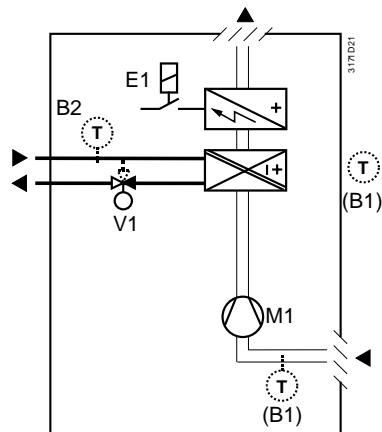
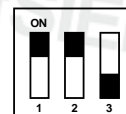
- **2-pipe fan coil unit**  
(heating or cooling)

On/Off



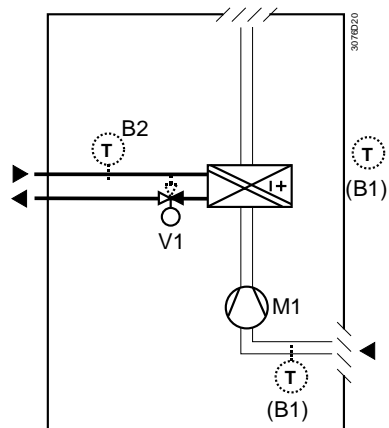
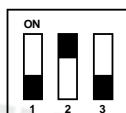
- **2-pipe fan coil unit with electric heater**  
(heating or cooling)

On/Off



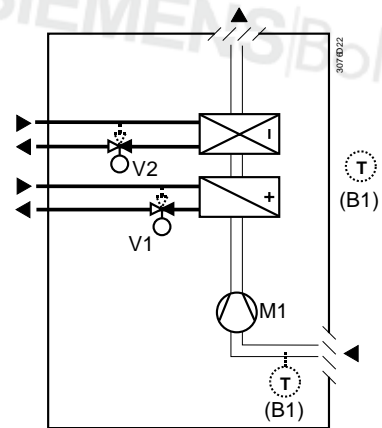
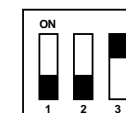
- **2-pipe fan coil unit**  
(heating or cooling)

3-position



- **4-pipe fan coil unit**  
(heating and cooling)

On/Off



V1 Heating or heating/cooling valve actuator

V2 Cooling valve actuator

E1 Electric heater

B1 Return air temperature sensor or external room temperature sensor (optional)

B2 Changeover sensor (optional)

M1 1- or 3- speed fan



### 3.4.2 Applications for universal systems (RDF800KN.. only)

Application and output signal, DIP switches, diagram	
<ul style="list-style-type: none"> <li>Chilled/heated ceiling (heating <b>or</b> cooling) On/Off</li> </ul>	<ul style="list-style-type: none"> <li>Chilled/heated ceiling with electric heater (heating <b>or</b> cooling) On/Off</li> </ul>
<ul style="list-style-type: none"> <li>Chilled/heated ceiling (heating <b>or</b> cooling) 3-position</li> </ul>	<ul style="list-style-type: none"> <li>Chilled ceiling and radiator (heating <b>and</b> cooling) On/Off</li> </ul>

V1 Heating or heating/cooling valve actuator

V2 Cooling valve actuator

E1 Electric heater

B1 Return air temperature sensor or external room temperature sensor (optional)

B2 Changeover sensor (optional)

D3 Dew point sensor



### 3.4.3 Applications for heat pump systems (RDF800KN.. only)

Application and output signal, DIP switches, diagram	
<ul style="list-style-type: none"> <li>1-stage compressor (heating <b>or</b> cooling)</li> </ul> <p>On/Off</p> <p>3181S31</p>	<ul style="list-style-type: none"> <li>1-stage compressor with electric heater (heating <b>or</b> cooling)</li> </ul> <p>On/Off</p> <p>3181S32</p>
<ul style="list-style-type: none"> <li>1-stage compressor (heating <b>and</b> cooling)</li> </ul> <p>On/Off</p> <p>3181S35</p>	

N1 Thermostat  
Terminal Y1: Heating or heating/cooling  
Terminal Y2: for cooling (H&C)  
E1 Electric heater

B1 Return air temperature sensor or external room temperature sensor (optional)  
D3 Dew point sensor

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Siemens  
Building Technologies

RDF800KN.., RDD810KN/NF Basic documentation

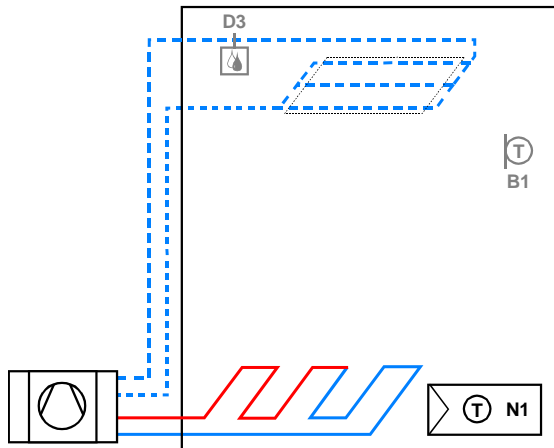
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- 1-stage compressor (heating **or** cooling)

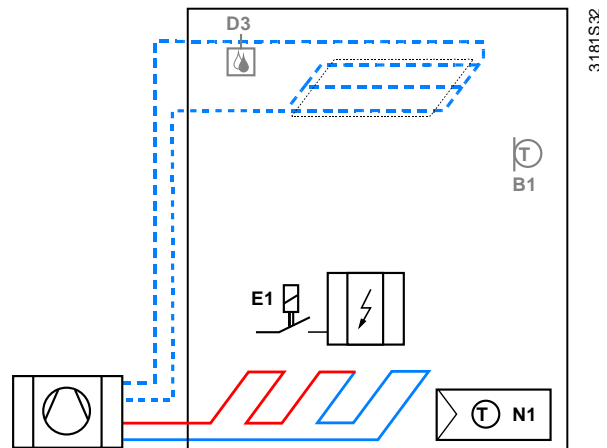
ON



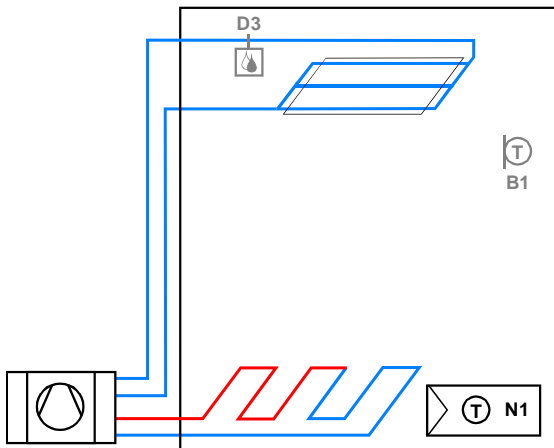
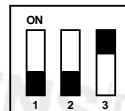
1 2 3



- ON
- 
- 1 2 3



- On/Off

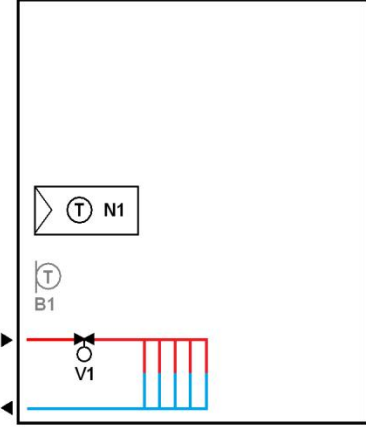
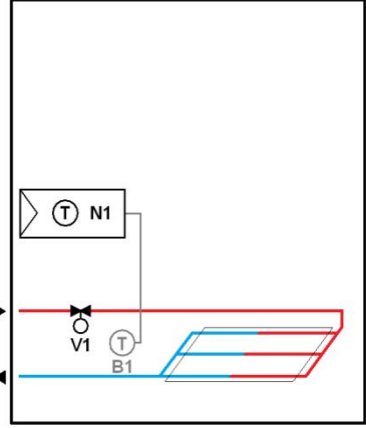
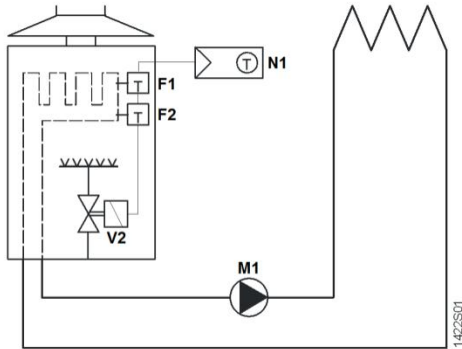
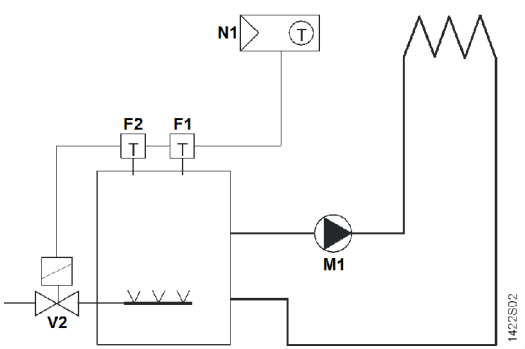
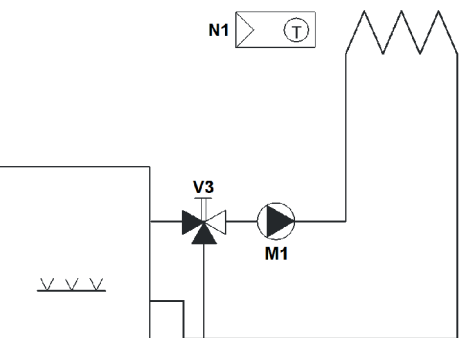
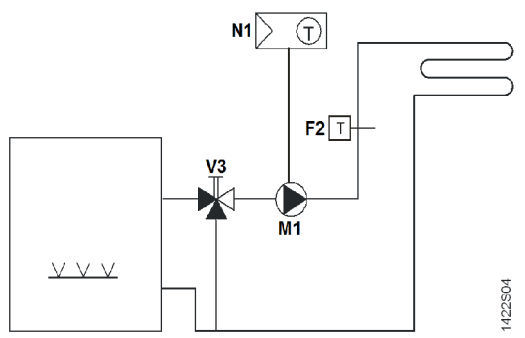


B1 Return air temperature sensor or external room temperature sensor (optional)

### D3 Dew point sensor



### 3.4.4 Applications for heating (RDD810KN/NF only)

Application and output signal, diagram	
 <p>Room thermostat controls the valve of the radiator application</p>	 <p>Room thermostat controls the valve for the floor heating application</p>
 <p>Room thermostat with direct control of a gas-fired wall-hung boiler</p>	 <p>Room thermostat with direct control of a gas-fired floor-standing boiler</p>
 <p>Room thermostat with direct control of a heat pump (pre-controlled by manual mixing valve)</p>	 <p>Room thermostat with direct control of hydronic floor heating system</p>

F1 Thermal reset limit thermostat  
F2 Safety limit thermostat  
M1 Circulating pump

N1 Room thermostat  
V1 2-port valve  
V2 Mixing 3-port valve with manual adjustment  
V3 Magnetic valve



### 3.5 Additional functions

#### Heating/cooling changeover using bus



Heating/cooling changeover

#### Automatic heating/cooling changeover using changeover sensor

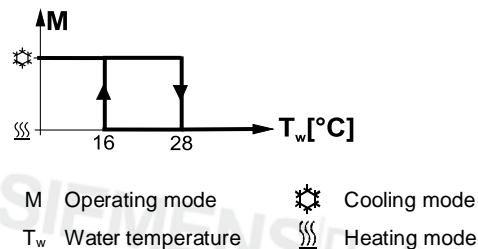
The heating/cooling changeover information can only be received using the bus, if the control sequence is set to automatic heating/cooling changeover (P01 = 3), and no local input X1/X2 is assigned with this function.

When the required information is missing (e.g. due to problems with data communication, or a power failure), the thermostat operates in the last valid room operating mode (heating or cooling).

If a cable temperature sensor (QAH11.1 + ARG86.3) is connected to X1/X2, and P38 or P40 = 2, the water temperature acquired by the changeover sensor changes over from heating to cooling mode, or vice versa. When the water temperature is above 28 °C (P37), the thermostat changes over to heating mode, and to cooling mode when below 16 °C (P36).

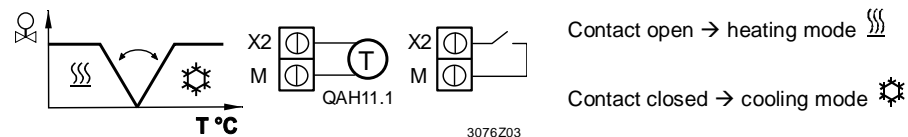
If the water temperature is between the two changeover points immediately after power-up, the thermostat starts in the previously active mode.

The water temperature is acquired at 30-second intervals and the operating state is updated accordingly.



#### Changeover switch

The QAH11.1 cable temperature sensor for automatic heating/cooling changeover can be replaced by an external switch for manual, remote changeover:




The sensor or switch can be connected to input terminal X2 or X1, depending on the commissioning of the inputs (P38/P40). See also section 3.9.

**Notes:** By using an external switch for changeover, the operating action (P39 or P41) cannot be modified.

- Contact open → heating mode ~~~~
- Contact closed → cooling mode ☀



<b>Manual heating/cooling changeover</b>	If manual heating/cooling changeover is set (P01 = 2), heating/cooling mode cannot be changed using the bus, changeover sensor or switch; it will remain in the manually selected mode.
<b>External/return air temperature sensor</b>	The thermostat acquires the room temperature through its built-in sensor, external room temperature sensor (QAA32), or external return air temperature sensor (QAH11.1) connected to multifunctional input X1 or X2. Input X1 or X2 must be configured accordingly. See section 3.9.
<b>Purge function</b>	The changeover sensor ensures changeover from heating to cooling and vice versa, based on the acquired water temperature. We recommend you activate the "Purge" function (P50) with 2-port valves. This function ensures correct acquisition of the medium temperature even if the 2-port valve is closed for an extended period of time. The valve is then opened for 1 to 5 minutes (adjustable) at 2-hour intervals during off hours.
<b>Caution</b> 	The "Purge" function (P50) must be disabled if the thermostat is used in compressor-based applications.
<b>Avoid damage from moisture</b>	In very warm and humid climates, the fan can be run periodically or continuously at a low fan speed (e.g. in empty apartments or shops) in Economy mode by setting P61, in order to avoid damage from moisture due to lack of air circulation. See also section 3.8.
<b>Minimum output ON-time/OFF-time</b>	<p>Limit the On/Off switching cycle to protect the HVAC equipment (e.g. a compressor) and to reduce wear and tear. The minimum output ON-time and OFF-time for 2-position control output can be adjusted from 1 to 20 minutes using P48 and P49.</p> <p>The factory setting is 1 minute.</p> <p>Readjusting the setpoint or heating/cooling mode changeover immediately results in calculation of the output state; the outputs may not hold the minimum 1-minute On/Off time.</p> <p>If P48 or P49 is set to above 1 minute, the minimum On/Off time for the control output is maintained as set, even if the setpoint or changeover mode is readjusted.</p>
<b>Floor heating/ Floor cooling</b>	<p>All heating sequences can also be used for floor heating.</p> <p>You can use fan coil unit heating/cooling sequences for floor heating or cooling by disabling the fan via P52.</p>
<b>Floor temperature limitation function</b>	<p>The floor temperature should be limited for two reasons: Comfort and protection of the floor.</p> <p>The floor temperature sensor, connected to multifunctional input X1 or X2, acquires the floor temperature. If it exceeds the parameterized limit (P51), the heating valve is fully closed until the floor temperature drops to a level 2 K below the parameterized limit.</p> <p>Factory setting of this function is "OFF" (disabled).</p> <p>Input X1 or X2 must be configured accordingly (P38 or P40 = 1). See section 3.9.</p>
<b>Recommended values for P51:</b>	<p>Living rooms: Up to 26 °C for long-time presence, up to 28 °C for short-time presence.</p> <p>Bathrooms: Up to 28 °C for long-time presence, up to 30 °C for short-time presence.</p>



The table below shows the relation between parameter, temperature source and temperature display:

P51	External temp. sensor available	Source for display of room temperature	Output control according to	Floor temp. limit function
OFF	No	Built-in sensor	Built-in sensor	Not active
OFF	Yes	External sensor	External temp. sensor	Not active
10...50 °C	No	Built-in sensor	Built-in sensor	Not active
10...50 °C	Yes	Built-in sensor	Built-in sensor + limit by external sensor	Active

The "Floor temperature limitation" function influences the outputs listed in the table below:

			"Floor temp. limit" function has impact on...			Remark
Application	Output Y11	Output Y21	Heating (P01 = 0/2/3)	Cooling (P01 = 1/2/3)	Heat. and cool. (P01 = 4)	
2-pipe	H/C valve		Y1	N/A		
2-pipe and electric heater	H/C valve	El heater	Y1, Y2	Y2 <sup>1)</sup>		
4-pipe	Heating valve	Cooling valve	Y1	N/A	Y1	

<sup>1)</sup> If P13 = ON → electric heater in cooling mode


**Note:** Either floor temperature sensor or external room temperature sensor can be used.

#### Dew point monitoring

Dew point monitoring is essential to prevent condensation on the chilled ceiling (cooling with fan disabled, P52). It helps avoid associated damage to the building. A dew point sensor with a potential-free contact is connected to multifunctional input X1 or X2. If there is condensation, the cooling valve is fully closed until no more condensation is detected, and the cooling output is disabled temporarily.



Fault state  
Fault information

The alarm  icon flashes during temporary override and the fault "Condensation in room" is sent using the bus.

The input must be configured accordingly (P38, P40). See section 3.9.

#### Screen Lock

The "Screen lock" function is enabled and disabled only by using P14. There are three options:

- Unlock
- Locked (all adjustments are locked but can be viewed)
- Setpoint (**note:** only setpoint adjustment is not locked)

#### Buzzer

The "Buzzer" function provides audio feedback when you touch the operating icons on the thermostat (see page 9).

Enable or disable the "Buzzer" function via P16.

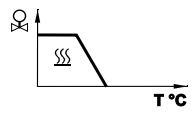
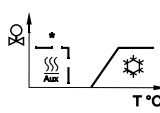
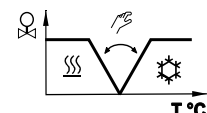
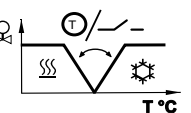
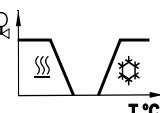


## 3.6 Control sequences

### 3.6.1 Sequences overview using P01 (RDF800KN.. only)

The main control sequence (such as the water coil sequence of the fan coil unit) can be set via **P01**.

The following sequences can be activated in the thermostats (each without or with auxiliary heating). The available sequences depend on the application (via the DIP switch, see section 3.4).

Parameter	P01 = 0	P01 = 1	P01 = 2	P01 = 3	P01 = 4
Sequence					
Heating		Cooling	Manually select heating or cooling sequence	Automatic heating/cooling changeover using external water temperature sensor or remote switch	Heating and cooling sequence, i.e. 4-pipe
Available for basic application <sup>1)</sup> : ↓		*) 2-pipe with electric heater			
2-pipe, 2-pipe and electric heater	✓	✓	✓	✓	
4-pipe			✓ <sup>2)</sup>	✓ <sup>2)</sup>	✓

- Notes:**
- <sup>1)</sup> For chilled/heated ceiling and radiator applications, see section 3.6.6; for compressor applications, see section 3.6.7.
  - <sup>2)</sup> For manual and automatic changeover with 4-pipe applications, see section 3.6.5:
    - 4-pipe **manual** changeover (P01 = 2) means activating either cooling or heating outputs.

For the relation between setpoints and sequences, see section 3.6.8.



### 3.6.2 Application mode



Application mode

The behavior of the thermostat can be influenced by a building automation and control system (BACS) via the bus using the "Application mode" command.

With this signal, cooling and/or heating mode can be enabled or disabled.

Application mode is supported in LTE mode and S-mode.

The RDF800KN../RDD810KN.. room thermostats support the following commands:

No.	Application mode	Description	Control sequence enabled (RDF800..)	Control sequence enabled (RDD810..)
0	Auto	Thermostat automatically changes between heating and cooling	Heating and/or cooling	Heating or Heating OFF <sup>1)</sup>
1	Heat	Thermostat is only allowed to heat	Heating only	
2	Morning warm-up	If "Morning warm-up" is received, the room should be heated up as fast as possible (if necessary). Thermostat only allows heating	Heating only	
3	Cool	Thermostat is only allowed to provide cooling	Cooling only	Heating OFF <sup>1)</sup>
4	Night purge	Not supported by fan coil applications	N/A (= Auto)	
5	Pre-cool	If "Pre-cool" is received, the room should be cooled down as fast as possible (if necessary). The thermostat will only allow cooling	Cooling only	Heating OFF <sup>1)</sup>
6	OFF	Thermostat is not controlling the outputs, which means all outputs go to off or 0%	Neither heating nor cooling	
8	Emergency heat	Thermostat should heat as much as possible. It only allows heating	Heating only	
9	Fan only	All control outputs are set to 0% and only the fan is set to high speed. This function is terminated by any operation on the thermostat	Run fan in high speed	Heating OFF <sup>1)</sup>

<sup>1)</sup> RDD810KN/NF thermostat turns off the heating output.

With all other commands, the thermostat behaves like in Auto mode, such as, heating or cooling according to demand.



ACS

The state (heating or cooling) of the thermostat can be monitored with the ACS tool (diagnostic value "Control sequence"). The last active mode is displayed when the thermostat is in the dead zone or when room temperature control is disabled.



## Heating OR cooling

With 2-pipe applications, the control sequence state is determined by the application mode (see section 3.6.3) and by the state of the heating/cooling changeover signal (using the local sensor or the bus), or fixed according to the selected control sequence (P01 = heating (0)/cooling (1)).

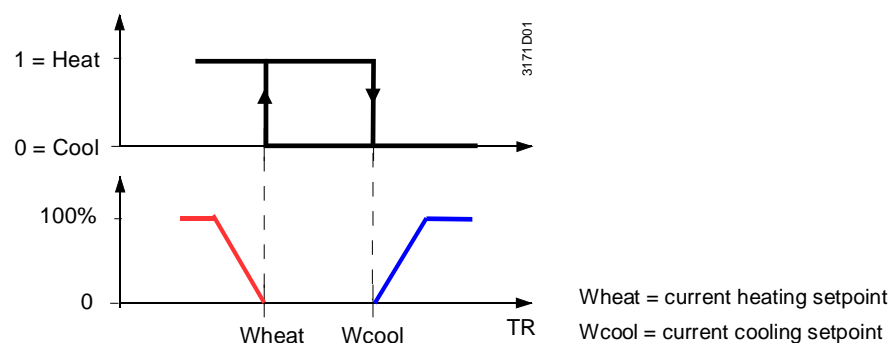
Application mode (using bus)	State changeover/continuous heating or cooling	Control sequence state
Auto (0)	Heating	Heating
	Cooling	Cooling
Heat (1), (2), (8)	Heating	Heating
	Cooling	<b>Heating</b>
Cool (3), (5)	Heating	<b>Cooling</b>
	Cooling	Cooling
Night purge (4), fan only (9)	Heating	Heating
	Cooling	Cooling

## Heating AND cooling

With 4-pipe, 2-pipe with electric heater, and 2-pipe with radiator applications, the control sequence state depends on the application mode and the heating/cooling demand.

Application mode (using the bus)	Heating/cooling demand	Control sequence state
Auto (0)	Heating	Heating
	No demand	Heating/cooling depending on the last active sequence
	Cooling	Cooling
Heat (1), (2), (8)	Heating	Heating
	No demand	<b>Heating</b>
	Cooling	<b>Heating</b>
Cool (3), (5)	Heating	<b>Cooling</b>
	No demand	<b>Cooling</b>
	Cooling	Cooling
Night purge (4), Fan only (9)	No room temperature control active	Heating/cooling depending on the last active sequence

The following diagram shows the value of the output as a function of the room temperature for a heating and cooling system:





### 3.6.3 2-pipe fan coil unit (RDF800KN.. only)

On 2-pipe applications, the thermostat controls a valve in heating/cooling mode with changeover (automatically or manually), heating only, or cooling only. Factory setting is "Cooling only" (P01 = 1).

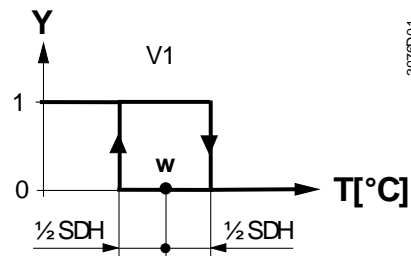
#### On/Off control

Control sequence

On/Off output

The diagrams below show the control sequence for 2-position control.

Heating mode

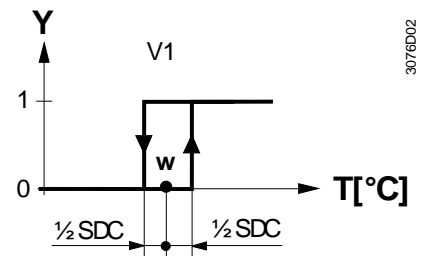


T[°C] Room temperature

w Room temperature setpoint

V1 Control command "Valve" or "Compressor"

Cooling mode



SDH Switching differential "Heating" (P30)

SDC Switching differential "Cooling" (P31)

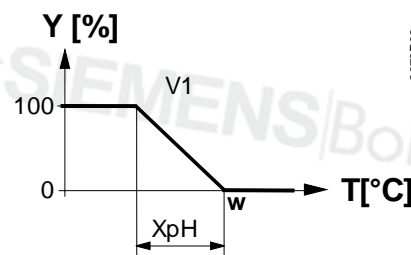
#### Modulating control: 3-position

Control sequence

modulating output

The diagrams below show the control sequence for modulating PI control.

Heating mode

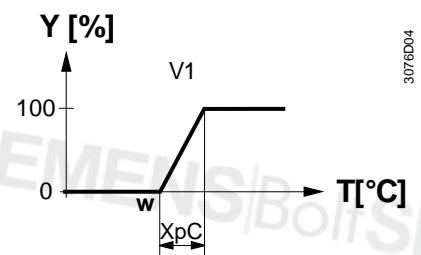


T[°C] Room temperature

w Room temperature setpoint

V1 Control command "Valve"

Cooling mode



XpH Proportional band "Heating" (P30)

XpC Proportional band "Cooling" (P31)

#### Notes:

- The diagrams only show the PI thermostat's proportional action.
- For fan sequence see section 3.8.

#### Setting the sequence and the control outputs

Refer to sections 3.4, 3.6.1, and 3.7.



### 3.6.4 2-pipe fan coil unit with electric heater (RDF800KN.. only)

Heating or cooling with auxiliary heater

On 2-pipe applications with electric heater, the thermostat controls a valve in heating/cooling mode with changeover, heating only, or cooling only plus an auxiliary electric heater.

Cooling only is factory-set (P01 = 1) with electric heater enabled (P13).

Electric heating, active in cooling mode

In cooling mode, the valve receives an **OPEN** command if the acquired room temperature is above the setpoint. The electric heater receives an **ON** command if the acquired room temperature drops below "setpoint" minus "dead zone" (= setpoint for electric heater) while the electric heater is enabled (P13 = ON).

**Note:** "Setpoint for electric heater" is limited by parameter "Comfort setpoint maximum" (P10).

Electric heating in heating mode

In heating mode, the valve receives an **OPEN** command if the acquired temperature is below the setpoint. The electric heater is used as an additional heat source when the heating energy controlled by the valve is insufficient.

The electric heater receives an **ON** command, if the room temperature is below "setpoint" minus "setpoint differential" (= setpoint for electric heater).

Electric heating and manual changeover

The electric heater is active in heating mode only and the control output for the valve is permanently disabled when manual changeover is selected (P01 = 2).

Digital input "Enable electric heater"

Remote enabling/disabling of the electric heater is possible using input X1 or X2 for tariff regulations, energy savings and so on.  
Input X1 or X2 must be configured accordingly (P38/P40). See section 3.9.



Enable electric heater

The electric heater can also be enabled/disabled using the bus.

**Note:** If "Enable electric heater" input uses the bus, the function **must not** be assigned to a local input X1 or X2.

**Caution** ⚠

An electric heater must always be protected by a safety limit thermostat!



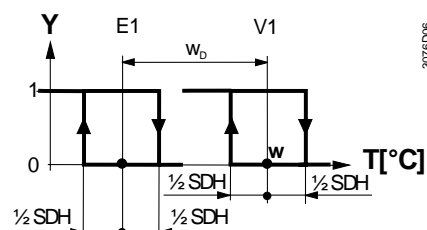
## On/Off control

Control sequence  
ON/OFF output

The diagrams below show the control sequence for 2-position.

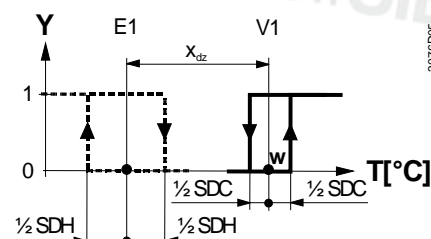
### Heating mode

(automatic changeover = heating or heating only)

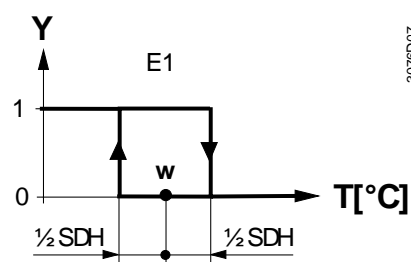


### Cooling mode

(manual/auto. changeover = cooling or cooling only)



### Heating mode with manual changeover (P01 = 2) (manual changeover = heating)



T [°C] Room temperature  
W Room temperature setpoint  
V1 Control command "Valve" or "Compressor"  
E1 Control command "Electric heater"  
SDH Switching differential "Heating" (P30)  
SDC Switching differential "Cooling" (P31)  
x<sub>dz</sub> Dead zone (P33)  
w<sub>D</sub> Setpoint differential (P34)

#### Notes:

- The diagrams only show the PI thermostat's proportional action.
- For the fan sequence see section 3.8.
- For better temperature control performance with 2-position electric heater, we suggest you set the switching differential heating (P30) to 1 K.

## Setting the sequence and the control outputs

Refer to sections 3.4, 3.6.1, and 3.7.



### 3.6.5 4-pipe fan coil unit (RDF800KN.. only)

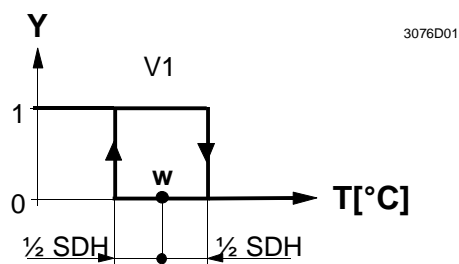
#### Heating and cooling

On 4-pipe applications, the thermostat controls 2 valves in heating and cooling mode, heating/cooling mode by manual selection (P01 = 2), or heating and cooling mode with changeover. Heating and cooling mode (P01 = 4) is factory-set.

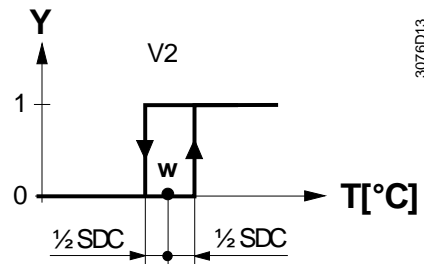
#### On/Off control

The diagrams below show the control sequence for 2-position control.

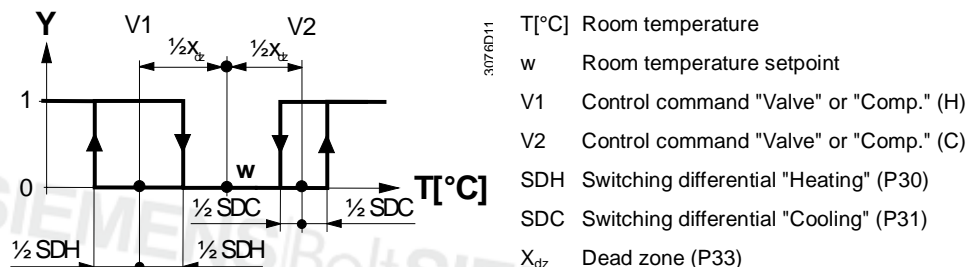
Heating mode with manual selection  
(P01 = 2)



Cooling mode with manual selection  
(P01 = 2)



Heating and cooling mode (P01 = 04)



- Notes:**
- The diagrams only show the PI thermostat's proportional action.
  - For the fan sequence see section 3.8.

#### Setting the sequence and the control outputs

Refer to sections 3.4, 3.6.1, and 3.7.

### 3.6.6 Chilled/heated ceiling and radiator applications (RDF800KN.. only)

For chilled/heated ceilings and radiators, proceed as follows:

- Set the corresponding basic application;
- Disable the fan (P52).

The following applications are available:

Application for chilled/heated ceiling, radiator	Set basic application	See section	Sequences
Chilled/heated ceiling with changeover	2-pipe	3.6.3	H ( \ ) C ( / )
Chilled/heated ceiling and electric heater (cooling only: disable electric heater using P13)	2-pipe and electric heater	3.6.4	El H + H ( \ \ ) El H + C ( \ / ) C ( / )
Chilled ceiling and radiator	4-pipe	3.6.5	H + C ( \ / )



### 3.6.7 Compressor applications (RDF800KN.. only)

For compressor applications, proceed as follows:

1. Set the corresponding basic application
2. Disable the fan (P52) or set the fan speed (P53)

The following applications are available:

Application for compressor	Set basic application	See section	Sequences
1-stage compressor for heating or cooling	2-pipe	3.6.3	H ( \ ) C ( / )
1-stage compressor and electric heater (for cooling only: disable electric heater using P13)	2-pipe and electric heater	3.6.4	EI H + H ( \ \ ) EI H + C ( \ / ) C ( / )
1-stage compressor for heating and cooling	4-pipe	3.6.5	H + C ( \ / )

- Notes:**
- Minimum On/Off time: P48/P49
  - Fan operation: P52 (0 = disabled, 1 = enabled)
  - Fan speed: P53 (1 = 1-speed, 2 = 3-speed)

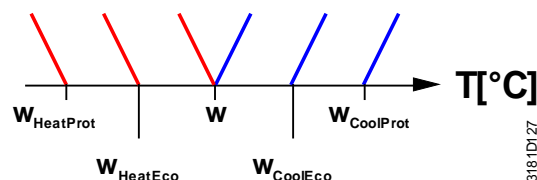
### 3.6.8 Setpoints and sequences (RDF800KN.. only)

#### 2-pipe applications

On changeover applications, the Comfort setpoints for heating and cooling sequence are the same (w).

On 2-pipe applications with electric heater, the Comfort setpoint is either at the first heating sequence (in heating mode) or at the cooling sequence (in cooling mode).

The setpoints for Economy and Protection mode are below the Comfort setpoints (heating) and above the Comfort setpoints (cooling), which can be set using P11, P12 (Economy mode) and P65, P66 (Protection mode).



Application	Comfort mode		Economy/Protection mode	
	Heating	Cooling	Heating	Cooling
2-pipe				
2-pipe and electric heater				

<sup>1)</sup> If P13 = ON

<sup>2)</sup> In case of manual changeover (P01 = 2), the first heating sequence is disabled to prevent heating (electric heater) and cooling (coil) at the same time

W = setpoint in Comfort mode



$W_{\text{HeatEco/Prot}}$  = setpoint heating in Economy or Protection mode  
 $W_{\text{CoolEco/Prot}}$  = setpoint cooling in Economy or Protection mode  
 YR = radiator sequence  
 E1 = electric heater sequence

#### 4-pipe applications

On 4-pipe applications, the Comfort setpoint (w) is in the middle of the dead zone, between the heating and the cooling sequence.

The dead zone can be adjusted via P33.

If manual changeover is selected, then either the cooling sequence or the heating sequence is released. In this case, the Comfort setpoint is at the selected heating or cooling sequence.

Application	Comfort mode			Economy/Protection mode
	Heating and cooling	Heating only <sup>1)</sup>	Cooling only <sup>1)</sup>	Heating and/or cooling
4-pipe				

<sup>1)</sup> Manual changeover, P01 = 2

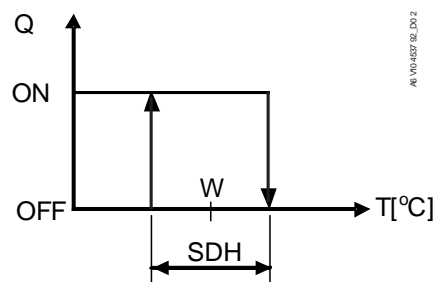
W = setpoint in Comfort mode

$W_{\text{HeatEco/Prot}}$  = heating setpoint for Economy or Protection mode

$W_{\text{CoolEco/Prot}}$  = cooling setpoint for Economy or Protection mode

### 3.6.9 Heating (RDD810KN/NF only)

The RDD810KN/NF room thermostat controls the 2-position outputs in heating mode:



T[°C] Room temperature

w Room temperature setpoint

SDH Switching differential "Heating" (P30)

Q Output signal for heating



## 3.7 Control outputs

### 3.7.1 Overview

#### Overview of control outputs

Different control output signals are available. They must be defined during commissioning (see below).

Control output Product no.	2-position	2-position PWM	3-position	DC 0...10 V
RDF800KN..	Y1, Y2 (2 x SPST)	---	Y1, Y2 <sup>*)</sup> (1 x ▲/▼)	---
RDD810KN/NF	Q11, Q12, Q14 (1 x SPDT)	---	---	---

<sup>\*)</sup> Only applies to 2-pipe applications.

#### On/Off control signal (2-position)

The valve or compressor receives the **OPEN/ON** command from control output Y1 or Y2 when...

- The acquired room temperature is below the setpoint (heating mode) or above the setpoint (cooling mode).
- The control outputs have been inactive for more than the "Minimum output OFF-time" (factory setting 1 minute, adjustable via P48).

The **OFF** command is received when...

1. The acquired room temperature is above the setpoint (heating mode) or below the setpoint (cooling mode).
2. The valve has been active for more than the "Minimum output on-time" (factory setting 1 minute, adjustable via P49).

#### Electric heater control signal (2-position)

The electric heater receives an **ON** command using the auxiliary heating control output (Y.., see Mounting Instructions) when...

- The acquired room temperature is below the "setpoint for electric heater".
- The electric heater has been off for at least 1 minute.

The **OFF** command for the electric heater is output when...

- The acquired room temperature is above the setpoint (electric heater).
- The electric heater has been on for at least 1 minute.

#### Caution

A safety limit thermostat (to prevent overtemperatures) must be provided externally.

#### Adaptive temperature compensation for electric heater

When an electric heater is connected directly to On/Off output Y2, the current causes the relay contact to heat up. This falsifies the reading of the built-in temperature sensor. The thermostat compensates the temperature if the rated power of the electric heating is entered in the parameters.

P45 (power of electric heater): Factory setting 0 kW, setting range: 0.0...1.2 kW.

#### 3-position control signal

Output Y1 provides the **OPEN** command, and Y2 delivers the **CLOSE** command to the 3-position actuator.

The factory setting for the actuator's running time is 150 seconds. It can be adjusted via P44.

The parameter is only visible if 3-position is selected via the DIP switches.



#### Synchronization

- When the thermostat is powered up, a closing command for the actuator running time + 150% is delivered to ensure that the actuator fully closes and synchronizes to the control algorithm.
- When the thermostat calculates either the fully closed or fully open position, the actuator's running time is extended + 150% to ensure the right actuator position is synchronized to the control algorithm.
- After the actuator reaches the position calculated by the thermostat, a waiting time of 30 seconds is applied to stabilize the outputs.

#### Heating output control signal (2-position) RDD800KN/NF only

Outputs Q14 and Q12 deliver the Normal Open (NO) and Normal Closed (NC) commands to the 2-position valve.

Both outputs are potential-free, depending on the Q11 input. Q11 can accept AC 24...230 V input voltage.

Output Q14 (NO) will be closed or output Q12 (NC) will be opened when the acquired room temperature is below its setpoint.

Q11 and Q14, or Q11 and Q12 can be used as a relay contact for switching the boiler on and off.

### 3.7.2 Control outputs configuration (using the DIP switches or the tool) (RDF800KN.. only)

---

In 2-pipe applications (2- or 3-position), the control outputs are set using the DIP switches (see section 3.4).


The DIP switches have no impact if the application is set up via tools. In this case, the control outputs need to be set with the ACS tool.





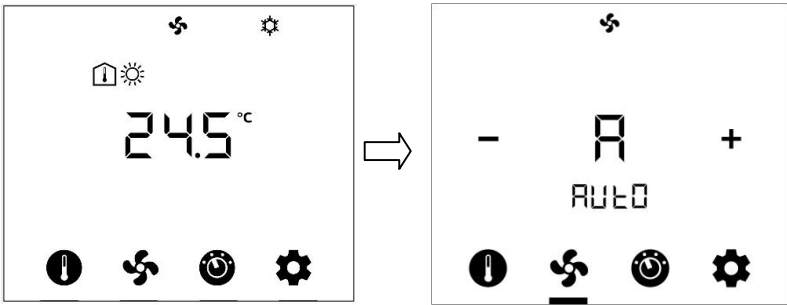
### 3.8 Fan control (RDF800KN.. only)



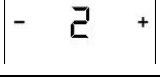

The fan operates in automatic mode or at the selected speed in manual mode. In automatic mode, the fan speed depends on the setpoint and the current room temperature. When the room temperature reaches its setpoint, the control valve closes and the fan switches off or stays at fan speed 1 according to the setting of P15 (fan stage in dead zone Comfort) and P60 (fan kick).

Factory setting for "Fan in the dead zone": Fan speed OFF (P15 = 0, P60 = OFF)

Touch the  icon when available and use +/- to adjust the fan speed.

Both the  and  icons display when manual fan speed is selected.



Display	Fan speed selection
	Auto
	Low
	Medium
	High



Fan command value  
Enable fan command value

Fan speed and mode can be changed using the bus.  
For this purpose, the fan command value must be enabled.



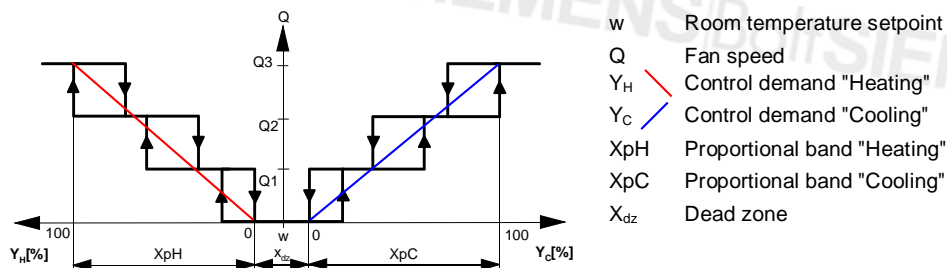
Fan operation  
Fan stage 1/2/3  
Fan output

Fan speed and mode can be monitored using the bus.



### 3-speed fan control with modulating heating/cooling control

The individual switching points for **ON** of each fan speed can be adjusted via P55...P57. The fan speed switch off point is 20% below the switch-on point. The diagrams below show fan speed control with modulating PI control.

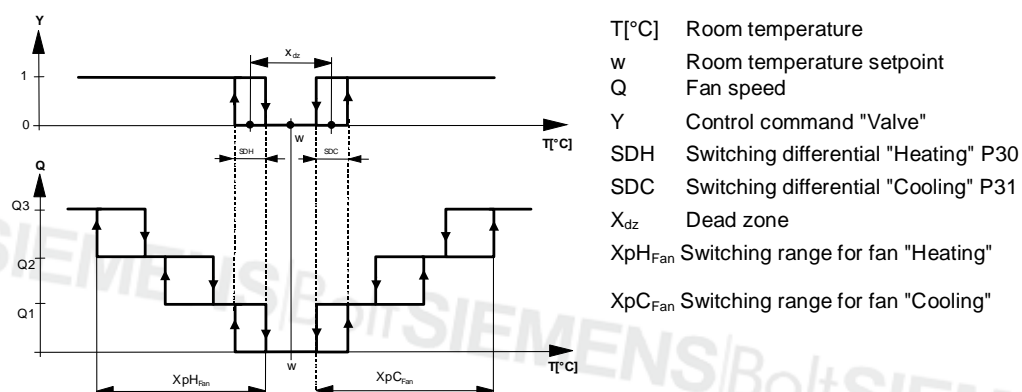


**Note:** The diagram only shows the PI thermostat's proportional part.

### 3-speed fan control with On/Off heating/cooling control

Applications with 2-position control:

- The switching point for low fan speed (Q1) is synchronized to the heating/cooling output. P57 is not relevant.
- The maximum switching range of the fan (XpH<sub>Fan</sub>/XpC<sub>Fan</sub>) is defined by the switching differential (SDH/SDC) using a look-up table.



Look-up table with  
On/Off control


SDH/SDC [K]	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	>4.5
XpH <sub>Fan</sub> /XpC <sub>Fan</sub> [K]	2	3	4	5	6	7	8	9	10

### 1-speed/3-speed fan

The thermostat can control a 1-speed or 3-speed fan (selected via P53). A 1-speed fan is connected to terminal Q1, a 3-speed fan is connected to terminals Q1, Q2 and Q3.

### Fan operation as per heating/cooling mode, or disabled

Fan operation can be limited to be active with cooling only or heating only, or even be totally disabled via P52 (fan operation).

When fan operation is disabled (P52 = 0), both the fan icon  on the top line and the operating icons (see page 9) on the last line disappear from the touchscreen.

This function allows you to use the thermostat on universal applications such as chilled/heated ceilings, or radiators (see section 3.6.6).

### Fan minimum on- time

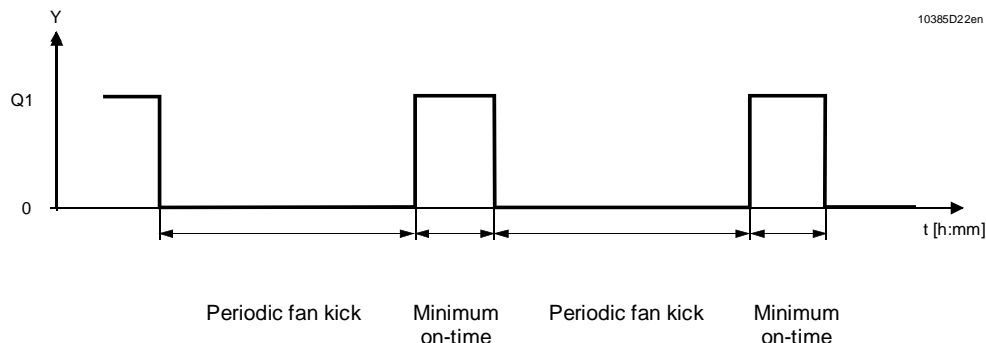
In automatic mode, a dwelling time of 2 minutes (factory setting) is active. The fan maintains each speed for at least 2 minutes before changing to the next speed. This minimum on-time can be adjusted from 1...6 minutes via P59.



## Fan operation in dead zone (fan kick)

In automatic fan mode and with the room temperature in the dead zone, the control valve is normally closed and the fan disabled. With the "Fan kick" function, the fan can be released from time to time at low speed for minimum on-time (see above) even if the valve is closed.

This function can be used to avoid damage from moisture due to a lack of air circulation, or to allow a return air temperature sensor to acquire the correct room temperature.



The periodic fan kick time can be selected individually for Comfort mode via P60, and for Economy mode via P61.

- Notes:**
- A fan kick value of **0** means the fan runs continuously in the dead zone.
  - A fan kick value **OFF** means the fan does not run in the dead zone.

## Fan operation in dead zone P15, Comfort mode

Using P15 at the Service level, the fan speed in the dead zone (in Comfort mode) can be set according to customer preference.

The following options are available:

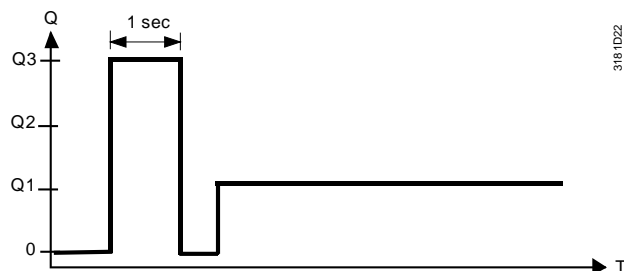
- Fan does not run in the dead zone (P15=0).
- Fan runs at low speed in heating and cooling mode (P15=1).
- Fan runs at low speed in cooling mode only (P15=2).

The functions "Fan in dead zone" (P15) and "Fan kick" (P60) are combined as follows:

- P60 = 0 Fan runs continuously in the dead zone, P15 has no influence.
- P60 = OFF Fan operation in dead zone according to P15.

## Fan start kick

The fan first starts at speed 3 for 1 second to ensure safe fan motor start by overcoming inertia and friction (selected using P58).



## Fan overrun for electric heater

When the electric heater is switched off, the fan overruns for 60 seconds (P54) to either avoid overtemperature of the electric heater or to prevent the thermal cutout from responding.

**CAUTION** ⚠  
Fan failure

In case of fan failure, the thermostat cannot protect the electric heater against overtemperature. For this reason, the electric heater must be equipped with a separate safety device (thermal cutout).



## Clean filter reminder

The "Clean filter reminder" function counts the fan operating hours and displays message '▲ FIL' to remind the user to clean the fan filter as soon as the threshold is reached. This does not impact the thermostat's operation, which continues to run normally. The function is set using P62 (default = OFF (0)).





Fault information

The "Clean filter reminder" function can be removed using +/- – when viewing alarms on the INFO page.

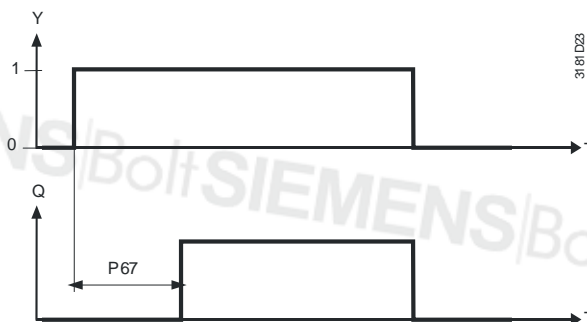


## Fan in Auto Timer mode

In Auto Timer mode , the default fan mode is automatic. It can be changed to Manual by touching the  icon. The fan returns to the automatic default mode after each switchover from Comfort to Economy mode, and vice versa.

## Fan start delay

To let the heating/cooling coil reach its temperature, the fan start can be delayed by a time period set via P67.





### 3.9 Multifunctional input, digital input

The thermostat has two multifunctional inputs X1 and X2. An NTC type sensor, such as the QAH11.1 (AI, analog input) or a switch (DI, digital input) can be connected to the input terminals. The functionality of the inputs can be configured using P38 or P39 for X1 and P40 or P41 for X2.



The current temperature or the state of inputs X1 or X2 is available on bus for monitoring purposes.

The parameters can be set to the following values:

No.	Function of input	Description	Type X1/X2	RDF..	RDD..
0	Not used	No function.	--	✓	✓
1	External/return air temperature	Input for external room temperature sensor or return air temperature sensor to acquire the current room temperature, or for floor heating temperature sensor to limit the heating output. <b>Note:</b> The room temperature is acquired by the built-in sensor if the floor temperature limitation function is enabled via P51.	AI	✓	✓
2	Heating/cooling changeover	Sensor input for "Automatic heating/cooling changeover" function. A switch, rather than a sensor, can also be connected. <b>Note:</b> A closed switch always means cooling; this cannot be changed. See section 3.5. Heating/cooling changeover is also possible via the bus. In this case, the function must not be assigned to local input X1, or X2. See section 3.5. Diagnostic value displays one of the following: <ul style="list-style-type: none"> <li>• 00 for closed contact</li> <li>• 100 for open contact, if a switch is connected.</li> </ul>	AI/DI	✓	
3	Window contact	Window contact input to switch the operating mode to Protection. If the window contact is open, user operations have no impact and <b>OFF</b> displays. Window contact is also possible using the bus. In this case, the function must not be assigned to local input X1 or X2. See section 3.2.1.	DI	✓	✓
4	Dew point monitor	Digital input for a dew point sensor to detect condensation. Cooling is stopped if condensation occurs.	DI	✓	







Enable electric heater



Fault information



X1, X2 (Digital)



X1, X2 (Temp.)



Presence detector

No.	Function of input	Description	Type X1/X2	RDF..	RDD..
5	Enable electric heater	Digital input to enable/disable the electric heater using remote control.  Enabling the electric heater is also possible using the bus. In this case, the function must not be assigned to local input X1 or X2. See section 3.2.1.	DI	✓	
6	Fault	Digital input to signal an external fault (e.g. dirty air filter).  If the input is active, <b>ALx</b> displays and a fault is sent on the bus. See also section 3.11.8. (Alarm x, where x = 1 for X1, x = 2 for X2). <b>Note:</b> Fault displays have no impact on the thermostat's operation. They merely represent a visual signal.	DI	✓	✓
7	Monitor input (digital)	Digital input to monitor the state of an external switch via the bus, e.g. to send a local alarm using KNX to the central control unit.	DI	✓	✓
8	Monitor input (temperature)	Sensor input to monitor the state of an external sensor (e.g. QAH11.1) via the bus, e.g. to send a local temperature (0...49°C) via KNX to the central control unit.	AI	✓	✓
10	Presence detector	Presence detector input to switch the operating mode to Comfort in case of occupancy and back to Economy when the room is unoccupied.  Presence detection is also possible via bus. In this case, the function must not be assigned to local input X1 or X2. See section 3.2.1.	DI	✓	✓

- Operating action can be changed between normally open (NO) and normally closed (NC) using P39 or P41.
- Inputs X1 and X2 must be configured with a different function (1...5, 10).  
Exception: 1 or 2 inputs can be configured as fault (6) or monitor input (7, 8).
- X1 is factory-set to "Window contact" (3), X2 to "External sensor" (1).

For more detailed information, refer to section 3.4.



## 3.10 Handling faults

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### Room temperature out of range

When the room temperature is out of the measuring range (that is, above 49 °C or below 0 °C), the limiting temperature flashes.

In addition, the heating output is activated if the current setpoint is not set to "OFF", the thermostat is in heating mode and the temperature is below 0 °C.

For all other cases, no output is activated.

The thermostat resumes Comfort mode after the temperature returns to the measuring range.

### Fault "Er1" on display

If the built-in sensor fails and no external sensor is connected, the thermostat displays error message **Er1**. This means that the thermostat must be replaced if the room temperature is acquired with the built-in sensor.



### Power failure

For error status messages on the bus, see section 3.11.8.

In the event of a power failure, all working conditions (operating mode, setpoint, fan speed, and all control parameter settings) are stored without time limitation.

When power returns, the thermostat reloads this data and continues to work in the same conditions as before.



## 3.11 KNX communications

The RDF800KN../RDD810KN.. KNX room thermostats support communications as per KNX specification.

S-mode            Standard mode; engineering using group addresses.

LTE mode        Logical Tag Extended mode, for easy engineering, used in conjunction with Synco.

### 3.11.1 S-mode

This mode corresponds to KNX communications.

Connections are established via ETS by assigning communication objects to group addresses.

### 3.11.2 LTE mode

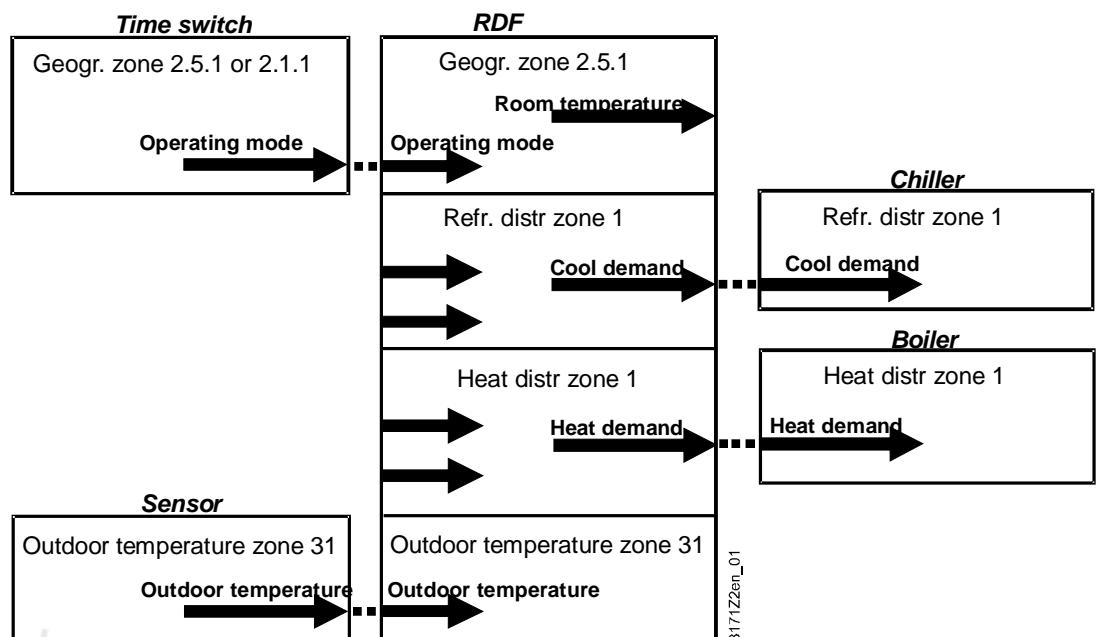
LTE mode was specifically designed to simplify engineering. In contrast to S-mode, there is no need to create individual connections (group addresses) in the tool. The devices establish connections autonomously.

#### Definitions

To make this possible, the following conditions must be fulfilled:

- Every device or subdevice is located within a zone.
- Every data point (input or output) is assigned to a zone.
- Every data point (input or output) has a precisely defined "name".

Whenever an output and input, with the same name, is located in the same zone, a connection is established automatically, as shown in the following diagram.





- For a detailed description of KNX (topology, bus supply, function and setting of LTE zones, filter tables, etc.), see "Communication using the KNX bus for Synco 700, 900 and RXB/RXL, Basic Documentation" [6].
- LTE mode data points and settings are described in the Synco Application Manual [12].
- To engineer and commission a specific system, use the Synco700 planning and commissioning protocol (XLS table in HIT, [7]).

### 3.11.3 Zone addressing in LTE mode (in conjunction with Synco)

In cases where RDF800KN../RDD810KN.. KNX room thermostats are used in LTE mode (e.g. in conjunction with Synco), zone addresses need to be allocated.

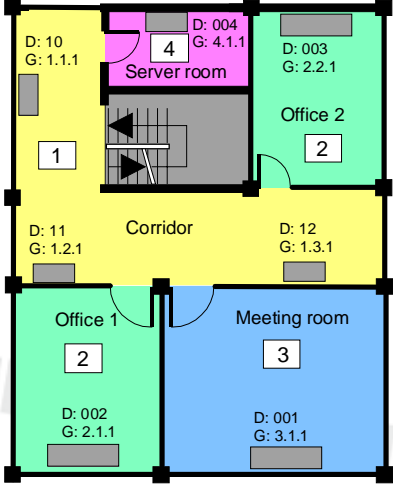
Depending on the application, the following zone address must be defined together with the Synco devices at the planning stage.

Short description	Factory setting	Parameter
Geographical zone (apartment)	--- (out of service)	P82
Geographical zone (room)	1	P83
Heat distr zone heating coil	1	P84
Refr distr zone cooling coil	1	P85

- Notes:**
- The "Subzone" of the "Geographical zone" is fixed to 1 (not adjustable).
  - The device will send and receive LTE communication signals only if the zone address is valid (not OSV = out of service).



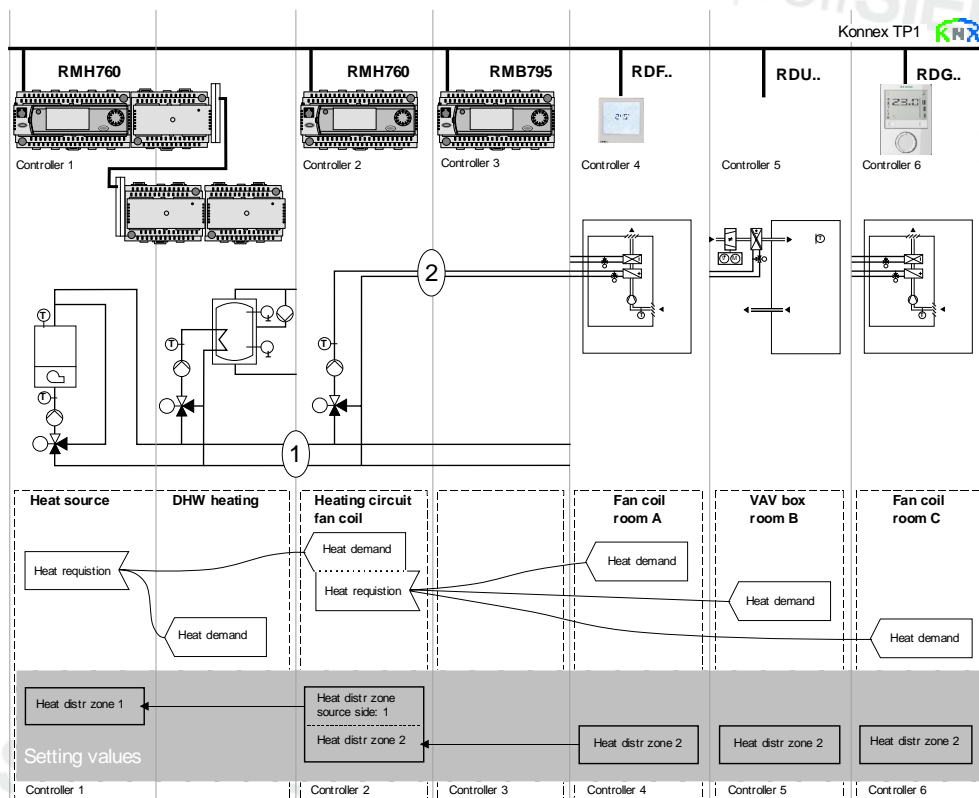
The zones to be defined are as follows:

<p><b>Geographical zone (space zone)</b> (Apartment . Room. Subzone) Apartment = ---, 1...126 Room = ---, 1...63 Subzone = fix 1</p>	<p>Zone in which an RDF800KN../RDD810KN.. KNX room thermostat is physically located. Other room-specific devices may also be located in this zone.</p> <p>Information exchanged in this zone is related specifically to the device's operating mode, setpoints, room temperature, and so on.</p> <p>While the designations "Apartment" and "Subzone" do not need to be taken literally, "Room" really does refer to a room. For example, Apartment can be used to refer to a group of rooms, floor or section of a building. Subzone is not used for HVAC devices. It is better suited for other disciplines, such as lighting. Subzone is fixed to "1" and not visible.</p> <p>The time switch information is expected from the same zone where the thermostat is located (Residential). If no time switch information is received from the same zone, the thermostat uses the information it received from the same apartment but with room "1" A.1.1 (Office).</p> <p><b>Example:</b> <b>Commercial building</b></p> <p>In a commercial building, the time switch information is sent by the RMB795B central control unit. The zones are divided into "Room groups" (e.g. 1...4), where each "Room group" can have an individual schedule. A room thermostat in the same "Room group" must have the same apartment address.</p> <p>Legend: D = device address (P81) G = geographical zone (P82, P83) (Apartment.Room.Subzone)</p> 
<p><b>Heat distribution zone heating coil</b> Zone = ---, 1...31</p>	<p>Information related specifically to the hot water system in heating coils is exchanged within this zone. The zone also includes a Synco device to process the information (e.g. RMH7xx or RMU7xx with changeover).</p>
<p><b>Refrigeration distribution zone cooling coil</b> Zone = ---, 1...31</p>	<p>Information related specifically to the chilled water system is exchanged within this zone (e.g. cooling demand). This zone also includes a Synco device to process the information (e.g. RMU7xx).</p>
<p><b>Outdoor temperature zone</b> Zone = fixed to 31</p>	<p>The outdoor temperature is provided via KNX bus on zone 31. If available, it is displayed when the INFO page is selected</p>



### 3.11.4 Example of heating and cooling demand zone

The building is equipped with Synco controls on the generation side and with RDF../RDU../RDG.. room thermostats on the room side.



#### Explanation relating to the above illustration

In typical applications, the individual RDF../RDU../RDG.. room thermostats send their heat demand directly to the primary controller (in the above example to the RMH760).

① and ② designate the numbers of the distribution zone.

- Notes:**
- This type of application can analogously be applied to refrigeration distribution zones.
  - If no 2-pipe fan coil unit is used, heat and refrigeration demand signals are sent simultaneously to the primary plant.

### 3.11.5 Send heartbeat and receive timeout

In a KNX network, S-mode and LTE mode communication objects can be exchanged between individual devices. The *Receive timeout* defines the period of time within which all the communication objects requested from a device must have been received at least once. If a communication object is not received within this period of time, a predefined value is used.

Similarly, the *Send heartbeat* defines the period of time within which all the communication objects requested must be transmitted at least once.

#### LTE mode/S-mode

Fixed times are specified as follows:

- Receive timeout: 31 minutes
- Send heartbeat: 15 minutes



## Reducing the bus load

Individual zones can also be disabled (out of service) using a control parameter if they are not required. In disabled zones, the LTE signal is no longer periodically sent, and therefore reduce bus load.

### 3.11.6 Startup

#### Startup response

The application is restarted after every reset, so that all the connected motorized valve actuators are synchronized (see section 3.7).

#### Startup delay

After a reset, it takes approximately 5 minutes for all the connected room thermostats to restart. This avoids overloading the mains power supply because restarting is avoided. At the same time, the load on the KNX network is reduced, as not all thermostats transmit data at the same time. The delay ( $T_{\text{WaitDevice}}$ ) is determined by the thermostat's device address. After the delay, the device starts to send.

### 3.11.7 Heating and cooling demand



Heating output primary  
Heating output  
secondary  
Cooling output primary

In conjunction with Synco, the heating and/or cooling demand from each room is transmitted to the BACS to provide the required heating or cooling energy.

An example for LTE mode is described in section 3.11.4.

In S-mode, the current state signals of the control outputs are available.

### 3.11.8 Fault function on KNX

If a fault occurs (e.g. digital fault input, dew point, or communication configuration) then a fault signal is sent via the bus.

An RDF800KN../RDD810KN.. room thermostat listens on the bus and sends its fault signal when the fault has the highest alarm priority. This ensures that the management station (BACS) does not miss any alarms.

If several alarms occur at the same time, the alarm with the highest priority is displayed first and is sent via the bus.



Fault transmission is different in LTE mode and S-mode:

S-mode	LTE mode
Fault state	Alarm information (error code + internal information)
Fault information (internal information)	Alarm text (default text can be edited with ACS tool)



The table below shows the error code and default alarm texts.

Priority	Fault/service	Thermostat	Fault information on the bus		Text adjustable <sup>*)</sup>
		Display	Error code	Default fault text	
-	No fault	---	0	No fault	✓
1	Bus power supply <sup>**) )</sup>	🔔 BUS	5000	No bus power supply	---
2	Device address error	🔔 ADR	6001	> 1 id device address	---
3	Condensation	🔔 CON	4930	Condensation	✓
4	External fault input X1	🔔 AL1	9001	Fault input 1	✓
5	External fault input X2	🔔 AL2	9002	Fault input 2	✓
6	Clean filter reminder	🔔 FIL	3911	Dirty filter	✓

<sup>\*)</sup> Default alarm texts are stored in the thermostat's non-volatile memory and can be adjusted using the ACS tool.

<sup>\*\*) )</sup> This error will not be sent via the bus (because there is either no bus, not sufficient bus power supply, the bus is overloaded or the bus signal is distorted).

### Priority of alarms

- Priority order is 1...6.
- External faults 4...5. If faults are active, AL1 and AL2 display alternately. Only the fault with the highest priority will be sent via the bus.



Fault transmission

A supervisory alarm system may command the thermostat to stop sending fault signals to the bus using the communication object "Fault transmission" (disable/enable).

This has no impact on the local display of faults.

After a timeout of 48 hours, the forwarding of fault signals will automatically be enabled again.



## 3.12 Communication objects (S-mode)

### 3.12.1 RDF800KN.. Overview

Page	Object no. and name	Thermostat	Object no. and name	Page
15	1 System time	→		
15	3 Time of day	→		
14	44 Outdoor temperature	→	→ 21 Room temperature	14
			→ 16 Room operating mode: State <sup>1)</sup>	16
18	12 Room operating mode: Time switch <sup>1)</sup>	→	→ 24 Room temperature: Current setpoint	25
18	7 Room operating mode: Preselection <sup>1)</sup>	↔		
16	20 Room operating mode: Window state	→	→ 33 Fan operation (0 = Auto/1 = Manual)	46
16	45 Room operating mode: Presence detector	→	→ 35 Fan output	46
25	22 Room temperature: Comfort basic setpoint	→	→ 36 Fan stage 1	46
25	23 Room temperature: Comfort setpoint	↔	→ 37 Fan stage 2	46
			→ 38 Fan stage 3	46
36	31 Application mode	→	→ 25 Heating output primary <sup>2)</sup>	57
46	32 Enable fan command value	→	→ 26 Heating output secondary <sup>2)</sup>	57
46	34 Fan command value	→	→ 27 Cooling output primary <sup>2)</sup>	57
39	29 Enable electric heater	→		
32	30 Heating/cooling changeover	→	→ 39/41 X1 (temperature/digital)	51
			→ 40/42 X2 (temperature/digital)	51
58	6 Fault transmission	→	→ 5 Fault state	34
			→ 4 Fault information	34
23	46 Room temp: Economy heating setpoint	→		
23	47 Room temp: Economy cooling setpoint	→		



Input communication object.



Output communication object.



Input and output communication object.

<sup>1)</sup> 8-bit and 1-bit object available. Select using parameter in ETS.




<sup>2)</sup> Availability depends on selected application or function.



### 3.12.2 RDD810KN/NF Overview

Page	Object no. and name	Thermostat	Object no. and name	Page
15	1 System time	→		
15	3 Time of day	→		
14	44 Outdoor temperature	→	→ 21 Room temperature	14
			→ 16 Room operating mode: State <sup>1)</sup>	16
18	12 Room operating mode: Time switch <sup>1)</sup>	→	→ 24 Room temperature: Current setpoint	25
18	7 Room operating mode: Preselection <sup>1)</sup>	↔		
16	20 Room operating mode: Window state	→		
16	45 Room operating mode: Presence detector	→		
25	22 Room temperature: Comfort basic setpoint	→		
25	23 Room temperature: Comfort setpoint	↔		
36	31 Application mode	→	→ 25 Heating output primary <sup>2)</sup>	57
			→ 39/41 X1 (temperature/digital)	51
			→ 40/42 X2 (temperature/digital)	51
58	6 Fault transmission	→	→ 5 Fault state	34
23	46 Room temp: Economy heating setpoint	→	→ 4 Fault information	34

 Input communication object  
 Output communication object  
 Input & output communication object

<sup>1)</sup> 8-bit and 1-bit object available, selectable by using parameter in the ETS

<sup>2)</sup> Availability depending on selected application/function



### 3.12.3 Description of communication objects

Obj	Object name	Function	Type/length	Flags
1	System time	Time and date	19.001 8 Byte	CWU
System time for display on the room thermostat. See P07 (3 or 4)				
3	Time of day	Time and date	10.001 3 Byte	CWU
Another object for receiving the time of day for display on the thermostat. See P07 (3 or 4)				
4	Fault information	Alarm Info	219.001 6 Byte	CT
Common alarm output. If an alarm occurs, the alarm number is transmitted				
5	Fault state	Faulty/ Normal	1.005 1 bit	CT
Common alarm output. If an alarm occurs, the alarm flag is set				
6	Fault transmission	Enable/ Disable	1.003 1 bit	CWU
A supervisory alarm system can disable the broadcasting of alarms by the devices. This has no impact on the local display of alarms. After a timeout of 48 hours, the sending of faults will automatically be enabled again.				
7	Room operating mode: Preselection	Auto Comfort PreComf. Economy Protection	20.102 1 Byte	CWTU
Controls the room operating mode selection of the thermostat via the bus. The command can also be submitted as four 1-bit communication objects (8...11). The last selected option is implemented – either from the local operating mode icon or using the bus. <b>Note:</b> The thermostat will switch from Precomfort to Economy or Comfort mode (selectable via P88).				
8 9 10 11	Operating mode: Preselection Auto Comf Eco Prot	Trigger	1.017 1 bit	CW
Switch the room operating mode to Auto, Comfort, Economy or Protection. The last selected option is implemented – either from the local operating mode icon or using the bus.				
12	Room operating mode: Time switch	Comfort Economy PreComf. Protection	20.102 1 Byte	CWU
This information is provided by a central time switch or a supervisor and defines the current HVAC operating mode. The command can also be submitted using three 1-bit communication objects (13...15). Protection has the highest priority and cannot be overridden. <b>Note:</b> The thermostat will transform Precomfort into either Economy or Comfort (P88).				
13 14 15	Time switch Comfort Economy Protection	Trigger	1.017 1 bit	CW
Switch the HVAC mode to either Comfort, Economy or Protection mode.				

Obj	Object name	Function	Type/length	Flags
16	Room operating mode: State	Comfort Economy Protection	20.102 1 Byte	CRT
Effective room operating mode used by the thermostat (considering time switch, user selection, window contact, etc.) This state information is available using one 8-bit enumeration or three 1-bit communication objects (17...19). <b>Note:</b> The thermostat does not support Precomfort.				
17	Room operating mode: State Comfort	ON OFF	1.002 1 bit	CT
18	State Economy			
19	State Protection			
Corresponding communication object sends "True"				
20	Window state	Open Closed	1.019 1 bit	CWU
The RDF is set to Protection if value "1" (open) is received. It switches back to the previous mode when the value is "0" (closed). "Window state" is sent (e.g by a KNX switch). It has the same effect as the local window contact X1, X2 (P38, P40). <i>Only <b>one</b> input source must be used, either local input X1/X2 or KNX bus.</i>				
21	Room temperature	Temp. value	9.001 2 Bytes	CRT
The value of the room temperature measured using built-in or external sensor is available with this communication object.				
22	Room temperature: Comfort basic setpoint	Temp. value	9.001 2 Bytes	CWU
If the Temporary setpoint function is enabled using P69, then after an operating mode change, the setpoint adjustments made by the user, and communication object 23 are dismissed and the thermostat is reset to the Comfort basic setpoint. <b>Note:</b> Setpoints that have been changed using the local HMI may be overwritten during a system startup from a central control unit, e.g.RMB795B. <i>The Comfort basic setpoint is stored in EEPROM (see section 3.3.2). → The service life of the EEPROM depends on the number of write cycles. Never write this communication object cyclically!</i>				
23	Room temperature: Comfort setpoint	Temp. value	9.001 2 Bytes	CWTU
Communication object is used to shift the setpoint used by the thermostat (see section 3.3.2). Same priority as local setpoint shift on the thermostat. The last selected option is implemented. <b>Note:</b> The Comfort basic setpoint (object 22) is not changed.				
24	Current setpoint	Temp. value	9.001 2 Bytes	CRT
This is the current setpoint, including shift, compensation, etc., used by the thermostat for room temperature control				
25	Heating output primary	0...100 %	5.001 8 bit	CRT
Indicates the position of the heating actuator of the first stage. E.g. 2-pipe with electric heater application: Output of heating coil.				
26	Heating output secondary	0...100%	5.001 8 bit	CRT
Indicates the position of the heating actuator of the second stage. E.g. 2-pipe with electric heater application: Output of electric heater.				



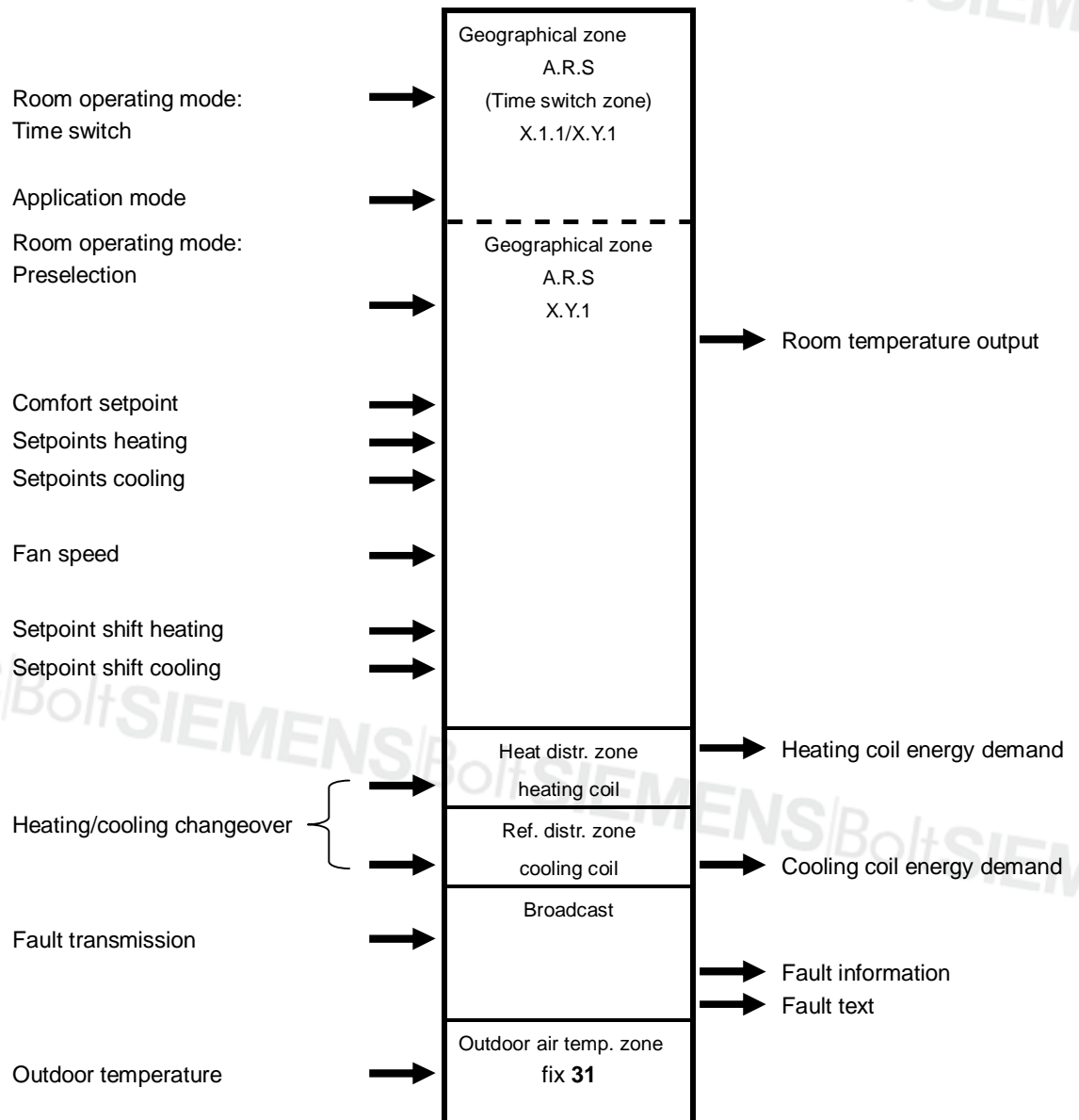
Obj	Object name	Function	Type/length	Flags
27	Cooling output primary	0...100%	5.001 8 bit	CRT
Indicates the position of the cooling actuator of the first stage. E.g. 2-pipe with electric heater application: Output of cooling coil				
29	Enable electric heating	Enable/ Disable	1.003 1 bit	CWU
An electric heater can be disabled with this communication object (e.g. to meet tariff regulations). The same function is also available using local multifunctional input X1/X2 (P38 or P40). Only <b>one</b> input source must be used, either local input X1/X2 or the KNX bus.				
30	Heating/cooling changeover	Heat/ Cool	1.100 1 bit	CWU
Changeover information transmitted by bus. Default: Current mode before power down. The same function is also available using local multifunctional input X1/X2 (P38 or P40). Only <b>one</b> input source must be used, either local input X1/X2 or KNX bus..				
31	Application mode	HVAC control mode	20.105 8 bit	CWU
0	Auto (default)	Heating and/or cooling		
1	Heat	Heating only		
2	Morning warmup*	Heating only		
3	Cool	Cooling only		
5	Precool*	Cooling only		
6	OFF	Neither heating nor cooling		
8	Emergency heat*	Heating only		
9	Fan only	Fan runs at high speed		
* Function handled like Heat (1) or Cool (3)				
32	Enable fan command value	Enable Disable	1.003 1 bit	CWU
Set fan mode to Auto (disable) or Manual (enable) using a KNX control unit. If Manual, the value received on <i>Fan command value</i> (34) will be used to command the fan speed. Default: Enable The last selected option is implemented – either from the local fan icon or using bus.				
33	Fan operation	Auto Manual	1.001 1 bit	CRT
Indicates the state of the fan mode: Auto (0) or Manual (1).				
34	Fan command value	0...100%	5.001 8 bit	CWU
The fan can be set to a specified speed by a KNX control unit when manual fan operation is enabled.				
Speed		Fan command value (physical KNX value)		
1	1...33% (1...85)			
2	34...67% (86...170)			
3	68...100% (171...255)			
Fan speed "0" is not supported by the thermostat and the fan speed will remain unchanged.				
35	Fan output	0...100%	5.001 8 bit	CRT
Indicates the current fan speed as a value 0...100%				
Speed		Fan output (physical KNX value)		
OFF	0% (0)			
1	33% (84)			
2	66% (186)			
3	100% (255)			
36	Fan speed 1	ON	1.001	CRT
37	Fan speed 2	OFF	1 bit	
38	Fan speed 3			
Indicate the state of the relay outputs				

Obj	Object name	Function	Type/length	Flags
39	<b>X1: Temperature</b>	Temp.	9.001	CRT
40	<b>X2: Temperature</b>	value	2 Byte	
Indicate the values of the temperature sensors connected to the local inputs X1/X2				
41	<b>X1: Digital</b>	ON	1.001	CRT
42	<b>X2: Digital</b>	OFF	1 bit	
Indicates the state of the digital inputs (adjusted by P39 or P41) including consideration of operating action				
44	<b>Outdoor temperature</b>	Temp. value	9.001 2 Byte	CWU
The outdoor temperature acquired by a KNX sensor can be displayed on the thermostat, if P07 "Additional user information" is set = 2 (outdoor temperature).				
45	<b>Presence detector</b>	Unoccupied Occupied	1.019 1 bit	CWU
The thermostat is set to Comfort mode if value "1" (occupied) is received. It switches back to Economy when the value is "0" (unoccupied). "Presence detector" is sent using KNX. It has the same effect as the "Local presence detector" function on X1/X2 (P38 or P40). Only <b>one</b> input source must be used, either local input X1/X2 or the KNX bus.				
46	<b>Room temperature: Economy heating setpoint</b>	Temp. value	9.001 2 Bytes	CWU
Communication object to adjust the Economy heating setpoint used by the thermostat (see section 3.3.2). It changes the value of P11. S-mode object must be enabled by setting "Room temp. : Economy setpoints" to "as group object". The Economy setpoint is stored in EEPROM. The service life of the EEPROM depends on the number of write cycles. Never write this communication object cyclically.				
47	<b>Room temperature: Economy cooling setpoint</b>	Temp. value	9.001 2 Bytes	CWU
Communication object to adjust the Economy cooling setpoint used by the thermostat (see section 3.3.2). It will directly change the value of P12. S-mode object must be enabled by setting "Room temp. : Economy setpoints" to "as group object". The Economy setpoint is stored in EEPROM. The service life of the EEPROM depends on the number of write cycles. Never write this communication object cyclically.				



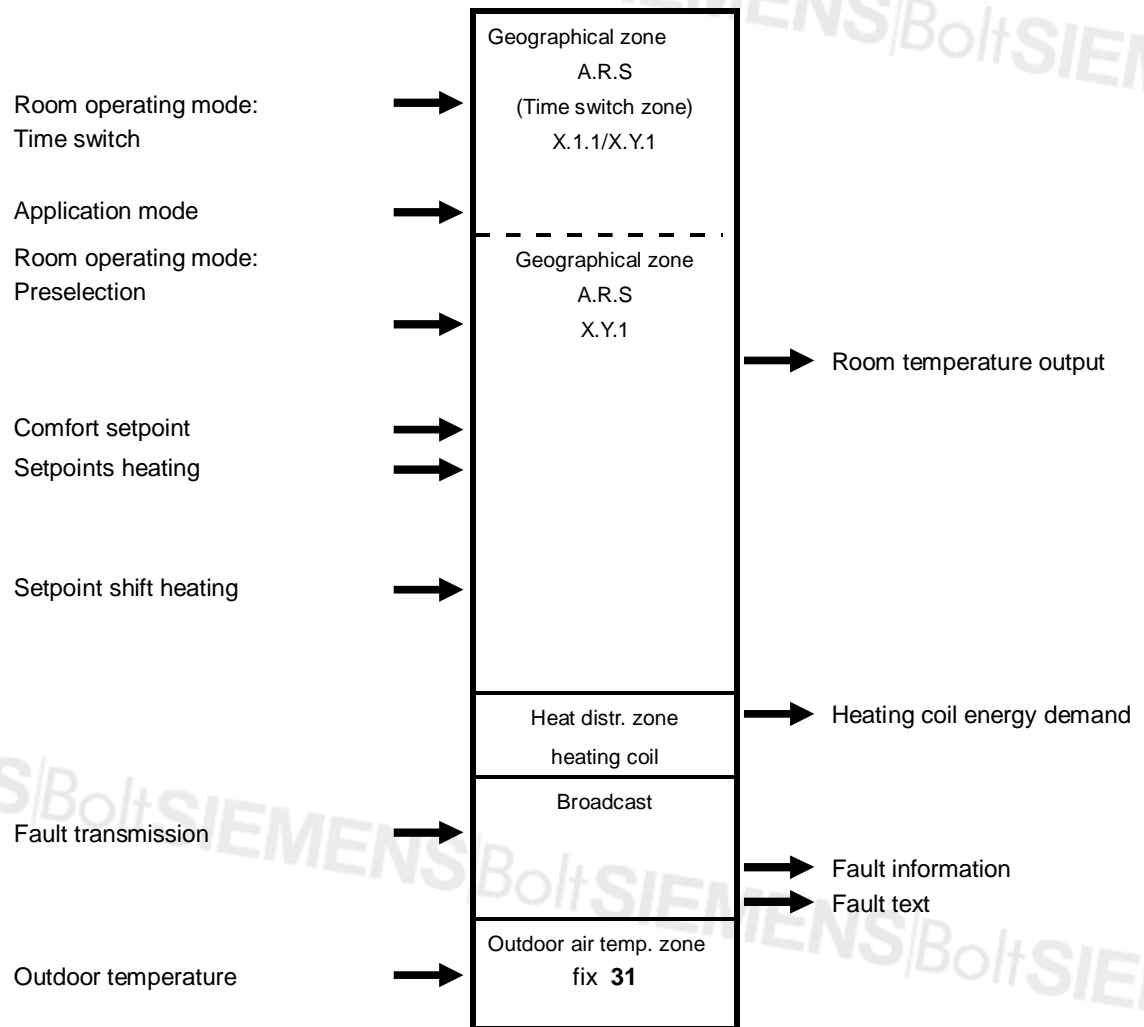
### 3.13 Communication objects (LTE mode)

#### 3.13.1 RDF800KN.. Overview





### 3.13.2 RDD810KN/NF Overview





## 3.14 Control parameters

A number of control parameters can be readjusted to optimize control performance. This can be done on the thermostat using the HMI, or the tool. These parameters can also be set during operation without opening the unit. In the event of a power failure, all control parameter settings are retained, see section 3.14.

The control parameters are assigned to one of the two levels:




- Service level - The Service level contains a small set of parameters to set up the thermostat for the HVAC system and to adjust the user interface. These parameters can be adjusted any time.
- Expert level including communications, diagnostics and test. - At the Expert level, you must change the parameters carefully since they impact the thermostat's control performance and functionality.

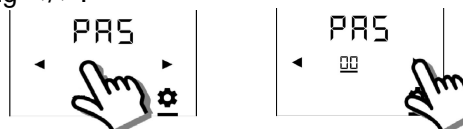
### 3.14.1 Setting parameters using the local HMI



Wake up the thermostat by touching the screen display.

#### Entering the Service level

Factory setting for the Service level password is **00 00**.

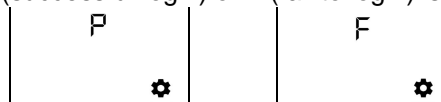
1. Touch and hold down the  icon for 5 seconds. Then set the first 2-digit number to **00** using  .



2. Touch the last 2-digit number and set it to **00** using  .






3. After 3 seconds, **P** (successful login) or **F** (fail to login) is displayed.



4. If the login failed, reenter the correct password as per step 1 above. After successful login, the first parameter is displayed as shown in the following example:



- Notes:**
- Touch any icon to exit.
  - Touch   to select any parameter and  to adjust values.
  - When reaching **END**, touch **END** to exit.
  - The password can be modified using the ACS tool.

#### Entering the Expert level

Follow the same steps for entering the Service level.  
Factory setting for Expert level password is **99 99**.

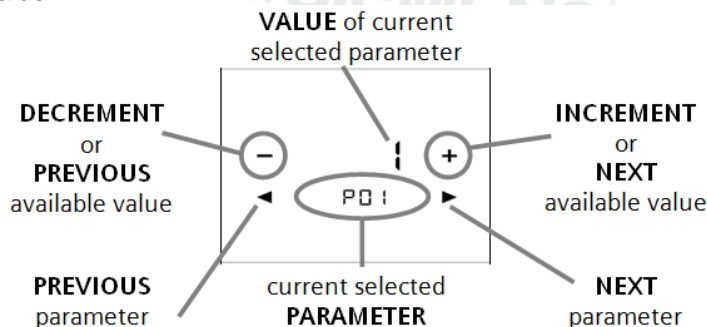
#### Passwords setting

The "User level password" (P29) for entering the Service level and the "Installer level password" (P99) for entering the Expert level are not visible in the parameter list and cannot be modified by using the local HMI.



## Configuring parameters

After entering the correct password, the screen displays as follows. Touch ◀/▶ to advance or return to the desired parameter and use +/- to select the desired available value.



Refer to section 3.14.3 for Service level parameters; refer to section 3.14.4 for Expert level parameters.

## Resetting parameters

The factory setting for the control parameters can be reloaded using P71, by setting the value to **ON**. Refer to section 3.14.4 for P71.  
For power reset and so on, refer to Data Sheets CE1N3174 and CE1N3175.

### 3.14.2 Setting and downloading parameters using the tools

Control parameters can be adjusted using the bus, either by downloading them during commissioning or during normal operation with a tool.



ACS

With the ACS tool, the parameters can be changed during...

- commissioning by downloading all of them.
- normal operation using Popcard (most of the parameters).

## Passwords setting

The “User level password” (P29) for entering the Service level and the “Installer level password” (P99) for entering the Expert level are only visible on the ACS tool. Both passwords can be modified in ACS or downloaded by using ETS.

## OZW772 web server, RMZ792-B bus operator unit



ETS

Most parameters can be changed during normal operation using either the OZW772 web server or the RMZ792-B bus operator unit.

ETS is an engineering tool that can be used for commissioning of the RDF800KN../RDD810KN.. KNX room thermostats. Device address and application, and control parameters can be defined and downloaded using ETS.

Refer to section 5.1.1 for ETS programming mode

**Note:** Parameter settings on the RDF800KN../RDD810KN.. KNX room thermostats are only supported by ETS4 and ACS version 8.28 or higher.

## Connecting a KNX tool

The connection of a KNX commissioning or operating tool to the RDF800KN../RDD810KN.. KNX room thermostats is described in section 4.2.



### 3.14.3 Service level parameters

Parameter	Name	Factory setting	Range	RDD810KN/NF	RDF800KN..	Dependencies
	Service level					
P01	Control sequence	2-pipe: 1 = cooling only  4-pipe: 4 = heating and cooling	0 = heating only 1 = cooling only 2 = H/C changeover manual 3 = H/C changeover auto 4 = heating and cooling	x	✓	
P02	Operation using room op selector	1	1 = Auto – Protection 2 = Auto - Comfort - Economy – Protection	✓	✓	
P04	Unit	0	0 = °C 1 = °F	✓	✓	
P05	Measured value correction (for built-in/external sensor)	0 K	– 3...3 K	✓	✓	
P06	Standard display	0	0 = room temperature 1 = setpoint	✓	✓	
P07	Additional display information	0	0 = --- (no display) 3 = time of day (12 hour) (using bus) 4 = time of day (24 hours) (using bus)	✓	✓	
P08	Comfort basic setpoint	21 °C	5...40 °C	✓	✓	
P09	Comfort setpoint minimum	5 °C	5...40 °C	✓	✓	
P10	Comfort setpoint maximum	35 °C	5...40 °C	✓	✓	
P11	Economy heating setpoint	15 °C	OFF, 5...WCoolEco; WCoolEco = 40 °C max.	✓	✓	
P12	Economy cooling setpoint	30 °C	OFF, WHeatEco...40 °C; WHeatEco = 5 °C min.	x	✓	
P13	Electric heater when cooling	ON	ON: Enabled OFF: Disabled	x	✓	Appl. <sup>*)</sup>
P14	"Screen lock" function	0	0: Unlock 1: Lock 2: Setpoint adjustable	✓	✓	
P15	Fan stage in dead zone (Comfort)	0	0 = disabled 1 = low speed (Heat and Cool) 2 = low speed (Cooling only)	x	✓	
P16	Buzzer function	1	0: disabled 1: enabled	✓	✓	

<sup>\*)</sup> Appl. = applications

**Note:** Parameter display depends on the selected application and function.



### 3.14.4 Expert level parameters with diagnostics and test





Parameter	Name	Factory setting	Range	RDD810KN/NF	RDF800KN..	Dependencies
	Expert level					
P30	Heat P-band Xp/switching differential	2 K	0.5...6 K	✓	✓	
P31	Cool P-band Xp/switching differential	1 K	0.5...6 K	x	✓	
P33	Dead zone Comfort mode	2 K	0.5...5 K	x	✓	Appl. <sup>1)</sup>
P34	Setpoint differential	2 K	0.5...5 K	x	✓	Appl. <sup>1)</sup>
P35	Integral action time Tn	45 min	0...120 min	x	✓	P46
P36	H/C changeover switching point cooling	16 °C	10...25 °C	x	✓	P38, P40
P37	H/C changeover switching point heating	28 °C	27...40 °C	x	✓	P38, P40
P38	Input X1	3 = window contact	0 = --- (no function) 1 = room temp ext. sensor/ return air temp (AI) 2 = H/C changeover (AI/DI) 3 = window contact (DI) 4 = dew point sensor (DI) 5 = enable electric heater (DI) 6 = fault input (DI) 7 = monitor input (Digital) 8 = monitor input (Temp) 9 = supply air sensor (AI) 10 = presence detector (DI)	0, 1, 3, 6, 7, 8, 10 only	✓	P40
P39	Normal position input X1	0 (NO)	0 = normally open/open 1 = normally closed/close	✓	✓	P38
P40	Input X2	1 = ext. sensor	0 = --- (no function) 1 = room temp ext. sensor/ return air temp (AI) 2 = H/C changeover (AI/DI) 3 = window contact (DI) 4 = dew point sensor (DI) 5 = enable electric heater (DI) 6 = fault input (DI) 7 = monitor input (Digital) 8 = monitor input (Temp) 9 = supply air sensor (AI) 10 = presence detector (DI)	0, 1, 3, 6, 7, 8, 10 only	✓	P38
P41	Normal position input X2	0 (NO)	0 = normally open/open 1 = normally closed/close	✓	✓	P40
P44	Actuator running time Y1/Y2	150 s	20...300 s	x	✓	P46
P45	Power of electric heater on Y2 (for adaptive temperature compensation)	0.0 kW	0.0...1.2 kW	x	✓	
P46	Output Y1/Y2	On/Off (1)	0 = 3-position 1 = On/Off	x	✓	Appl.
P48	ON time minimum 2-pos output	1 min.	1...20 min	✓	✓	P46
P49	OFF time minimum 2-pos output	1 min.	1...20 min	✓	✓	
P50	Purge time	OFF	OFF: Not active 1...5 min: Active with selected duration	x	✓	P38,
P51	Flow temp limit floor heating	OFF	OFF, 10...50 °C	✓	✓	P38, P40
P52	Fan control	1	0 = disabled 1 = enabled 2 = heating only 3 = cooling only	x	✓	



Parameter	Name	Factory setting	Range	RDD810KN/NF	RDF800KN..	Dependencies
	Expert level					
P53	Fan speeds	3-speed	1 = 1-speed 2 = 3-speed	x	✓	P52
P54	Fan overrun time	60 s	0...360 s	x	✓	P52, Appl.
P55	Fan speed switching point high	100%	80...100%	x	✓	P52, P53
P56	Fan speed switching point med	65%	30..75%	x	✓	P52, P53
P57	Fan speed switching point low	10%	1...15%	x	✓	P52, P53
P58	Fan kick start	ON	ON: Enabled OFF: Disabled	x	✓	P52
P59	On time minimum fan	2 min	1...6 min	x	✓	P52
P60	Periodic fan kick Comfort	OFF	0...89 min, OFF(90)	x	✓	P52
P61	Periodic fan kick Eco	OFF	0...359 min, OFF(360)	x	✓	P52
P62	Service filter	OFF (0)	OFF, 100...9900 h	x	✓	P52
P65	Protection heating setpoint	8 °C	OFF, 5...WCoolProt; WCoolProt = 40 °C max.	✓	✓	
P66	Protection cooling setpoint	OFF	OFF, WHeatProt... 40; WHeatProt = 5°C min.	x	✓	
P67	Fan start delay	0 s	0...360 s	x	✓	P52, P46
P68	Temporary Comfort mode	0 (= OFF)	0...360 min	✓	✓	P02
P69	Temporary Comfort setpoint	OFF	OFF = disabled ON = enabled	✓	✓	
P71	Restore factory setting	OFF	OFF = disabled ON = reload start	✓	✓	
<b>Communications</b>						
P81	Device address <sup>1)</sup>	255	1...255	✓	✓	
P82	Geographical zone (apartment) <sup>2)</sup>	---	---, 1...126	✓	✓	
P83	Geographical zone (room) <sup>2)</sup>	1	---, 1...63	✓	✓	
P84	Heat distr zone heating coil	---	---, 1...31	✓	✓	Appl. <sup>*)</sup> P01
P85	Refrig distr zone cooling coil	---	---, 1...31	x	✓	Appl. <sup>*)</sup> P01
P88	Transformation Precomfort	0	0 = Economy 1 = Comfort	✓	✓	
<b>Access codes (only visible on the ACS tool)</b>						
P29	User level password	00 00	00 00...49 99	✓	✓	
P99	Installer level password	99 99	50 00...99 99	✓	✓	

- <sup>1)</sup> Physical address = Area.Line. DeviceAddress. Factory setting for Area = 0, Line = 2. can be changed by special management service. For example, from line coupler or using the ACS tool.
- <sup>2)</sup> Type = geographical zone A.R.S. In RDF subzone = fixed value 1.
- <sup>\*)</sup> Appl. = applications



Parameter	Name	Range	RDD810KN/NF	RDF800KN..	Dependencies
	Diagnostics and test				
d01	Application number	NONE = (no application) 2P = 2-pipe 2P3P = 2-pipe 3-position 2PEH = 2-pipe with electric heater 4P = 4-pipe	H = heating	✓	
d02	X1 state	0 = not activated (for DI) 1 = activated (DI) 0...49 °C = current temp. value (for AI) 00  = H/C input shorted 100  = H/C input open	✓	✓	
d03	X2 state	0 = not activated (for DI) 1 = activated (DI) 0...49 °C = current temp. value (for AI) 00  = H/C input shorted 100  = H/C input open	✓	✓	
d05	Test mode for checking the Y1/Y2 actuator's running direction <sup>3)</sup>	"---" = no signal on outputs Y1 and Y2 OPE = output Y1 forced opening CLO = output Y2 forced closing	x	✓	P46

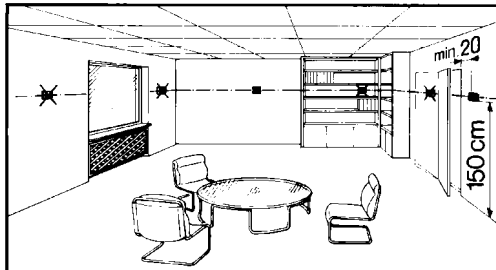
<sup>3)</sup> This parameter can only be exited when the setting is back at "---".  
Touch + and – simultaneously to exit.



## 4. Handling

### 4.1 Mounting and installation

Mount the room thermostat on the conduit box. Do not mount on a wall in niches or between bookshelves, behind curtains, above or near heat sources, or exposed to direct solar radiation. Mount it approximately 1.5 m above the floor.



#### Mounting / dismounting



- Do not apply excessive force on screws! The deformation of the mounting frame may lead to improper connections and operation of the unit.
- Mount the room thermostat in a clean, dry indoor place without direct airflow from heating/cooling equipment, and not exposed to drips of water.
- For RDF800KN only, in case of limited space in the conduit box, use mounting spacer ARG70.3 to increase the headroom by 10 mm.
- Before removing the front cover, disconnect the power supply.

#### Wiring

See Mounting Instructions M3174.1xx and M3174.2xx [1] enclosed with the thermostat.



- Comply with local regulations to wire, protect and earth the thermostat.
- The unit has no internal fuse for supply lines to fan and actuators. To avoid risk of fire and injury due to short-circuits, the AC 230 V mains supply line must have a circuit breaker with a rated current of no more than 10 A.
- Use only valve actuators rated for AC 230 V.
- Properly size the cables to the thermostat, fan and valve actuators for AC 230 V mains voltage.
- RDF800KN.: The wiring cross section used for power supply (L, N), fan/relays (Qx) and AC 230 V outputs (Yx -N) must be adapted to the preceding overload protection elements (max 10 A) under all circumstances. Comply under all circumstances with local regulations.
- RDD810KN/NF: The wiring cross section used for power supply (L, N), and the AC 230 V outputs (Qxx - N) must be adapted to the preceding overload protection elements (max 10 A) under all circumstances. Comply under all circumstances with local regulations.
- Cables of SELV inputs X1-M/X2-M: Use cables with min. AC 230 V insulation, as the conduit box carries AC 230 V mains voltage.
- Input X1-M or X2-M: Several switches (e.g. window contact) may be connected in parallel. Consider overall maximum contact sensing current for switch rating.
- KNX communication cables (input CE+/CE-): Use cables with min 230 V insulation, as the conduit box carries AC 230 V mains voltage.
- When KNX bus power supply is connected on the line with communicating thermostats and Synco controllers, the internal KNX power supply of the Synco controllers must be switched off.
- Disconnect from power supply before opening the thermostat's cover.








## 4.2 Commissioning

### Before powering up (only for RDF800KN..)

Before powering up, set the DIP switches for the desired application. Do one of the followings:

- For remote setup via the tools, set all DIP switches to **OFF**;
- For local setup, set the DIP switches to select applications (see table below).

Commissioning method	DIP switches	LCD	Application
Remote setup		APP NONE	-
Local setup		APP 2P	2-pipe
		APP 2PEH	2-pipe with electric heater
		APP 4P	4-pipe
		APP 2P3P	2-pipe with 3-position output

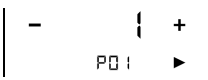



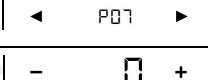
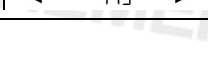
After setting the DIP switches, complete the installation and power up the thermostat.

**Note:** As soon as the application is changed, the thermostat reloads the factory settings for all control parameters, except for the KNX device and the zone addresses!


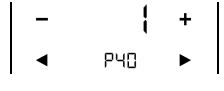
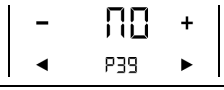
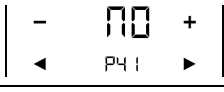

### Wizard

After setting the DIP switches (**not required with RDD810KN/NF**) and powering up the thermostat, the wizard function guides you through configuring the basic parameters for normal operation according to the table below.

- Touch ◀/▶ to advance/return to any parameter;
- Touch +/- to change values.

LCD	Parameter	Range	Factory setting
	Control sequence (RDF800KN.. only)	0: Heating only 1: Cooling only 2: Manual changeover 3: Auto changeover 4: Heating and cooling	2-pipe = 1 4-pipe = 4
	User operating mode profile	1: Comfort > Protection 2: Comfort > Economy > Protection	1
	Selection of °C or °F	0: °C 1: °F	0
	Standard display	0: Room temperature 1: Setpoint	0
	Display info line (2 <sup>nd</sup> line of LCD)	0: --- (no display) 3: Time of day (12h) via bus 4: Time of day (24h) via bus	0
	Fan speed in dead zone (RDF800KN.. only)	0: Fan OFF 1: Fan speed 1 H/C	0



LCD	Parameter	Range	Factory setting
		2: Fan speed 1 Cool only	
	Functionality of X1	0: --- no function 1: Ext/return Temp (AI) 2: H/C changeover (AI/DI) 3: Window contact (DI) 4: Dew point sensor (DI)	3
	Functionality of X2	5: Enable electric heater (DI) 6: Fault input (DI) 7: Monitor input (digital) 8: Monitor input (temp) 10: Presence detection (DI)	1
	Operating action of X1	Normally open (NO) Normally closed (NC)	Normally open (NO)
	Operating action of X2		
	-	End of wizard	-

For more information about parameters, see section 3.14.

## Reset

To reload the factory settings for all parameters, set P71 to **ON**. Restart the thermostat after reset. All LCD segments flash, indicating that the reset is correct. Three seconds later, the thermostat is ready for commissioning by qualified HVAC personnel.

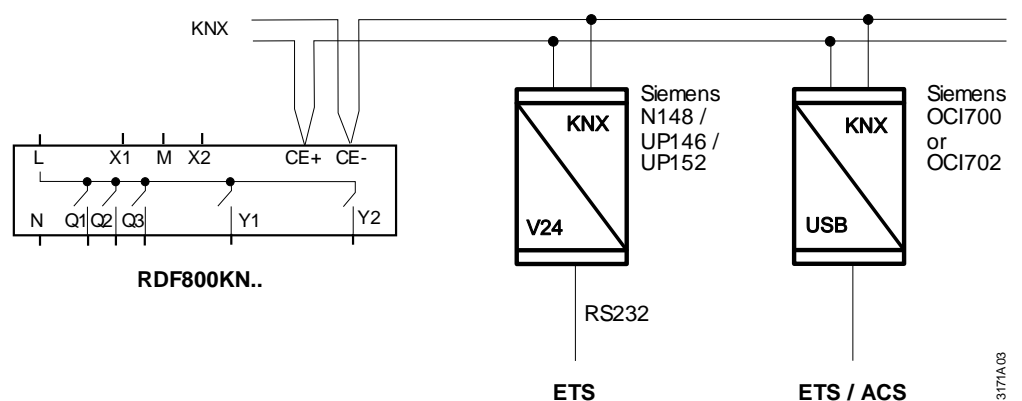
## Applications

The room thermostats are delivered with a fixed set of applications. Select and activate the required application during commissioning using one of the following tools:

- Local DIP switch and HMI
- Synco ACS
- ETS

## Connecting tools

Connect the Synco ACS or ETS tool to the KNX bus cable at any point for commissioning. The following example applies to RDF800KN..:



ACS and ETS require one of the following interfaces:

- RS232 KNX interface (e.g. Siemens N148, UP146 or UP152)
- OCI700, OCI702 USB-KNX interface

3171A03



**Note:** An external KNX bus power supply is required if an RDF800KN../RDD810KN.. KNX room thermostat is connected directly to a tool (ACS or ETS) using KNX interface.

## Control parameters

The thermostat's control parameters can be set to ensure optimum performance of the entire system. The parameters can be adjusted using

- Local HMI
- Synco ACS
- ETS

The control parameters of the thermostat can be set to ensure optimum performance of the entire system (see section 3.14).

Control sequence (for RDF800KN.. only)

- Depending on the application, the control sequence may need to be set via P01. The factory setting is as follows:

Application	Factory setting P01
2-pipe and chilled/heated ceiling	1 = cooling only
4-pipe, chilled ceiling and radiator	4 = heating and cooling

Compressor-based applications (for RDF800KN.. only) ⚠

- When the thermostat is used in connection with a compressor, adjust the minimum output on-time (P48) and off-time (P49) for Y1/Y2 to avoid damaging the compressor or shortening its life due to frequent switching.

Calibrating the sensor (P05)


- Recalibrate the temperature sensor (built-in or external) if the room temperature displayed on the thermostat does not match the room temperature measured (after min. 1 hour of operation). To do this, change P05.

Setpoint and range limitation

- We recommend to review the setpoints and setpoint ranges (parameters for RDF800KN..: P08...P12; for RDD810KN/NF: P08...P11) and change them as needed to achieve maximum comfort and to save energy.

## Programming mode

The programming mode helps identify the thermostat in the KNX network during commissioning.

Touch and hold down the  icon for more than 5 seconds to activate programming mode, which is indicated by the display of **Pr09**. Programming mode remains active until thermostat identification is complete.

07  
Pr 09

## Assigning KNX device address

Assign device address (P81) using the HMI, ACS or ETS tool.

When the device address is set to 255, communication is deactivated (no exchange of process data).

## Assigning KNX group addresses


Use ETS to assign the KNX group addresses of the thermostat's communication objects.

## KNX serial number

Each device has a unique KNX serial number inside the front panel. An additional sticker with the same KNX serial number is enclosed in the packaging box. This sticker is intended for installers for documentation purposes.



## 4.3 Operation

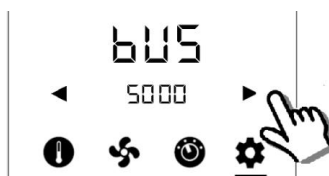
The following pages can be displayed by touching the  icon, depending on priority: alarm/service reminder, manual H/C changeover, basic Information about room and outdoor temperature.

See the previous sections in this document for the following operations: temperature setpoints, fan speed, operating modes, parameter mode, programming mode, etc.

### 4.3.1 Alarm/Service reminder

If any alarm is displayed (  ), touch the  icon to check the alarm or service reminder.


If there is more than one alarm, use /  to browse through all active alarms



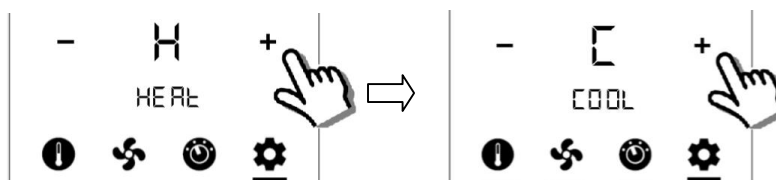
The following table describes the detail information for all alarms and services.

Priority	Alarm/service	Display	Error code	Type
1	Bus power supply	BUS	5000	Fault
2	Device address error	ADR	6001	
3	Condensation	CON	4930	
4	Ext fault input 1	AL1	9001	
5	Ext fault input 2	AL2	9002	Service
6	Clean filter reminder (+/- to remove reminder)	FIL	3911	

### 4.3.2 Heating/cooling manual changeover (RDF800KN.. only)

If manual heating/cooling changeover is set using P01 = 2, touch the  icon once or twice (depending on the alarms) to select heating or cooling mode.

The selected control sequence will start in three seconds.



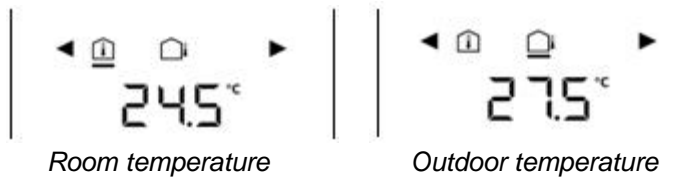
**Note:** The  icon is displayed when manual heating/cooling changeover is enabled.



### 4.3.3 INFO page

---

This INFO page provides information about room temperature (🏠) and outdoor temperature (🌡️), if available from the KNX bus.



If there is no active alarm or manual heating or cooling changeover is disabled, (P01 ≠ 2), only the INFO page displays.

## 4.4 Remote operation

---

The RDF800KN../RDD810KN.. KNX room thermostats can be operated from a remote location using the OZW772 web server, a RMZ792-B bus operating unit or the ACS tool.

## 4.5 Disposal

---



The devices are considered electronics devices for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.



## 5. Supported KNX tools

### 5.1 ETS



#### ETS

ETS is an engineering tool and is used to fully commission the RDF800KN../RDD810KN.. KNX room thermostats.

ETS can implement the following functions:

- Define and download the physical address
- Define and download the application (plant type, control sequence)
- Set up and download the thermostat's control parameters
- Set up and download group addresses

This document does not describe how to operate ETS and how to set up a device. Refer to the KNX Manual [4] for more details.



#### Note!

**Setting RDF800KN../RDD810KN.. KNX is only supported by ETS. ETS can be updated online.**

#### 5.1.1 Commissioning – downloading using ETS

1. Set the DIP switches to <b>OFF</b> (remote configuration) before snapping the front panel to the mounting plate (RDF800KN.. only)	
2. When the thermostat is powered up initially, the display on the right side indicates that no application is downloaded or has been selected before.	
3. Touch and hold the  icon for more than 5 seconds to activate programming mode. The display on the right side indicates that the thermostat is ready for downloading the address and the applications.	
4. Touch <b>ON</b> to exit.	<p><b>Note:</b></p> <p>Each time the application is changed, the thermostat reloads the factory settings for all control parameters, except for KNX device and zone addresses.</p>



### 5.1.2 Parameter settings in ETS

1. Open the project in ETS and select a device.
2. Click **Parameters** tab, and adjust the control parameters as follows:

The screenshot shows the 'Parameters' tab in the ETS software. On the left, a tree view lists categories: Device, Room Operating Mode, Room Temperature Setpoints, Controller, Fan, and Inputs. The main area displays parameters for a selected device, organized into sections. The 'Plant type' is set to '2-pipe'. The 'Control Sequence' is set to 'Cooling only'. The 'Operation via room op selector' is set to 'Auto - Protection'. The 'Unit' is set to 'Degrees Celsius'. The 'Standard display' is set to 'Room temperature'. The 'Additional display information' is set to '----'. The 'Keypad' is set to 'Unlocked'. The 'Buzzer' is set to 'Enable'. The 'Temporary comfort mode [minutes]' is set to '0'. The 'Passwords' section shows 'Service level' set to '0' and 'Expert level' set to '9999'.

Parameter	Value
[DIP] Plant type	2-pipe
[P01] Control Sequence	Cooling only
[P02] Operation via room op selector	Auto - Protection
[P04] Unit	Degrees Celsius
[P06] Standard display	Room temperature
[P07] Additional display information	----
[P14] Keypad	Unlocked
[P16] Buzzer	Enable
[P68] Temporary comfort mode [minutes]	0
Passwords	
[P29] Service level	0
[P99] Expert level	9999

3. The **Plant type** (application), **Control Sequence** and other control parameters ([Pxx] description) can be downloaded.  
For more details on control parameters, see section 3.14.

- Notes:**
- ETS4 or higher versions is used to assign the communication objects to group addresses (S-mode)
  - ETS4 or higher versions is used to download the application and parameters
  - New password values (P29 and P99) for entering into the Service and Expert level can be downloaded.

## 5.2 ACS



### ACS

The RDF800KN../RDD810KN.. KNX room thermostats can be commissioned (physical address, application, and parameters) by using the ACS tool. They can also be operated or monitored via bus during normal operation.

This section does not describe how the physical address is defined and only provides a brief overview of ACS' main functionality.

For more information, refer to ACS online help.



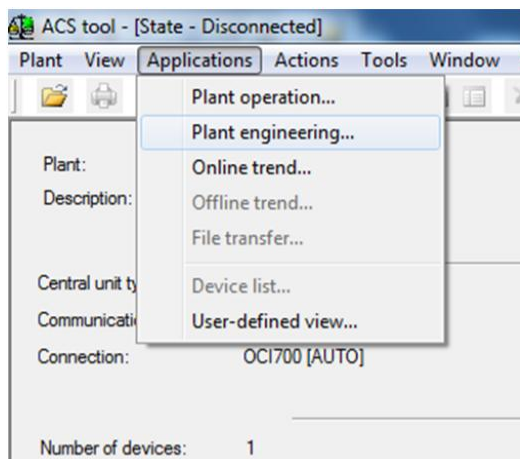
### Note!

**Setting RDF800KN../RDD810KN.. KNX parameters is only supported by ACS version 8.28 or higher.**

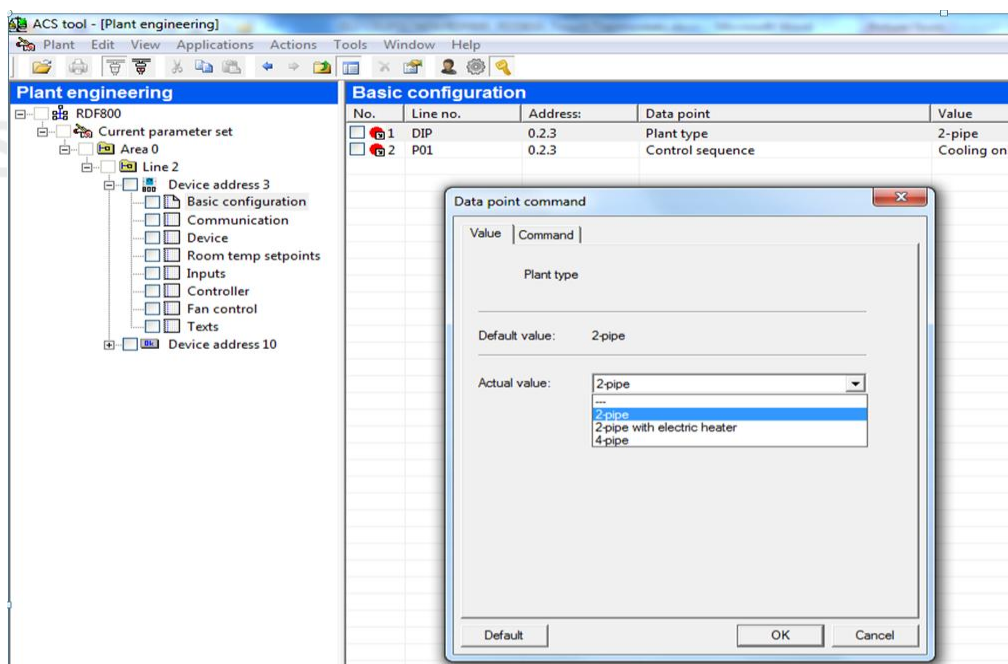


## 5.2.1 Parameter settings in ACS

In the **ACS** program, select **Plant** → **Open** to open the plant.  
To start the parameter settings, select **Applications** → **Plant engineering**.



The application and control parameters can be adjusted and downloaded.  
Column **Line no.** contains the parameter number as displayed in the parameter table. Refer to section 3.14.



### Passwords setting

The “User level password” (P29) for entering the Service level and the “Installer level password” (P99) for entering the Expert level are visible on the ACS tool only under **Device**. Both passwords can be modified in the ACS tool.

Device			
No.	Line no.	Address:	Data point
● 8	P29	0.2.9	Service level
● 9	P99	0.2.9	Expert level

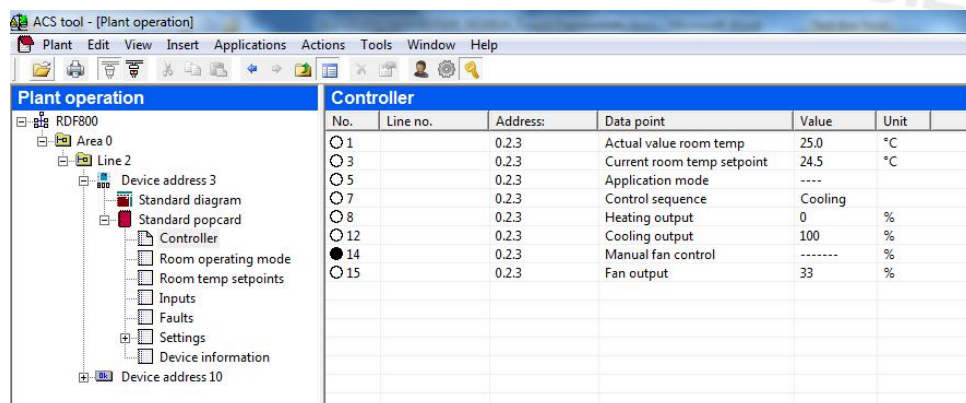


## 5.2.2 Operation and monitoring with ACS



ACS

In the **ACS** program, select **Plant** → **Open** to open the plant.  
To start operation and monitoring, select **Applications** → **Plant operation**.



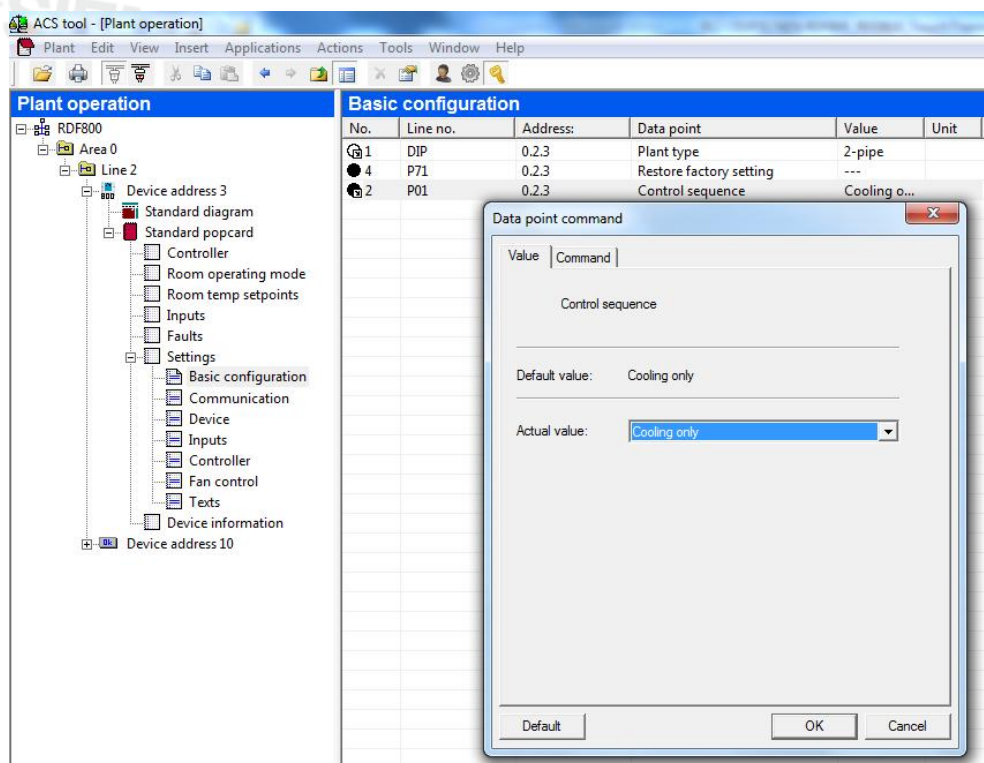
No.	Line no.	Address:	Data point	Value	Unit
1	0.2.3		Actual value room temp	25.0	°C
3	0.2.3		Current room temp setpoint	24.5	°C
5	0.2.3		Application mode	----	
7	0.2.3		Control sequence	Cooling	
8	0.2.3		Heating output	0	%
12	0.2.3		Cooling output	100	%
14	0.2.3		Manual fan control	-----	%
15	0.2.3		Fan output	33	%

Parameter settings in  
ACS

The ACS tool supports parameter settings even during normal operation.

To change a control parameter, double click the parameter under **Standard popcard** to make the settings.

- Notes:**
- Make sure you have logged on with sufficient access right.
  - Only control parameters can be changed, not applications!



No.	Line no.	Address:	Data point	Value	Unit
1	DIP	0.2.3	Plant type	2-pipe	
4	P71	0.2.3	Restore factory setting	---	
2	P01	0.2.3	Control sequence	Cooling o...	

Data point command

Value | Command

Control sequence

Default value: Cooling only

Actual value: Cooling only

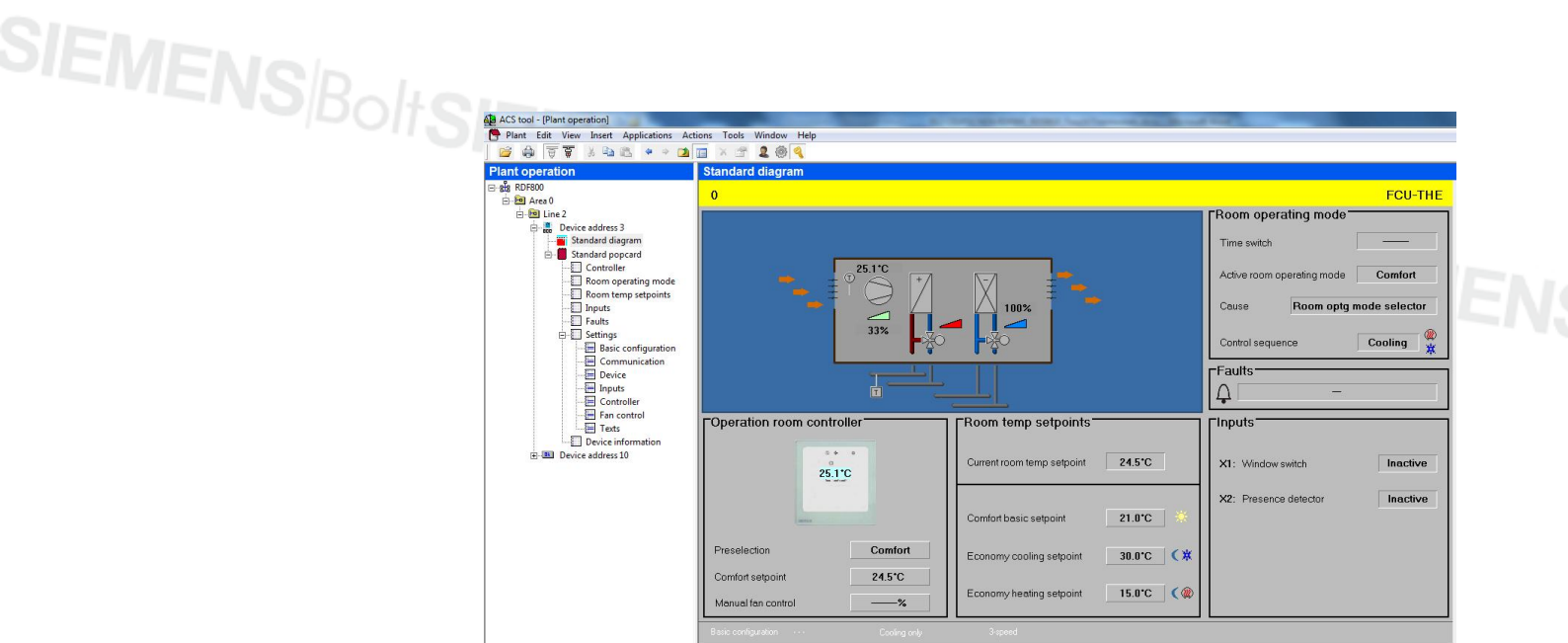
Default OK Cancel

Plant diagram in ACS

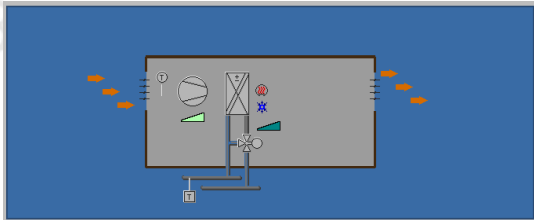
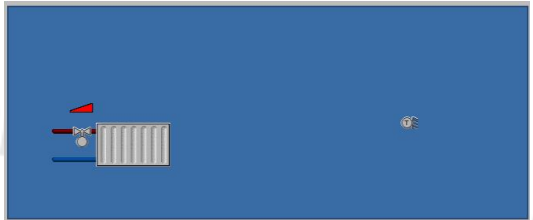
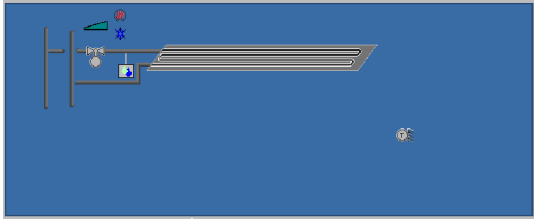
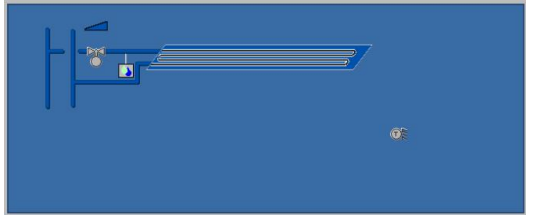
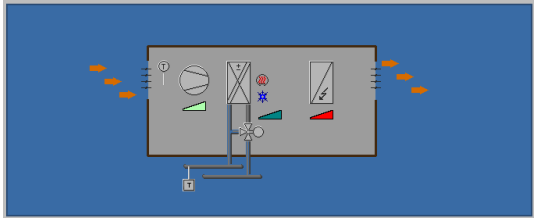
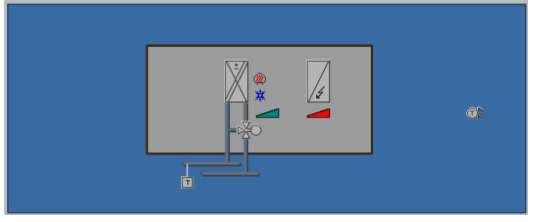
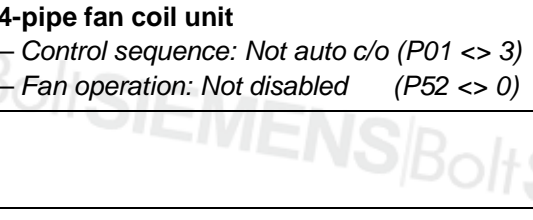
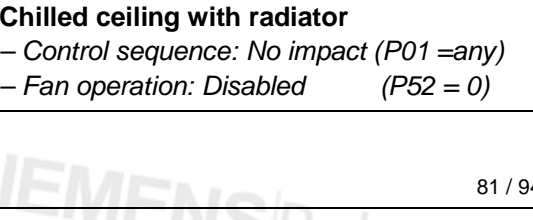
The ACS tool offers plant diagrams for easy monitoring and operation of the thermostat.

To start this application, select **Applications** → **Plant operation** → **Standard diagram**.

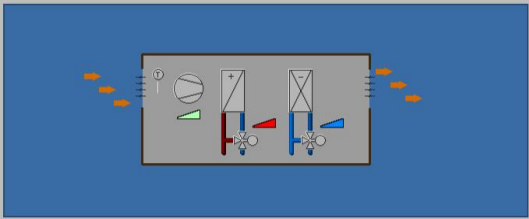
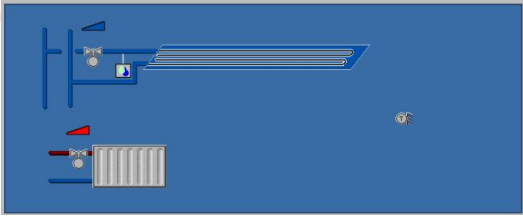
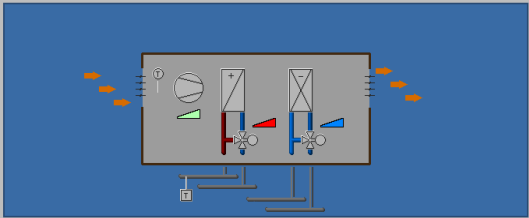
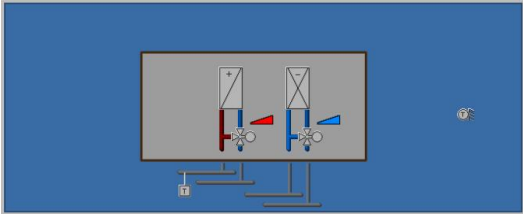




The ACS tool provides standard plant diagrams for RDF800KN../RDD810KN.. KNX room thermostats, depending on the following configurations:

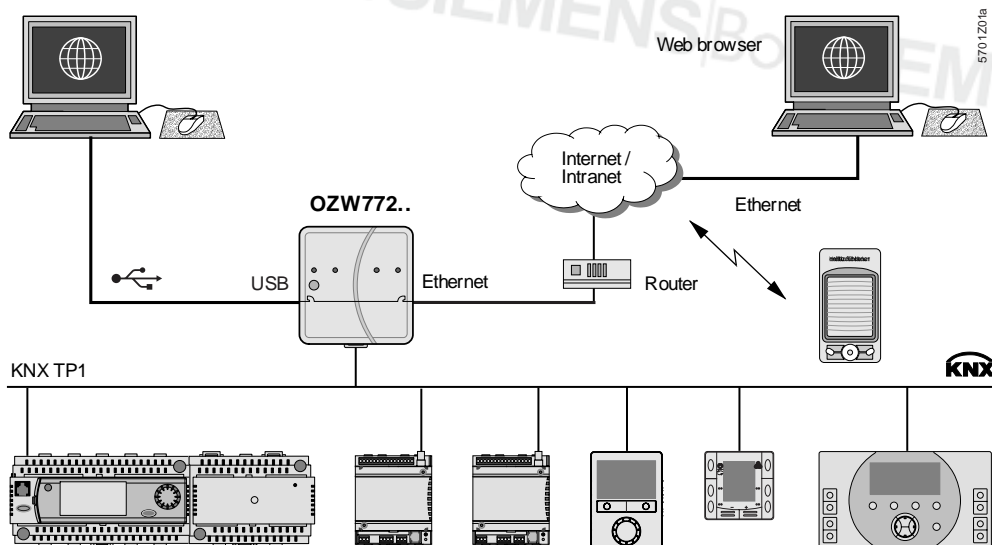
Plant type	Application Configuration	Application Configuration
2-pipe	<b>2-pipe fan coil unit</b> <ul style="list-style-type: none"> <li>Control sequence: No impact (<math>P01 = any</math>)</li> <li>Fan operation: Not disabled (<math>P52 \neq 0</math>)</li> </ul> 	<b>Radiator</b> <ul style="list-style-type: none"> <li>Control sequence: Heating only (<math>P01 = 0</math>)</li> <li>Fan operation: Disabled (<math>P52 = 0</math>)</li> </ul> 
	<b>Chilled/heated ceiling</b> <ul style="list-style-type: none"> <li>Control sequence: Changeover (<math>P01 = 2,3</math>)</li> <li>Fan operation: Disabled (<math>P52 = 0</math>)</li> </ul> 	<b>Chilled ceiling</b> <ul style="list-style-type: none"> <li>Control sequence: Cooling only (<math>P01 = 1</math>)</li> <li>Fan operation: Disabled (<math>P52 = 0</math>)</li> </ul> 
2-pipe and electric heater	<b>2-pipe fan coil unit with electric heater</b> <ul style="list-style-type: none"> <li>Control sequence: No impact (<math>P01 = any</math>)</li> <li>Fan operation: Not disabled (<math>P52 \neq 0</math>)</li> </ul> 	<b>Single stage with electric heater</b> <ul style="list-style-type: none"> <li>Control sequence: No impact (<math>P01 = any</math>)</li> <li>Fan operation: Disabled (<math>P52 = 0</math>)</li> </ul> 
4-pipe	<b>4-pipe fan coil unit</b> <ul style="list-style-type: none"> <li>Control sequence: Not auto c/o (<math>P01 \neq 3</math>)</li> <li>Fan operation: Not disabled (<math>P52 \neq 0</math>)</li> </ul> 	<b>Chilled ceiling with radiator</b> <ul style="list-style-type: none"> <li>Control sequence: No impact (<math>P01 = any</math>)</li> <li>Fan operation: Disabled (<math>P52 = 0</math>)</li> </ul> 



Plant type	Application Configuration	Application Configuration
		
	<b>Fan coil unit main/secondary</b> – Control sequence: Auto c/o (P01 = 3) – Fan operation: Not disabled (P52 <> 0)	<b>Main/secondary</b> – Control sequence: Auto c/o (P01 = 3) – Fan operation: Disabled (P52 = 0)
Heating only		
	– Floor heating limit temperature (P51=OFF)	– Floor heating limit temperature (P51≠OFF)



### 5.2.3 Operation and monitoring with OZW772 web server



HomeControl app  
for plant control

The OZW772 web server enables you to operate a Synco HVAC system from a remote location (computer or smartphone) – using the HomeControl app.

The start page shows the most important data points. Navigating through menus and paths enables you to access all data points quickly and correctly. The entire installation can be visualized in the form of plant diagrams. Alarm and state messages can be forwarded to different message receivers, such as e-mail, or SMS, etc.

For details, see Commissioning Instructions CE1C5701.

### 5.2.4 Operation and monitoring with RMZ792-B bus operator unit



The RMZ792-B is a communicating bus operator unit designed for operating Synco™ 700 and RDF KNX devices in a KNX network. It is suited for both fixed installation and mobile use (e.g. for use by the service engineer). It does not operate with third-party devices.

For details, see Basic Documentation CE1P3113.

**Note:** The application cannot be displayed in the form of text, instead a number is used: (Parameter **Plant type** on **Basic setting** menu):

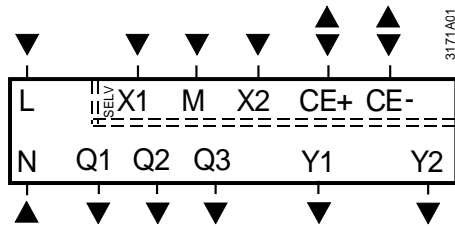
- 0 = no application
- 1 = 2-pipe
- 2 = 2-pipe and electric heater
- 4 = 4-pipe



## 6. Connection

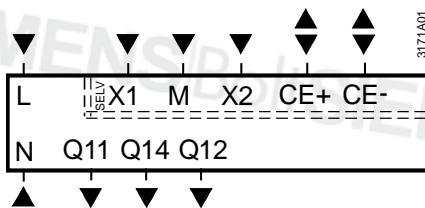
### 6.1 Connection terminals

#### RDF800KN..



L, N	Operating voltage AC 230 V
Q1	Control output "Fan speed 1 AC 230 V"
Q2	Control output "Fan speed 2 AC 230 V"
Q3	Control output "Fan speed 3 AC 230 V"
Y1, Y2	Control output "Valve" AC 230 V (NO, for normally closed valves), output for compressor or electric heater
X1, X2	Multifunctional inputs for temperature sensor (e.g. QAH11.1) or potential-free switch Factory setting: – X1 = window contact – X2 = external sensor (function can be selected via P38 or P40)
M	Measuring neutral for sensor and switch
CE+	KNX data +
CE-	KNX data -

#### RDD810KN/NF



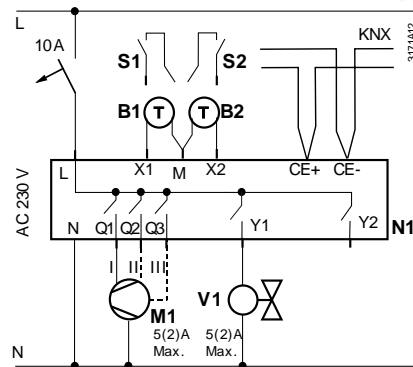
L, N	Operating voltage AC 230 V
Q11, Q12	NC contact (for NO valves)
Q11, Q14	NO contact (for NC valves)
X1, X2	Multifunctional input for temperature sensor or potential-free switch Factory setting: – X1 = window contact – X2 = external sensor (function can be selected via P38 or P40)
M	Measuring neutral for sensor and switch
CE+	KNX data +
CE-	KNX data -



## 6.2 Connection diagrams

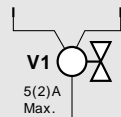
### Application RDF800KN..

2-pipe/heating or  
cooling – On/Off

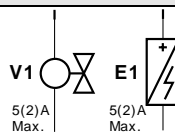


- N1 Room thermostat RDF800KN..
- M1 1-speed or 3-speed fan
- V1 Valve actuator, 2- or 3-position
- V1, V2 Valve actuator, 2-position
- E1 Electric heater
- C1, C2 1-stage compressor
- S1, S2 Switch (keycard, window contact, presence detector, etc.)
- B1, B2 Temperature sensor (return air temperature, external room temperature, changeover sensor, etc.)
- CE+ KNX data +
- CE- KNX data –

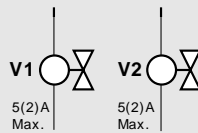
2-pipe/heating or  
cooling – 3-position  
– Y1 = open  
– Y2 = close



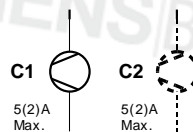
2-pipe and electric  
heater/  
heating or cooling  
and electric heater



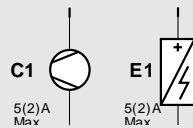
4-pipe/  
heating and radiator  
– V1 = heating  
– V2 = cooling



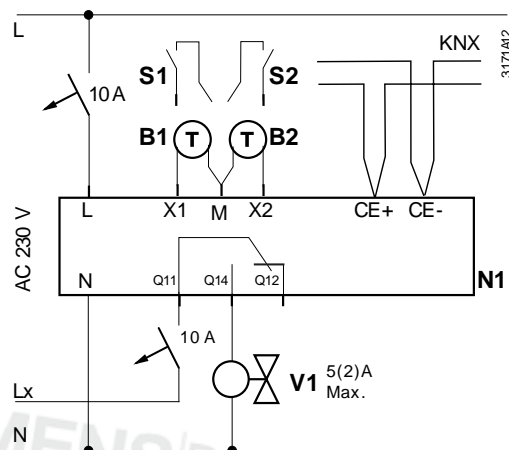
1-stage compressor  
– C1 = heating  
and/or  
– C2 = cooling



1-stage compressor  
and electric heater



### Application RDD810KN/NF



- N1 Room thermostat
- V1 Valve actuator
- Lx AC 24...230 V
- S1, S2 Switch (keycard, window contact, presence detector, etc.)
- B1, B2 Temperature sensor (return air temperature, external room temperature, changeover sensor, etc.)
- CE+ KNX data +
- CE- KNX data –



## 7. Mechanical design

### 7.1 General

The thermostats consist of two parts:

- Front panel with electronics, operating elements and built-in room temperature sensor.
- Mounting base with power electronics.

**Note:** RDF800KN/NF and RDD810KN/NF require additional mounting frames to complete the installation and are only suitable for square conduit boxes (confirming to BS 4662 standard).

RDF800KN is suitable for round conduit boxes (conforming to CEE/VDE), or square conduit box (confirming to BS 4662 standard).

The rear of the mounting base carries the screw terminals as follows:

Terminals		Description
RDD810KN/NF	RDF800KN/NF	
L, N	L, N	AC 230 V power supply mains and neutral
-	Y1, Y2	Relay outputs 1 and 2
-	Q1, Q2, Q3	Low, medium and high speed, fan relay outputs
Q11	-	Relay input (dry contacts)
Q12	-	Relay, normally closed output (NC)
Q14	-	Relay, normally open output (NO)
X1/X2	X1/X2	Universal inputs 1 and 2
M	M	Input reference ground
CE+, CE-	CE+, CE-	KNX bus + and - terminals

The front panel of the thermostat can be plugged into the mounting base directly.



RDF800KN.. front panel



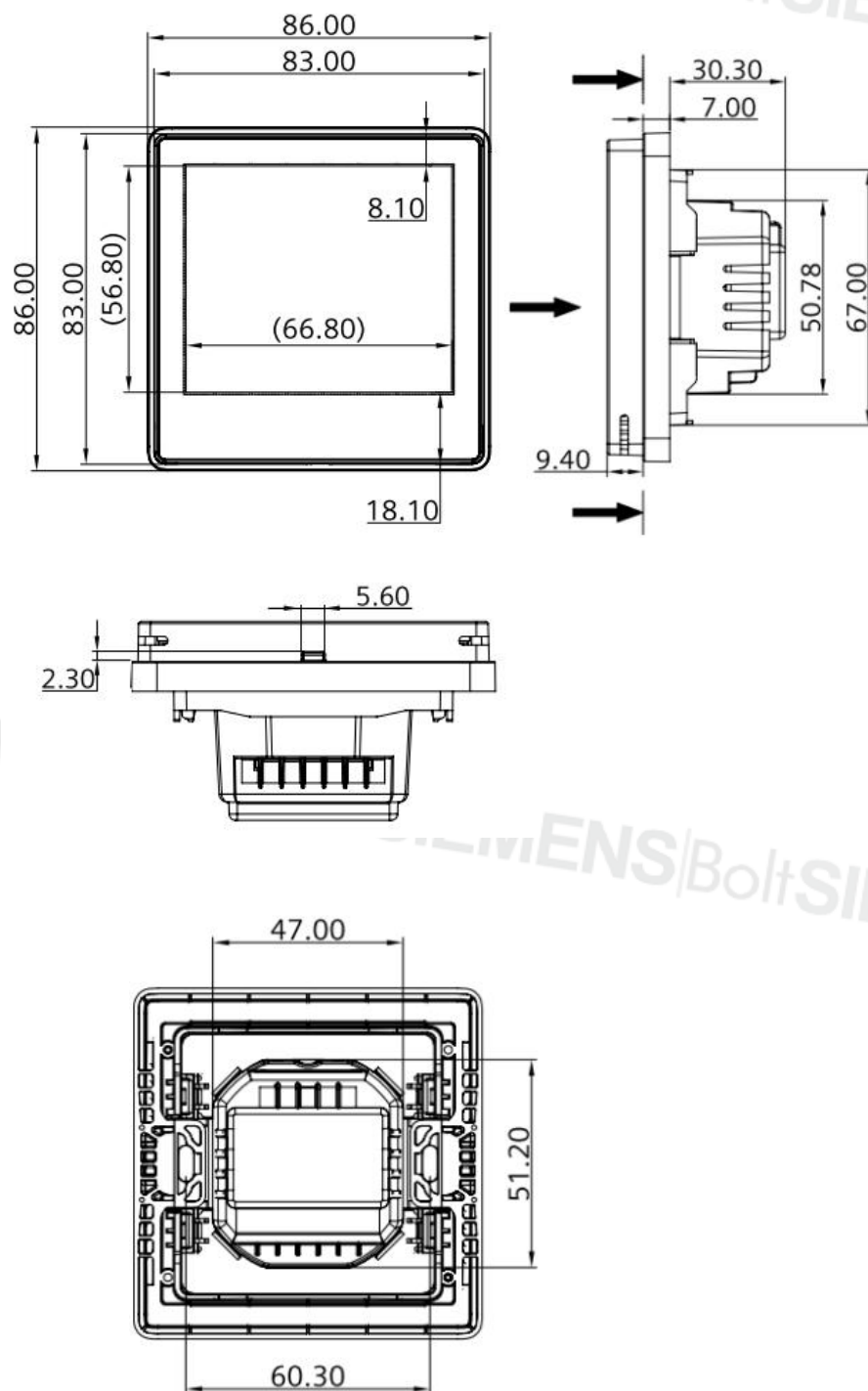
RDD810KN/NF front panel



## 7.2 Dimensions

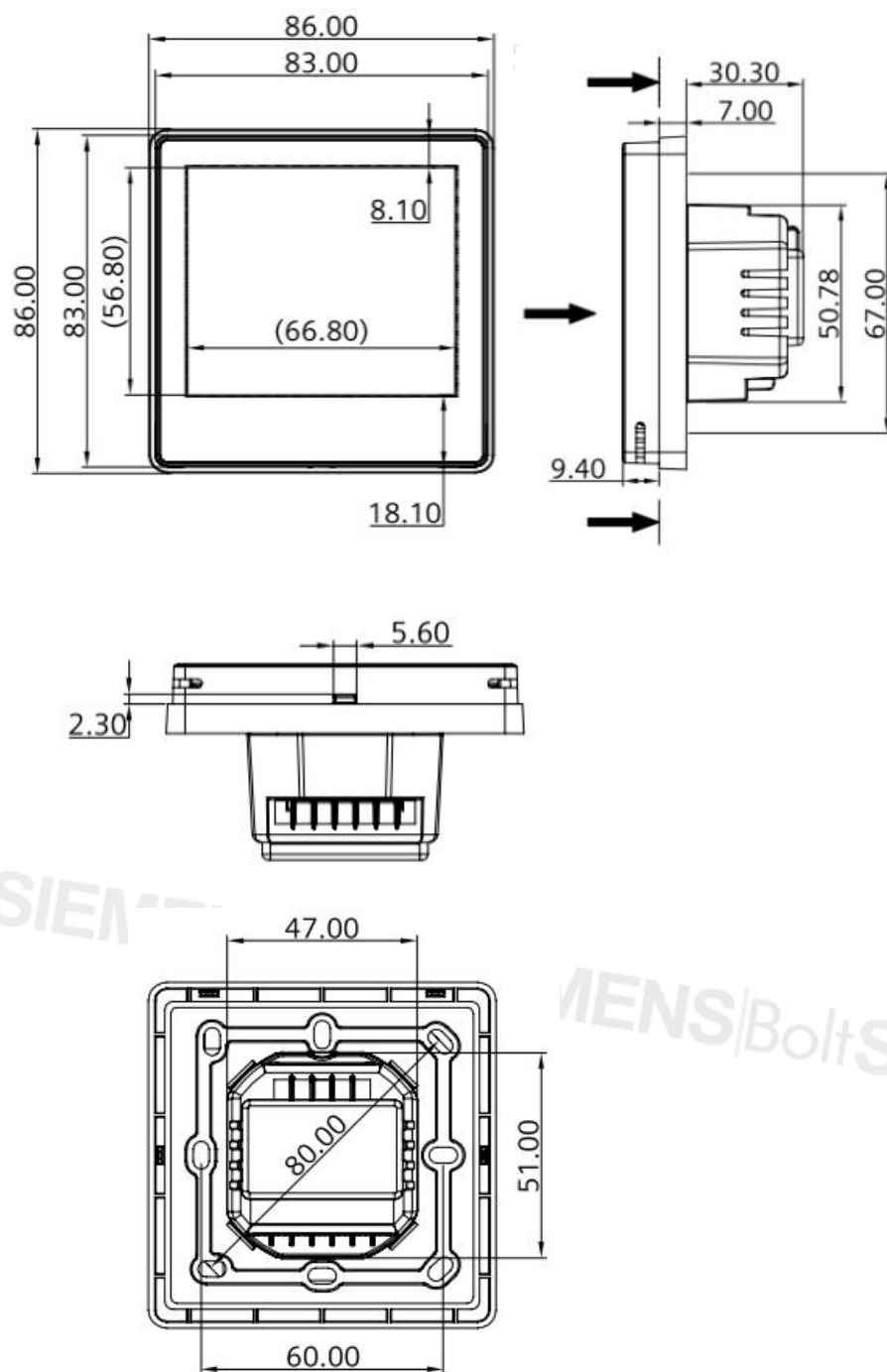
Dimensions in mm

RDF800KN/NF and  
RDD810KN/NF  
for square conduit  
boxes only



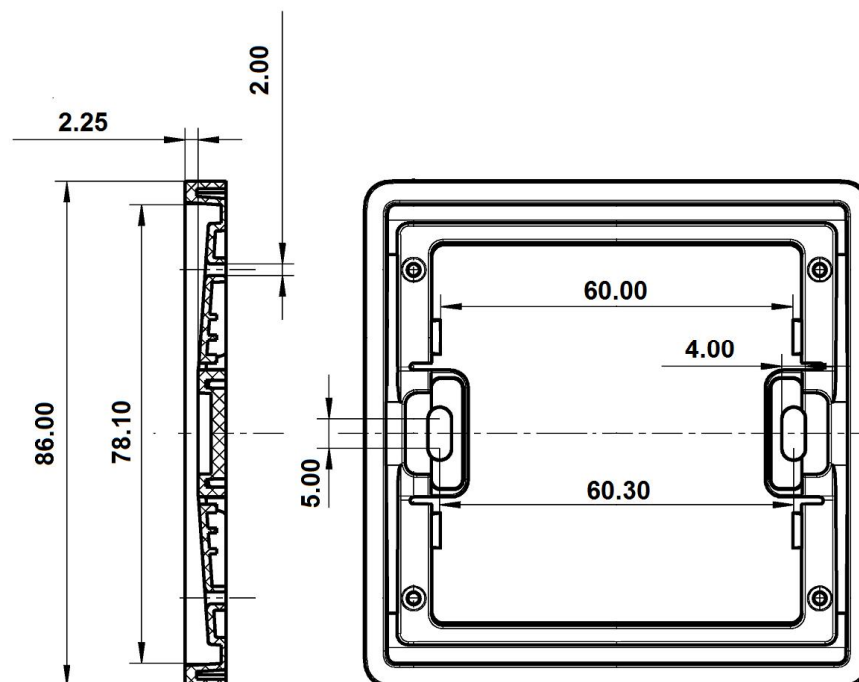


**RDF800KN  
for round  
conduit boxes**





**ARG800.1 single  
mounting frame for  
RDF800KN/NF and  
RDD810KN/NF**









## 8. Technical data

⚠ Power supply	Rated voltage	AC 230 V
	Overvoltage category	III
	Frequency	50/60 Hz
	Power consumption	Max. 6.0 VA/2.1 W
Caution ⚠	No internal fuse!	
	External preliminary protection with max C 10 A circuit breaker required in all cases.	
<b>Outputs for RDF800KN..</b>	Fan control Q1, Q2, Q3-N	AC 230 V
	Rating min. and max. res (ind.)	Min 5 mA, max. 5(2) A
⛔ Note!	<b>Fans must NOT be connected in parallel!</b>	
	Connect one fan directly, for additional fans, one relay for each speed.	
	Control output Y1-N/Y2-N (NO)	AC 230 V
	Rating min. and max. resistive (inductive)	Min 5 mA, max. 5(2) A
<b>Outputs for RDD810KN/NF</b>	Total load current through terminal "L" (Qx+Yx)	Max. 7 A
	Control output Q11, Q12, Q14 (SPDT)	AC 24...230 V
	Rating min. and max. resistive (inductive)	Min 10 mA, max. 5(2) A
Caution ⚠	No internal fuse!	
	External preliminary protection with max C 10 A circuit breakers in the supply line required in all cases.	
Inputs	Multifunctional input X1-M/X2-M	
	Temperature sensor input:	
	Type	See section 2.6
	Temperature range	0...49 °C
	Cable length	Max. 80 m
	Digital input:	
	Operating action	Selectable (NO/NC)
	Contact sensing	SELV DC 0...5 V/max. 5 mA
	Parallel connection of several thermostats for one switch	Max. 20 per switch
	Insulation against mains voltage (SELV)	4 kV, reinforced insulation
	Function of inputs:	
	External temperature sensor, heating/cooling changeover sensor, window contact, presence detection, dew point monitor contact, enable electric heater contact, fault contact, monitoring input	Selectable X1: P38 X2: P40
KNX bus	Interface type	KNX, TP1-64 (electrically isolated)
	Bus current	5 mA
	Bus topology: See KNX manuals ("Reference documentation")	



Operational data	Switching differential, adjustable	
	Heating mode (P30)	2 K (0.5...6 K)
	Cooling mode (P31 for RDF800KN.. only)	1 K (0.5...6 K)
	Setpoint setting and range	
	 Comfort (P08)	21 °C (5...40 °C)
	 Economy (P11-P12 for RDF800KN..) (P11 for RDD810KN/NF)	15 °C/30°C (OFF, 5...40 °C) 15 °C/30°C (OFF, 5...40 °C)
	 Protection (P65-P66)	8 °C/OFF (OFF, 5...40 °C)
	Multifunctional input X1/X2 for RDF800KN..	Selectable 0...8, 10
	Multifunctional input X1/X2 for RDD810KN/NF	Selectable 0, 1, 3, 6, 7, 8, 10
	Input X1 default value (P38)	3 (window contact)
	Input X2 default value (P40)	1 (external temperature sensor)
	Built-in room temperature sensor	
	Measuring range	0...49 °C
	Accuracy at 25 °C	< ± 0.5 K
	Temperature calibration range	± 3.0 K
	Settings and display resolution	
	Setpoints	0.5 °C
	Current temperature value displayed	0.5 °C
Environmental conditions	Operation	As per IEC 60721-3-3
	Climatic conditions	Class 3K5
	Temperature	0...50 °C
	Humidity	<95 % r.h.
	Transport	As per IEC 60721-3-2
	Climatic conditions	Class 2K3
	Temperature	-25...65 °C
	Humidity	<95 % r.h.
	Mechanical conditions	Class 2M2
	Storage	As per IEC 60721-3-1
	Climatic conditions	Class 1K3
	Temperature	-25...65 °C
	Humidity	<95 % r.h.
Standards and directives	EU Conformity (CE)	8000078258_xx <sup>*)</sup>
	Electronic control type	2.B (micro-disconnection on operation)
	 RCM conformity to EMC emission standard	AS/NZS 61000-6-3
	Safety class	II as per EN 60730
	Pollution class	Normal
	Degree of protection of housing	IP 30 as per EN 60529
Environmental compatibility	The product environmental declaration CB1E3174xx contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
General	Connection terminals	Solid wires or prepared stranded wires 1 x 0.4...1.5 mm <sup>2</sup> or 2 x for KNX cables/sensor Min 1.5 mm <sup>2</sup>
	Wiring cross section on L, N, Q1, Q2, Q3, Y1, Y2	
	Housing front color	Ivory white
	Weight without/with packaging for RDF800KN..	0.155/0.255 kg
	Weight without/with packaging for RDD810KN/NF	0.145/0.245 kg

<sup>\*)</sup> The documents can be downloaded from <http://siemens.com/bt/download>.



<b>Reference documentation</b>	Handbook for Home and Building Control - Basic Principles ( <a href="http://www.knx.org/knx-en/training/books-documentation/knx-association-books/index.php">http://www.knx.org/knx-en/training/books-documentation/knx-association-books/index.php</a> )
Synco	CE1P3127 Communication via the KNX bus for Synco 700, 900 and RXB/RXL Basic Documentation
Desigo	CM1Y9775 Desigo RXB integration – S-mode CM1Y9776 Desigo RXB/RXL integration – individual addressing CM1Y9777 Third-party integration CM1Y9778 Synco integration CM1Y9779 Working with ETS



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