

oventrop

Innovation + Quality

Valves, controls + systems

“i-Tronic” / “R-Tronic”
Energy saving and improvement of the room climate
achieved with low investments

Product range

*for an improved
energy efficiency ...*



Contents

- 2 Improvement of the room climate and energy saving achieved with low investments
- 3 Quality of the room climate /
Measures for an improved room climate and energy consumption with low investments
- 4-5 "i-Tronic" Climate display device /
Models
- 6-7 "R-Tronic" Climate display device/control /
Models
- 8 Energetic evaluation of the climate display/control "R-Tronic RTFC K"
- 9 "R-Con" Wireless receiver for surface heating and cooling systems
- 10 "Synet CR" Communication centre
- 11 "Synet CR" Software interface
- 12 "R-Tronic WA K" Thermostat for heating and cooling operation



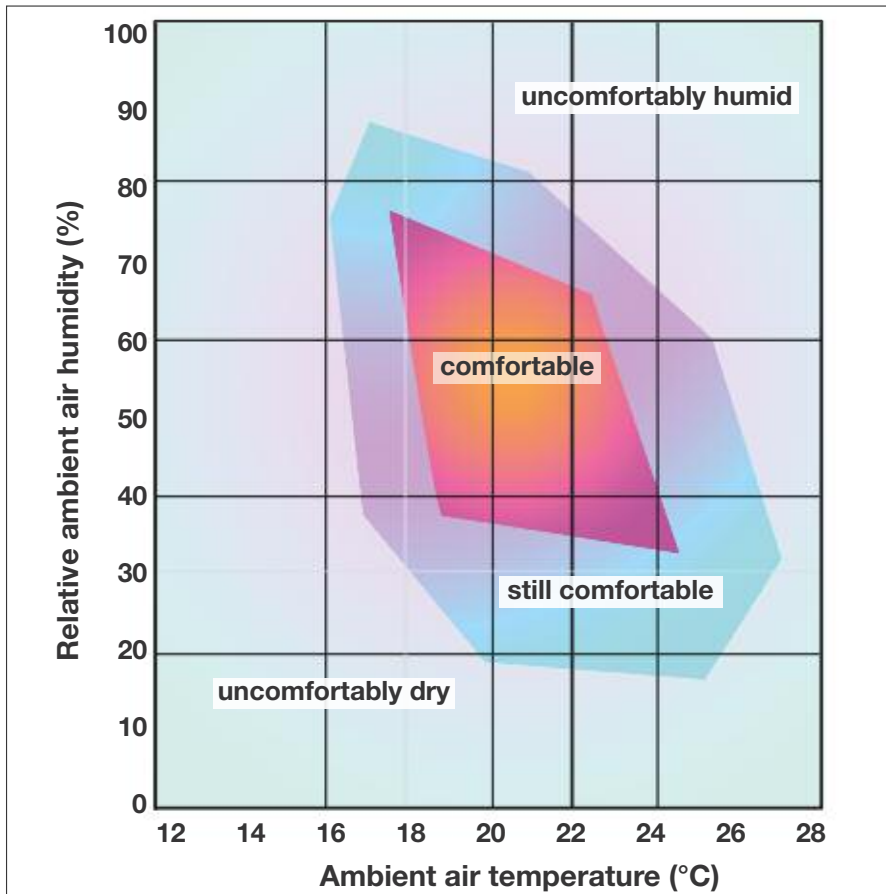
THE CHEAPEST
ENERGY IS
WHAT YOU
DON'T USE

Arthur H. Rosenfeld, physicist

Improvement of the room climate and energy saving achieved with low investments

An optimized indoor climate has a positive effect on our health and efficiency. The room climate is mainly influenced by the temperature (C°), the relative humidity (RH, relative humidity in %) and the CO₂ content (in ppm, parts per million) in the air.

This product range shows how a comfortable room climate with a reduced energy consumption can be achieved with low investment measures.



1

Quality of the room climate

Our well being is influenced by the ambient air temperature to a high degree. This temperature can be adjusted to requirements of comfort and low energy consumption by using room temperature controllers in conjunction with hydraulically balanced radiators and surface heating and cooling systems.

Also the temperature-dependent ambient air humidity (RH) influences our well being. Both, ambient air temperature and humidity, can be displayed in a comfort diagram (see illustration 1). The water vapour absorption capacity of the air is determined by the RH value. Moisture damages, for instance on cold outer walls, may occur if this value is exceeded over a longer period. Excessive water vapour can be expelled by ventilating the room. This way, moisture damages can be avoided. The frequency of airing depends on the outside temperature but a RH value of 65% should not be exceeded.

After all, the quality of the room climate is influenced by the carbon dioxide content (CO₂) to a high degree.

Measures for an improved room climate and energy consumption with low investments

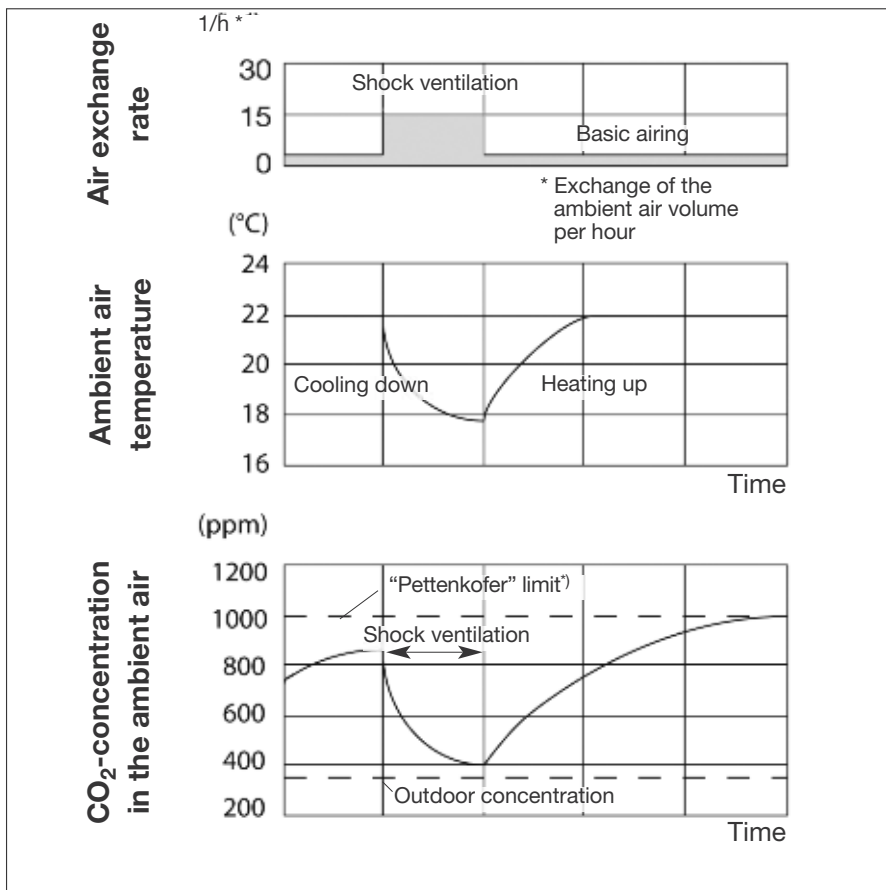
Heat losses caused by room airing cannot be avoided completely as a minimum of airing must be ensured. For this reason, the Energy Saving Directive prescribes a minimum air exchange rate of 0.6-0.7h⁻¹ which can be reached with the help of different airing measures. Window airing constitutes a very simple measure. Air exchange rates up to 15 h⁻¹ can be reached by opening the window completely and an improvement of the ambient air quality is already reached after a few minutes. As little energy as possible should be wasted during airing. This objective is supported by the display of the CO₂ and RH values and their allocation for an optimum indoor climate. The following values are defined in the guideline VDI 6022-3:

CO₂ ≤ 1000 ppm ("Pettenkofer" limit)
RH about 30...65%

Once the measured value is again within the recommended range, window airing can be terminated. Warming up of the fresh air is now the main task of the heating system. The heat which is stored in the walls of the room and the interior furnishing is retained to a large extent.

When combining room temperature control and the above airing measures, much more energy can be saved than in systems in which the climate values are ignored.

- 1 Simplified illustration of the comfort zone defined by the ambient air humidity and the room temperature
- 2 Effects of window airing on the room temperature and the CO₂ content in the ambient air (example).



2

*) The "Pettenkofer" limit is a value referring to the CO₂ concentration in the ambient air. When this value is exceeded, the ambient air becomes inferior as a result and fatigue phenomena occur. Indoor, a value of 1000 ppm (parts per million) is acceptable.



Oventrop offers the **climate display device “i-Tronic”** or the **climate display device/control “R-Tronic”** for the improvement of the room climate.

“i-Tronic” Climate display device







“i-Tronic TFC” is a climate meter monitoring the important room climate parameters:

- room temperature (°C)
- relative humidity RH (%)
- carbon dioxide CO₂ (ppm)

The climate meter shows the current measured values. The improvement of the indoor climate quality through airing is directly visible. Thus, the user can carry out the airing periods on an energy-saving basis.

The use of the climate meter “i-Tronic TFC” is an especially energy-saving and low-investment measure for achieving a good and healthy indoor climate.

1 Example “i-Tronic TFC” with table stand

Product	Description	System
 <p>“i-Tronic TFC” Item no. 1150683</p>	<p>“i-Tronic TFC” Climate meter with integrated sensor for display of the</p> <ul style="list-style-type: none"> - room temperature in °C - relative humidity RH in % - CO₂ content in ppm <p>Power supply via an external flush-mounted power pack (100-240V~/50-60 Hz), with wall bracket.</p>	
 <p>“i-Tronic TFC” Item no. 1150685</p>	<p>“i-Tronic TFC” Climate meter with integrated sensor for display of the</p> <ul style="list-style-type: none"> - room temperature in °C - relative humidity RH in % - CO₂ content in ppm <p>Power supply via an external mains adaptor (100-240V~/50-60 Hz), with table stand.</p>	
 <p>“i-Tronic TFC” Item no. 1150688</p>	<p>“i-Tronic TFC” Climate meter with integrated charging electronics for location-independent measurement of the</p> <ul style="list-style-type: none"> - room temperature in °C - relative humidity RH in % - CO₂ content in ppm <p>Power supply via a detachable mains adaptor with micro-USB cable. A mobile monitoring of the important room climate parameters is possible through two integrated rechargeable batteries (2 x AA NIMH) in the table stand.</p>	



“R-Tronic” Climate display device/control







The actuators “Aktor MH/MD CON B” e. g. on the radiator are controlled via radio. A maximum of three actuators “Aktor MH/MD CON B” can be taught in on one “R-Tronic”. For a mobile quick access via the internet up to 16 wireless thermostats can be taught in on the centre “Synet CR” (see page 10). All settings are easily made with the wireless thermostat and the system status is displayed.

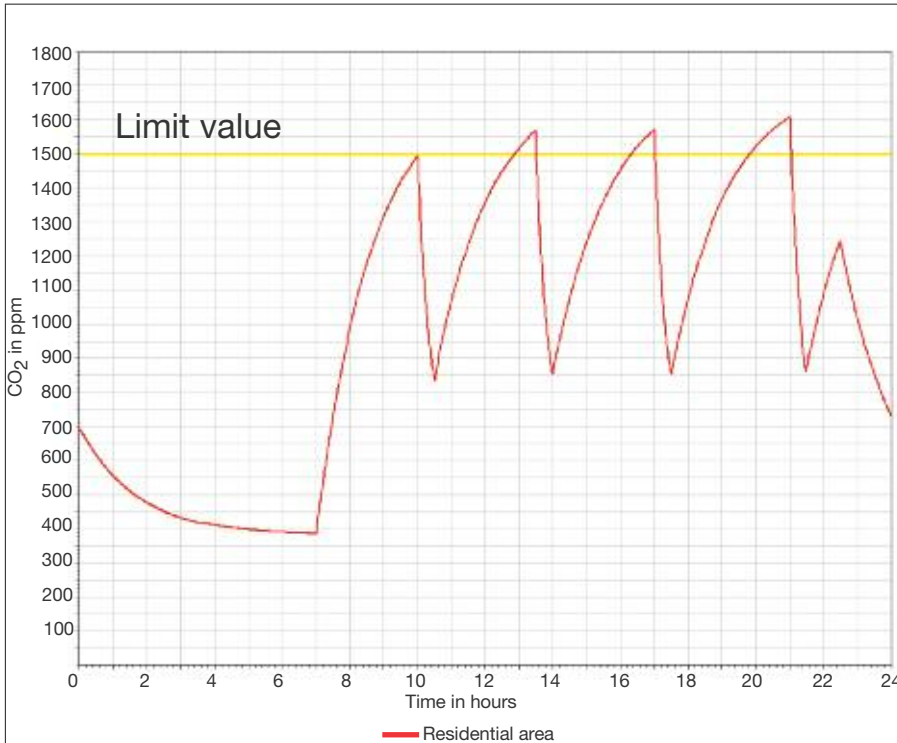
Adjustable nominal temperatures and time profiles facilitate an optimum room temperature control. Depending on the model, the climate control additionally displays the air humidity and the CO₂ concentration. These values can then be influenced directly (e. g. by airing).

Models:

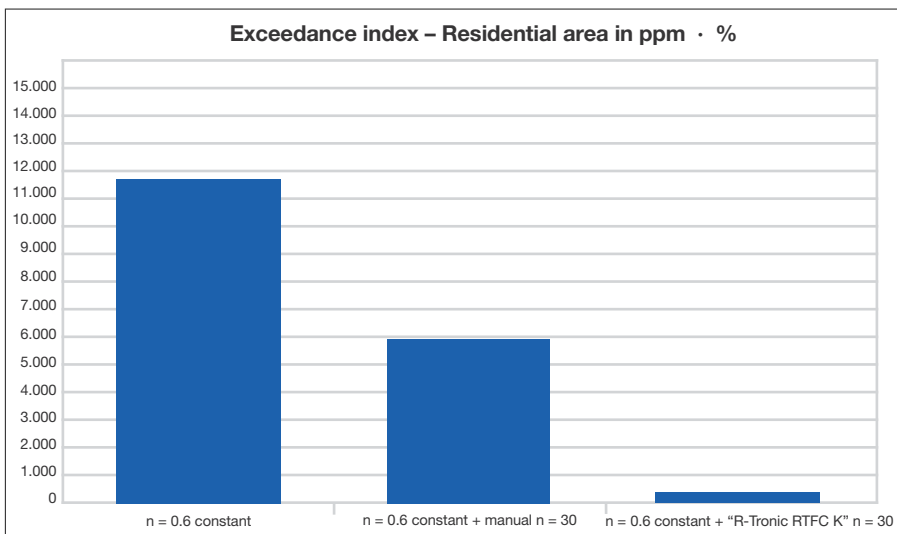
- **“R-Tronic RT B”:**
Wireless thermostat with actuator “Aktor MH/MD CON B” for the room temperature control with timer functions.
- **“R-Tronic RTF B”:**
as “R-Tronic RT B”, but additionally with integrated humidity sensor and display of the relative humidity RH in %.
- **“R-Tronic RTFC K”:**
as “R-Tronic RTF B”, but additionally with CO₂ sensor and display of the CO₂ concentration in ppm. If there is excessive CO₂ concentration, airing information is displayed.

1 Installation example “R-Tronic RTFC K”

Product	Description	System
 <p>“R-Tronic RT B” Item no. 1150680 plus “Aktor MH CON B” Item no. 1150665</p>	<p>“R-Tronic RT B” Wireless thermostat with actuator “Aktor MH CON B” for</p> <ul style="list-style-type: none"> - room temperature control with timer functions. <p>Power supply via battery. Power supply via an external flush-mounted power pack or a mains adaptor is possible (to be ordered separately).</p>	 <p>TEMPERATURE</p>
 <p>“R-Tronic RTF B” Item no. 1150681 plus “Aktor MH CON B” Item no. 1150665</p>	<p>R-Tronic RTF B” Wireless thermostat with humidity display and actuator “Aktor MH CON B” for</p> <ul style="list-style-type: none"> - room temperature control with timer functions and - integrated humidity sensor and display of the relative humidity RH in %. <p>Power supply via battery. Power supply via an external flush-mounted power pack or a mains adaptor is possible (to be ordered separately).</p>	 <p>TEMPERATURE</p> <p>AIR HUMIDITY</p>
 <p>“R-Tronic RTFC K” Item no. 1150682/84 plus “Aktor MH CON B” Item no. 1150665</p>	<p>“R-Tronic” RTFC K” Wireless thermostat with humidity and CO₂ display as well as actuator “Aktor MH CON B” for</p> <ul style="list-style-type: none"> - room temperature control with timer functions and - integrated humidity sensor and display of the relative humidity RH in % and - sensor for measurement of the CO₂ content and display of the CO₂ concentration in ppm. <p>Power supply via an external flush-mounted power pack or mains adaptor (100-240V~/50-60 Hz).</p>	 <p>TEMPERATURE</p> <p>AIR HUMIDITY</p> <p>CO₂</p>



1



2

Energy expenditure: "R-Tronic RTFC K" Climate display/control compared to other control concepts					
Control concept	Temperature control		Additional expenditure (through too long shock ventilation)	Temperature control + shock ventilation	
	New building	Existing building		New building	Existing building
Climate display/control "R-Tronic RTFC K"	Reference (100 %)				
Standard thermostat	119.3 %	124.8 %	4.3 %	123.6 %	129.1 %
Electronic radiator thermostat (standard with heating medium temperature effect)	105.5 %	105.5 %	4.3 %	109.8 %	109.8 %

3

8

The Oventrop climate display device / control "R-Tronic RTFC K" facilitates the improvement of the air quality and the saving of energy.

Prof. Dr.-Ing. Rainer Hirschberg (publicly appointed and sworn expert for heating, ventilation/air-conditioning and sanitary technology) outlines these advantages in the study - **Energetic evaluation of the room control "R-Tronic"** - amongst others for residential areas in residential buildings.

The essential statements of the study are:

1. Air quality

The "R-Tronic RTFC K" measures the CO₂ concentration and displays an exceedance of the presettable limit value. Thus, the user notices the necessity to ventilate the room to maintain the air quality. At the same time, a shortfall in the limit value signals the user to terminate airing.

(Illustration 1 shows the temporal development of the CO₂ concentration when using the "R-Tronic RTFC K".)

For classification of the CO₂ values as indicator for the air quality, the "exceedance index" has established itself. It is the product of the exceedance average value (medium CO₂ concentration in ppm less reference value 1500 ppm) and the excess frequency (time share in % based on the whole period considered - 24h - during which the CO₂ concentration is higher than the reference value).

(Illustration 2 shows the exceedance index in ppm · % for a residential area with a basic air exchange n=0.6 1/h.)

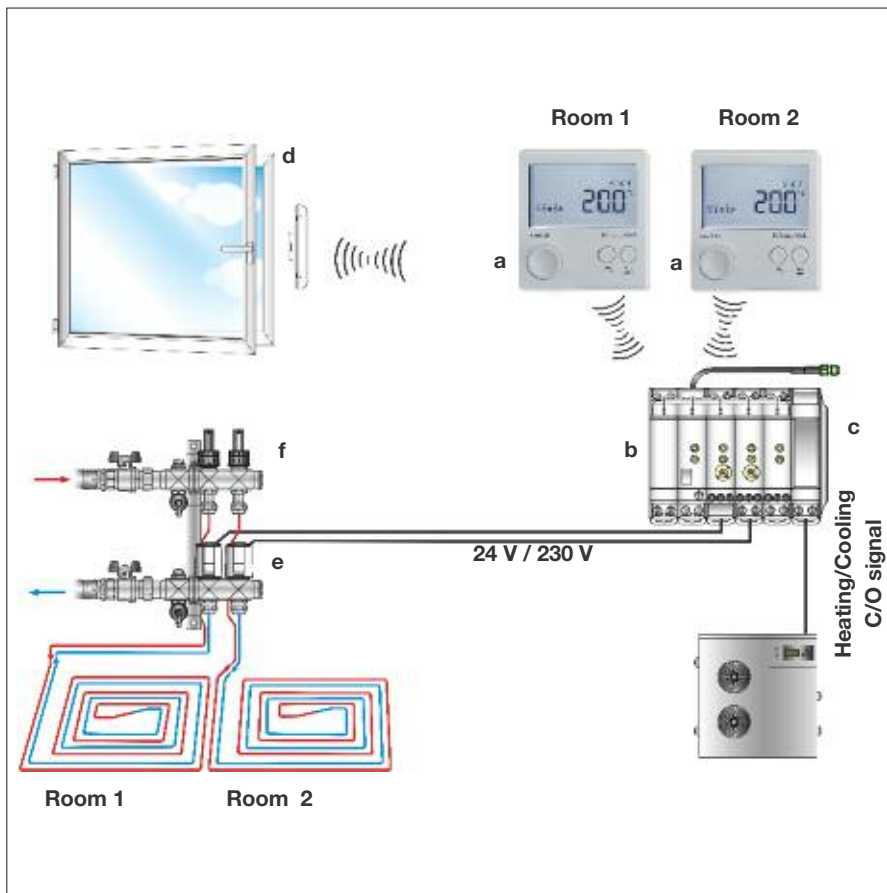
It is obvious that with a correct application of the "R-Tronic RTFC K" with values less than 1000 ppm · % (see page 3) an optimum air quality relating to the CO₂ concentration can be achieved.

2. Energy saving

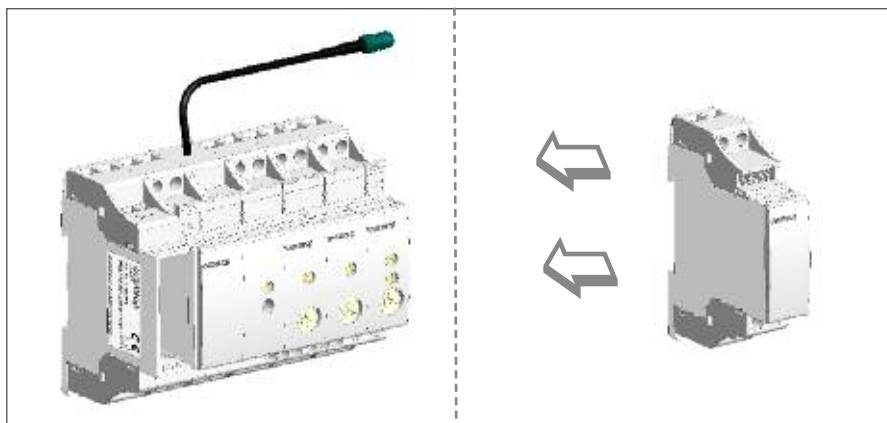
The control concept of the "R-Tronic RTFC K" (i. e. wireless thermostat and actuator are separated) excludes the heating medium temperature effect. The study could determine a value for the expenses which is far below the value according to DIN V 18599-10 for PI regulators with optimization function. The study shows that approx. 29.1 % of the energy can be saved compared to e. g. standard thermostats directly mounted on radiators in existing buildings.

(Illustration 3 shows the energy consumption:

Climate display device/control "R-Tronic RTFC K" compared to other control concepts.)



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3

“R-Con” Wireless receiver

Electronic multichannel wireless receiver for room temperature control of up to 8 independent heating zones according to adjustable timed programmes at the wireless thermostats “R-Tronic RT B”, “R-Tronic RTF B” and “R-Tronic RTFC K”. Operation via the menu-driven wireless thermostat.

Selectable functions:

- Pump logic with adjustable lead time and follow-up time
- Burner logic for heat demand
- Two point control
- PWM control for surface heating
- Switching from heating to cooling (additional module “R-Con HC” in preparation)

The functions are selected via a rotary switch directly at the wireless receiver.

Electrothermal actuators “Aktor T 2P” 24 V or 230 V can be connected to the 8 channels (closing contact with 4A/250 V AC each).

“R-Con HC” Extension module heating/cooling for “R-Con” wireless receiver

The extension module is connected to the wireless receiver “R-Con” and is used for switching between heating and cooling operation via a C/O signal (change-over signal). The C/O signal can be evaluated by standard reversible heat pumps.

1 System illustration

Legend:

- a Wireless thermostat “R-Tronic RT B”, “R-Tronic RTF B”, “R-Tronic RTFC K”
- b Wireless receiver “R-Con”
- c Extension module “R-Tronic HC” (in preparation)
- d Wireless window contact “FK-C F” (in preparation)
- e Electrothermal actuator “Aktor T2P” (two point)
- f Stainless steel distributor/collector “Multidis SF”
- g Heating circuit pump

2 Wireless receiver “R-Con”, 8 channels with logic module

Item no.: 1150772

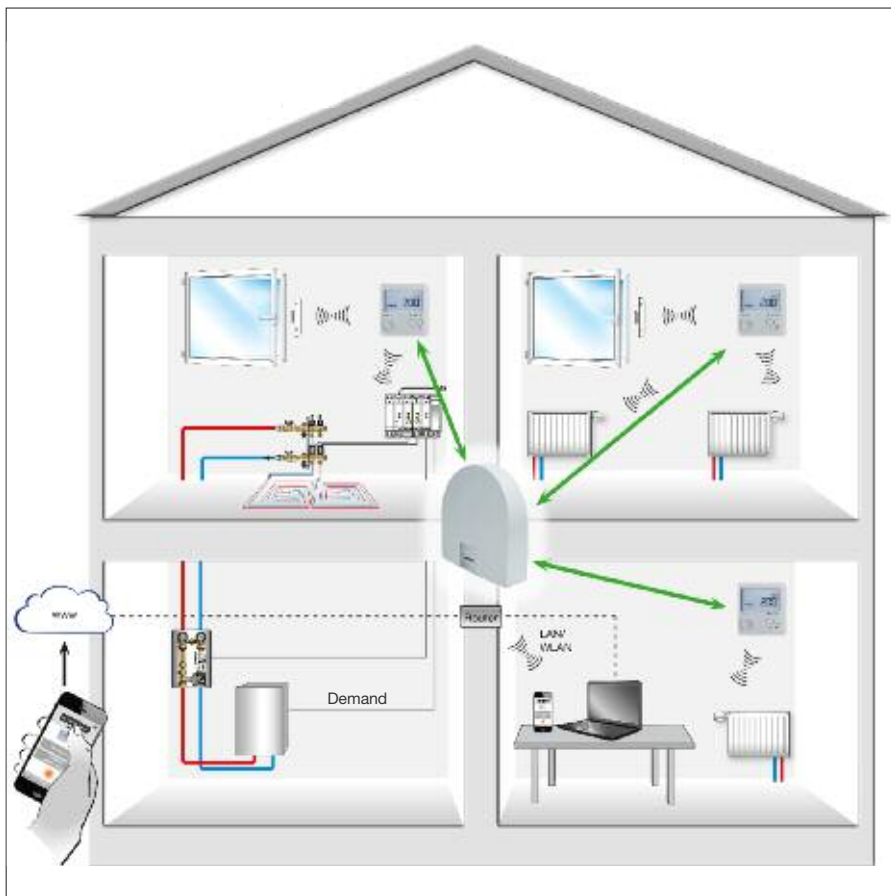
and

Extension module “R-Con HC” for wireless receiver “R-Con” (in preparation)

Item no.: 1150774

3 Wireless window contact “FK-C F” (in preparation)

Item no.: 1153070



1



2

“Synet CR” Communication centre

The centre for the simple networking, visualization and parameterization of “R-Tronic” climate display devices/controls via web interface or smartphone.

Up to 16 wireless thermostats or rooms can be managed by the centre by transmitting adjustable time programmes for the individual room from the centre to the “R-Tronic” via the bi-directional radio communication.

Access options via:

- the mobile network worldwide with the smartphone (App)
- a WLAN network with PC/laptop/tablet or smartphone
- a LAN network with PC/laptop

User interfaces:

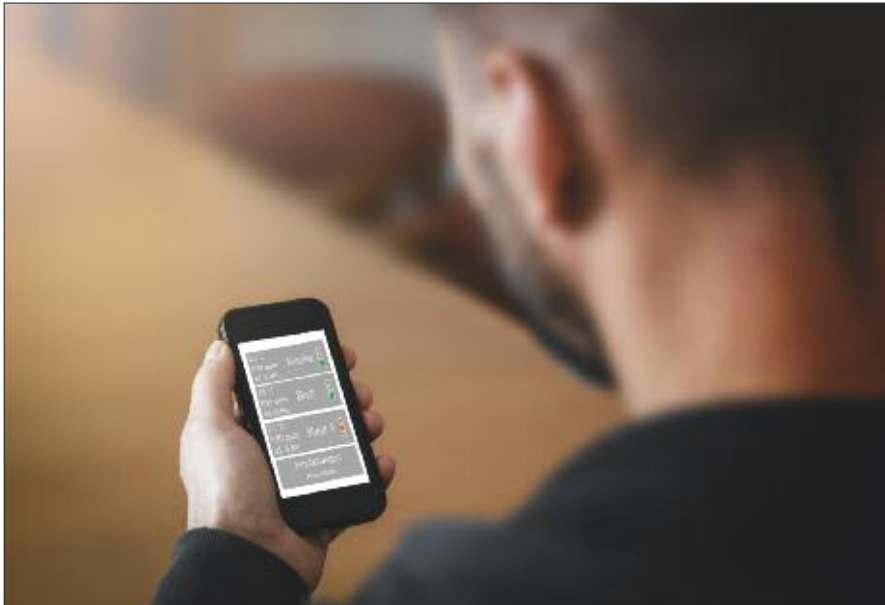
- integrated web interface
- App for iOS and Android terminals

Interfaces:

- LAN
 - a. direct PC/laptop connection
 - b. direct router connection
- USB for WLAN stick
 - a. Access Point Mode
 - b. Client mode
- Radio communication with “R-Tronic” climate display devices/controls
- Mains adaptor 5 V

The communication centre “Synet CR” is also suitable for wall attachment.

- 1 System illustration
Integration in the building technology
- 2 Communication centre “Synet CR”
item no. 1150687



1

The user interface of the communication centre “Synet CR” allows an easy operation of the whole system via smartphone, tablet or PC. This is a (terminal) neutral WEB App. The user interface is displayed on all terminals in the same manner.

The user interface is clearly structured and therefore allows the configuration of the “R-Tronic” system as well as the operation and visualization of the room-related parameters.

Time profiles and desired temperatures can be set easily. Also settings such as setback operation or standard operation can be activated for the entire dwelling by mouse click or touchscreen.

For evaluation of the climate parameters, e. g. temperature, humidity* and CO₂*, there is a room to room trend recording.

1 Control room climate conveniently via smartphone

2 Startup screen of the “Synet CR” interface

3 Room to room climate data (temperature, relative humidity*, CO₂*)

4 Trend recording of the room climate data

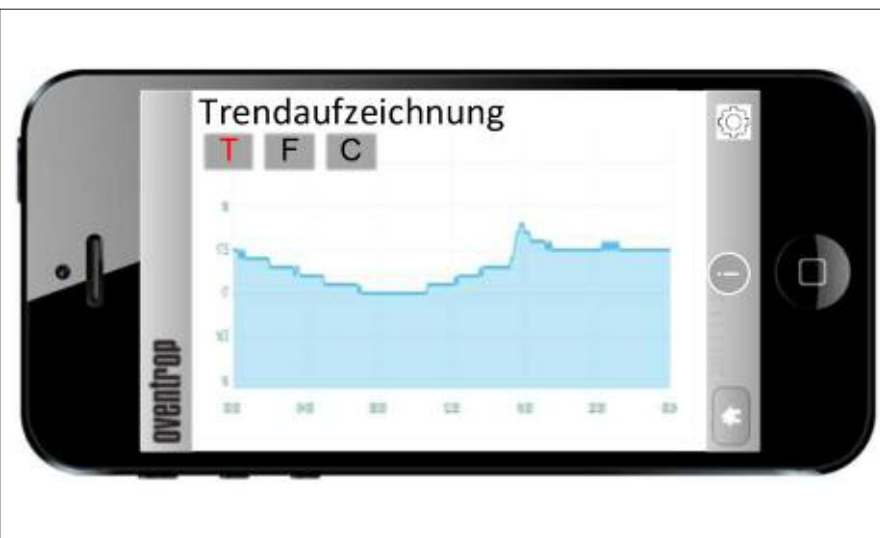


2



3

*) depending on the “R-Tronic” model



4



1

The “R-Tronic WA K” is an electronic thermostat for room temperature control of fan coil units with heating and cooling function, for instance in hotel rooms or rooms open to the public. A simple menu guide allows selection of the nominal room temperature between an upper and lower limit, and three-stage or automatic (temperature controlled) fan speed control. Further settings, such as adjustment of the upper and lower temperature limits, can only be carried out by the qualified tradesman via an encrypted access to the operating menu. A wireless window contact “FK-C F” can be taught in so that the heating or cooling operation is interrupted when opening the window.

- 1 Installation example “R-Tronic RTFC K”
- 2 “R-Tronic WA K”
Thermostat with fan drive (in preparation)
item no.: 1150690
“Aktor T 2P”
Electrothermal actuator (two point)
item no.: 1012415/16
“FK-C F”
Wireless window contact
item no.: 1153070
- 3 System illustration with fan coil



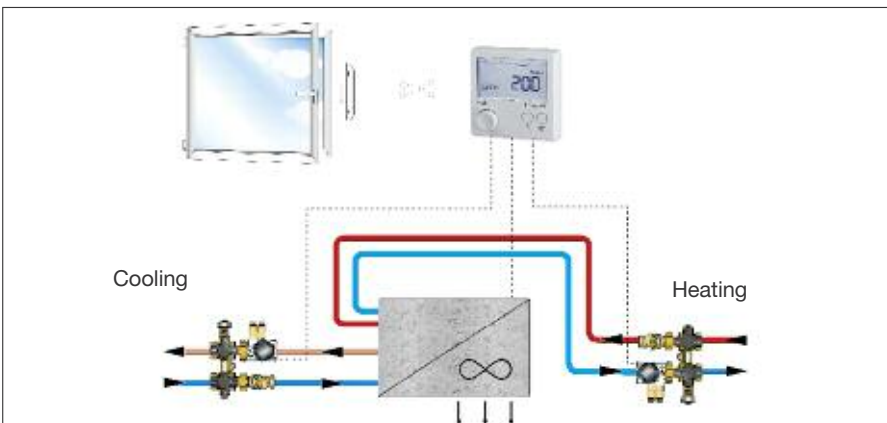
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Further information can be found in the Oventrop catalogue “Products”, the technical data sheets or on the internet, product range 8.

Subject to technical modifications without notice.

Private persons may purchase our products from their qualified installer.

Presented by:



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