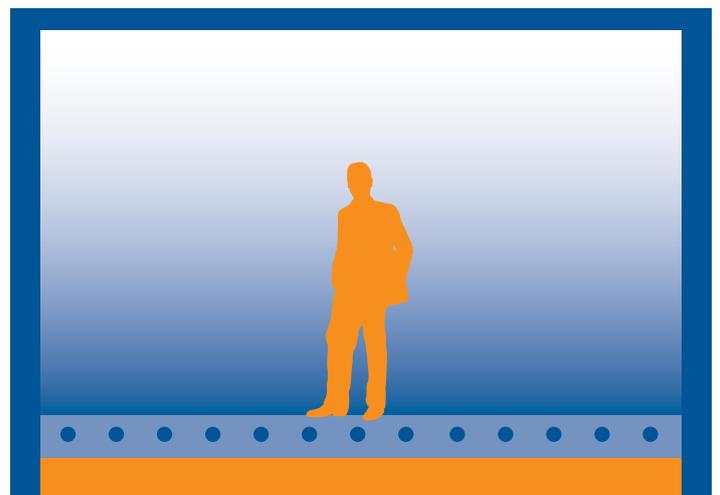


Underfloor cooling





We have been working in an ideal climate for thirty years.

A climate that has brought us to a position of leadership in Italy in the field of radiant heating and cooling. RDZ was the first company to receive the management system quality certification (today UNI EN ISO 9001:2008).

RDZ has been a quality-oriented company since its very beginning, using the finest materials, developing new solutions, constantly providing excellent service. And also by creating a positive climate in the company to promote the exchange of ideas and stimulate cooperation for constant improvement.

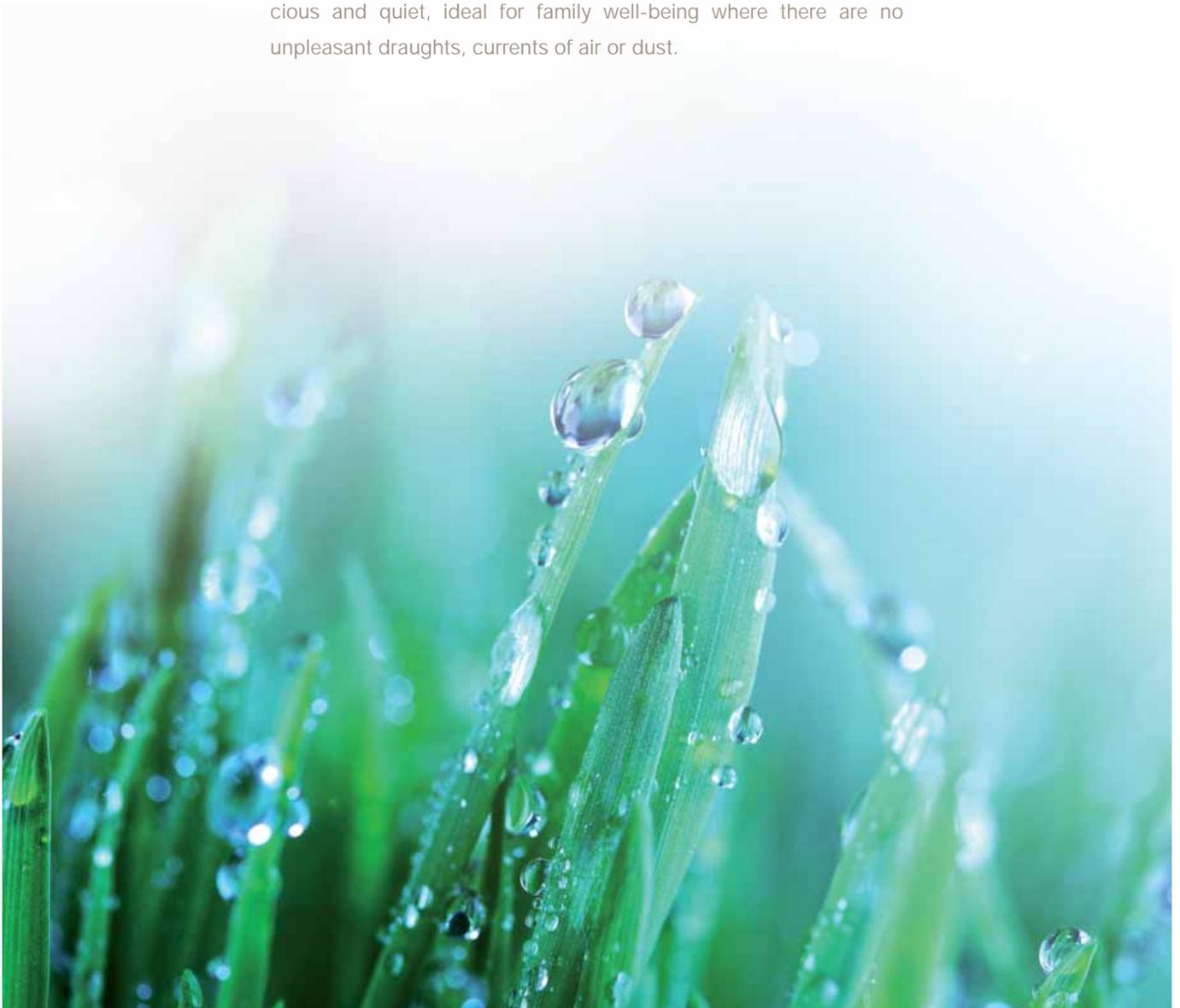


Underfloor radiant cooling system: highest comfort in summer.

Summer cooling requires a system that is both comfortable and healthy, as well as able to guarantee high performance and reduced energy consumption.

The underfloor radiant system is not only considered as the best heating system for winter but also as an excellent solution for summer cooling. A single, invisible and low-energy-consumption system allows users to create the best living environment all year round, with no need of any additional installations.

Room climate-controlled by such a system are comfortable, spacious and quiet, ideal for family well-being where there are no unpleasant draughts, currents of air or dust.





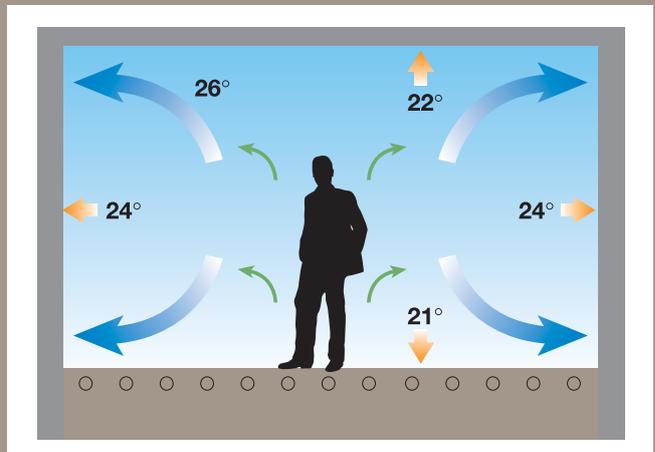
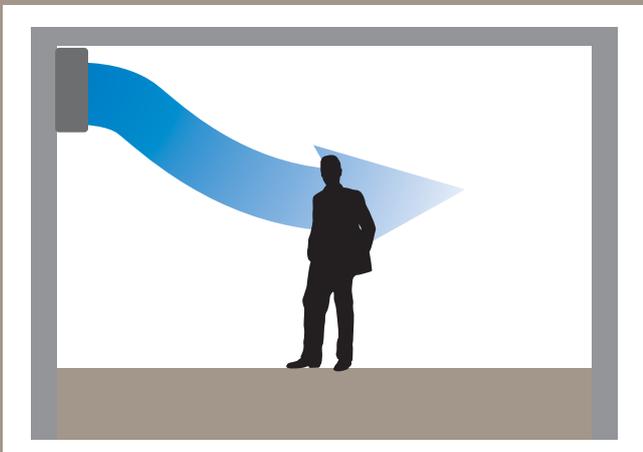
Underfloor cooling: an ideal solution for houses



Underfloor cooling systems are especially recommended for residential summer cooling and have become an extremely viable alternative to traditional air conditioning systems in recent years. They are comfortable, invisible and silent, whilst offering excellent thermal performance and versatility.



Comfort without currents and streams of air



Underfloor cooling enables users to achieve uniform temperatures and the required level of heat exchange between the human body and their surroundings. Furthermore, it eliminates the annoying streams and currents of air typical of traditional air conditioning systems.



Reasons for choosing underfloor cooling.

Simple physical principles govern how an underfloor cooling system works; regulating the heat transfer between people and their surroundings. The balanced distribution of cool air radiated from the flooring ensures that the required temperature is distributed evenly and proportional to the heat transfer between human body and the environment. There are no currents of cold air, the environment is silent and there are no movements of dust.

Underfloor cooling systems are compatible with any flooring: ceramic, parquet, marble, hard brick, etc. Being concealed, the system guarantees full use of the available space with a wide range of furnishing options.

1 Summer and winter comfort.

2 Silent working.

3 No air currents.

4 Reduced energy consumption.

5 Better hygiene, better health.

6 Furnishing freedom.



Underfloor cooling thermal performance.

Each underfloor heating system is also a potential underfloor cooling system. It is important to assess closely the technical parameters required by the premises to be heated or cooled through the underfloor radiant system. In such a system, the floor surface is responsible for carrying out the thermal transfer of either heat or cold between humans and the environment. As such, different thermal performance will be achieved depending on the type of flooring and its composition (e.g. wood, tile, ceramic brick, etc.).

The diagram on page 7 shows the sensible heat (dry heat) absorbed by a radiant floor system with cross-linked and interconnected pipe positioning.

N.B.: It is important to bear in mind that any underfloor cooling system should be integrated with an appropriate air dehumidification system.

1



Ceramic tile flooring

Cooling thermal performance with ceramic tile flooring.

$$R_{\lambda,B} = 0.01 \text{ (m}^2 \cdot \text{K/W)}$$

2



Parquet flooring

Cooling thermal performance with parquet wood flooring.
Thickness 1 cm λ 0.25

$$R_{\lambda,B} = 0.04 \text{ (m}^2 \cdot \text{K/W)}$$

3

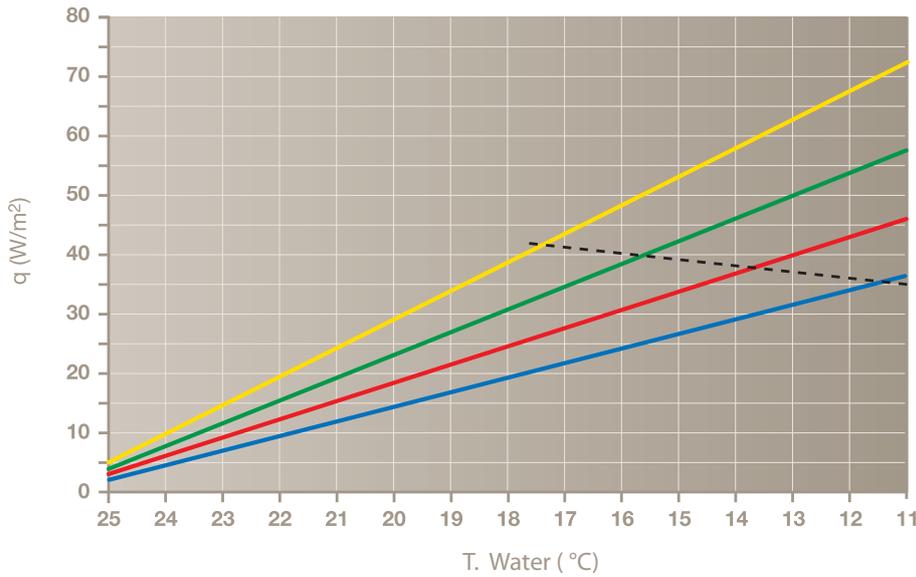


Wood strip flooring

Cooling thermal performance with wood strip flooring.
Thickness 2 cm λ 0.25

$$R_{\lambda,B} = 0.08 \text{ (m}^2 \cdot \text{K/W)}$$

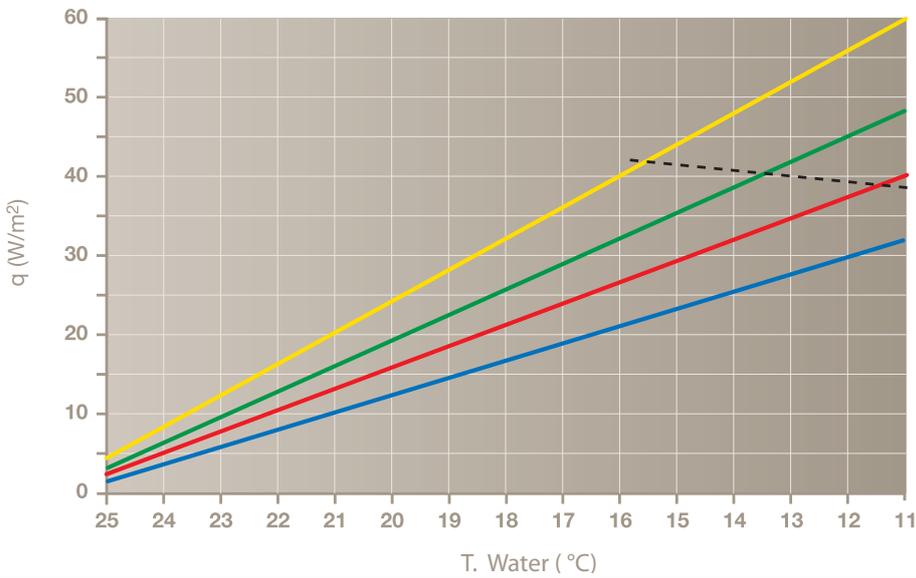
T. Room= 26 °C



- Pitch: 8
- Pitch: 16
- Pitch: 25
- Pitch: 33

Peak surface temperature curve 19.5 °C

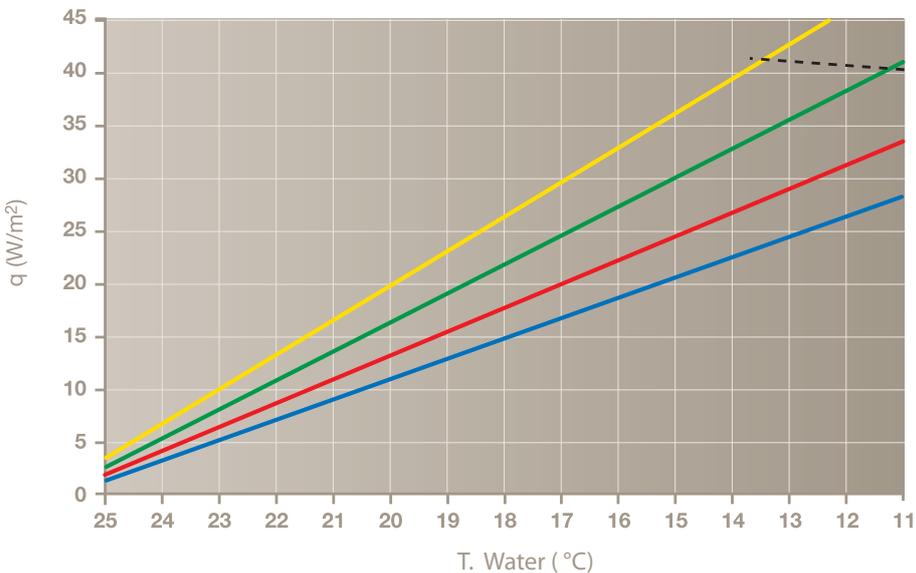
T. Room= 26 °C



- Pitch: 8
- Pitch: 16
- Pitch: 25
- Pitch: 33

Peak surface temperature curve 19.5 °C

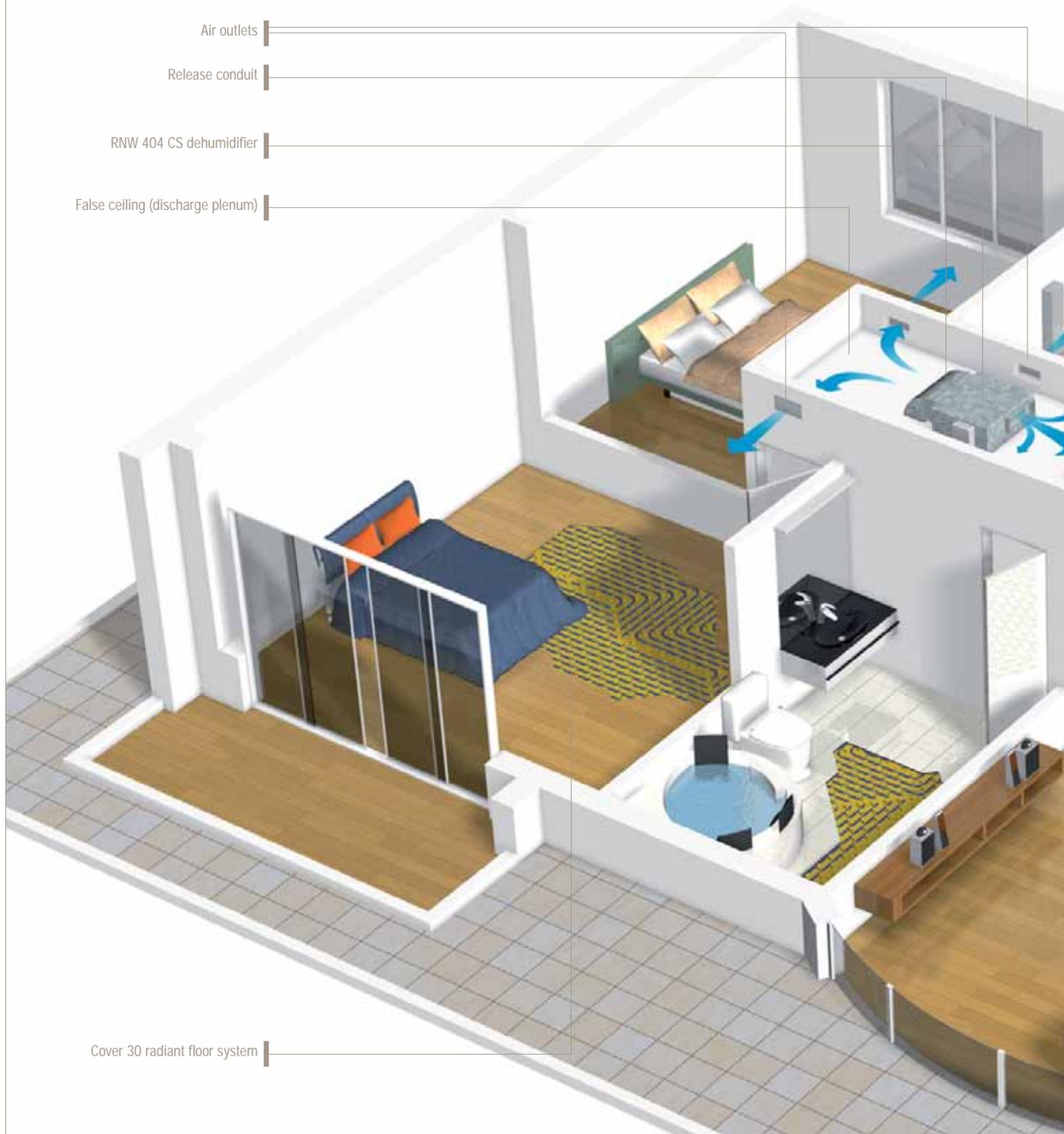
T. Room= 26 °C



- Pitch: 8
- Pitch: 16
- Pitch: 25
- Pitch: 33

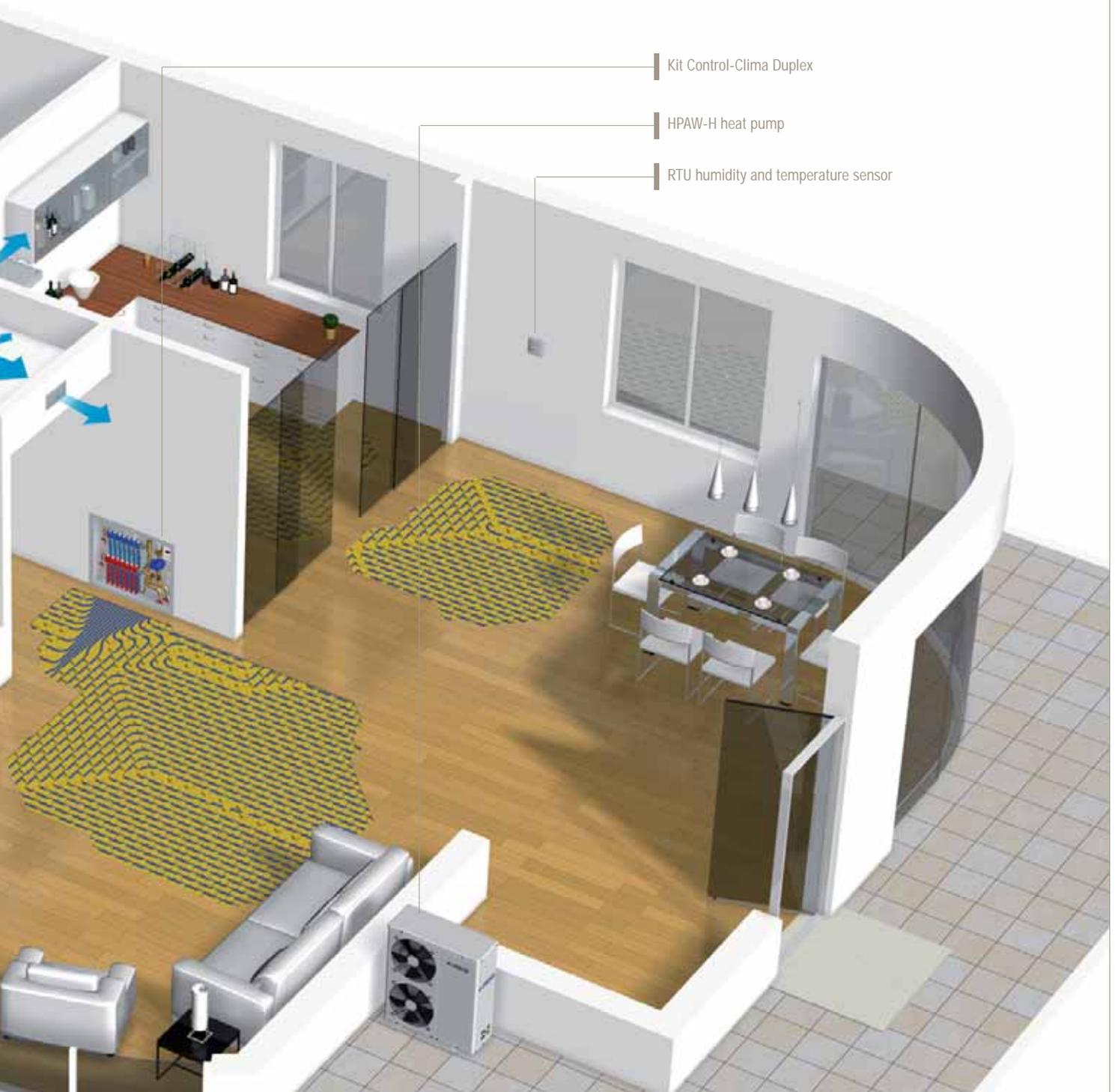
Peak surface temperature curve 19.5 °C

Underfloor cooling:



a 360° solution.

RDZ underfloor cooling combines a number of integrated components in order to obtain maximum comfort. The correct working of a radiant system requires not only the flooring and the underfloor installation (panels, pipes, etc.) but also the air dehumidifiers and the control system to manage water temperature, and room air temperature and humidity.



Three winning solutions for underfloor cooling

In order to obtain the best possible performance and comfort from an underfloor radiant system it is essential that the three main parts of the system have been specially designed to be highly integrated:



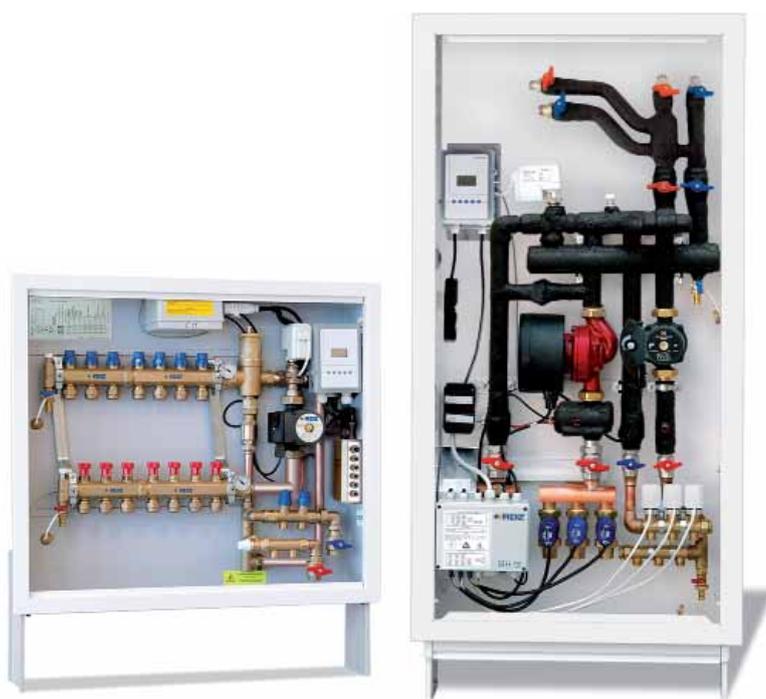
1 Radiant system

Underfloor radiant systems enable thermal energy – either heat or cold, depending on seasonal requirements – to be transferred to the rooms. RDZ boasts a wide range of different systems to suit all requirements.



2 Dehumidification system

RNW dehumidifiers are specially designed for radiant systems. They allow air humidity to be kept under check simply and easily, thus avoiding the risk of floor surface condensation.



3 Thermoregulation system

Thermoregulation guarantees optimal system efficiency and total control of all system parameters, with water temperature, room temperature and relative humidity controlled in real time.

RNW dehumidifiers and heat recovery units.

Adiabatic dehumidifiers to control relative humidity in radiant heating/cooling systems. Each machine is a cooling unit equipped with 2 additional heat exchangers that exploit the availability of chilled water (15-18 °C) used by the radiant panels. The pre-treatment coil, located under the evaporator, reduces the temperature of the air, lessening the sensible load on the evaporating coil. The post-treatment coil, located after the condenser, reduces the temperature of the air before sending it back to the room.

This treatment produces dehumidified air with the same temperature as the air inside the room. Basically, RNW dehumidifiers control the "latent load"; this increases the efficiency of the cooling unit, which supplies the panels with water at higher temperatures than the temperature usually required for dehumidifying.

RNW 204 I Wall/embedded dehumidifier - Code 7040010



Power consumption	Watt	340
Air flow	m ³ /h	200
15 °C Water flow	L/h	240
Dimensions (lxhxd)	mm	760x619x207
Weight	kg	45
Dehumidification capacity*	L/day	24.0
For houses (areas up to...)	m ²	80-100

RNW 204 E External/wall dehumidifier - Code 7040028



Power consumption	Watt	340
Air flow	m ³ /h	200
15 °C Water flow	L/h	240
Dimensions (lxhxd)	mm	800x650x230
Weight	kg	49.6
Dehumidification capacity*	L/day	24.0
For houses (areas up to...)	m ²	80-100

RNW 404 CS Ceiling/embedded dehumidifier - Code 7040030



Power consumption	Watt	360
Air flow	m ³ /h	220
15 °C Water flow	L/h	240
Dimensions (lxhxd)	mm	711x242x546
Weight	kg	36
Dehumidification capacity*	L/day	26.6
For houses (areas up to...)	m ²	100-130

RNW 508 CS Ceiling/embedded duct dehumidifier - Code 7040050



Power consumption	Watt	500
Air flow	m ³ /h	500
Dehumidification capacity*	L/24h	42
Dimensions (lxhxd)	mm	840x290x600
Weight	kg	47
Available static pressure (average speed)	Pa	52
For houses (areas up to...)	m ²	150-200

RNW 600 CS Ceiling/embedded duct dehumidifier - Code 7040035



Power consumption	Watt	900
Air flow	m ³ /h	600
Dehumidification capacity*	L/24h	62
Dimensions (lxhxd)	mm	690x349x718
Weight	kg	53
For houses and offices (areas larger than...)	m ²	280

RNW 1000 Duct dehumidifier - Code 7030040



Power supply	V/ph/Hz	230/1~ +N/50
Dehumidification capacity*	L/24h	50.2
Rated power consumption	Watt	950
Air flow	m ³ /s	0.278
	m ³ /h	1000
Refrigerant type and quantity		R407C
	kg	1.2
Sound pressure level**	dB[A]	53
Available static pressure of fan	Pa	100
Dimensions (lxhxd)	mm	875x398x761
Weight	Kg	73
For commercial applications		

RTK 1000 Heat recovery unit - Code 7030050



Power supply	V/ph/Hz	230/1~ +N/50
Rated power consumption	Watt	150
Air flow	m ³ /s	0.278
	m ³ /h	1000
Available static pressure of fan	Pa	100
Dimensions (lxhxd)	mm	875x398x980
Weight	Kg	47
For commercial applications		

* Measured at 26 °C room temp, 65% HR and 15 °C inlet water temp. - ** At 1 m in free-field atmosphere.

Control-Clima Thermoregulation Kit.



Solutions employing the preassembled Kit Control-Clima are easy to use and especially suitable for small to medium sized single-family property systems.

Kit Control-Clima is a mini thermal power plant equipped with all the necessary components to control the radiant floor system both in summer and winter.

Its electronic control unit operates the water temperature - based on external temperature (both summer and winter) - and the dehumidifier, based on humidity readings from the humidity and temperature sensor.

The Kit contains all the required electrical connections in order to operate the system.

Components

1



RTU - HUMIDITY AND TEMPERATURE SENSOR

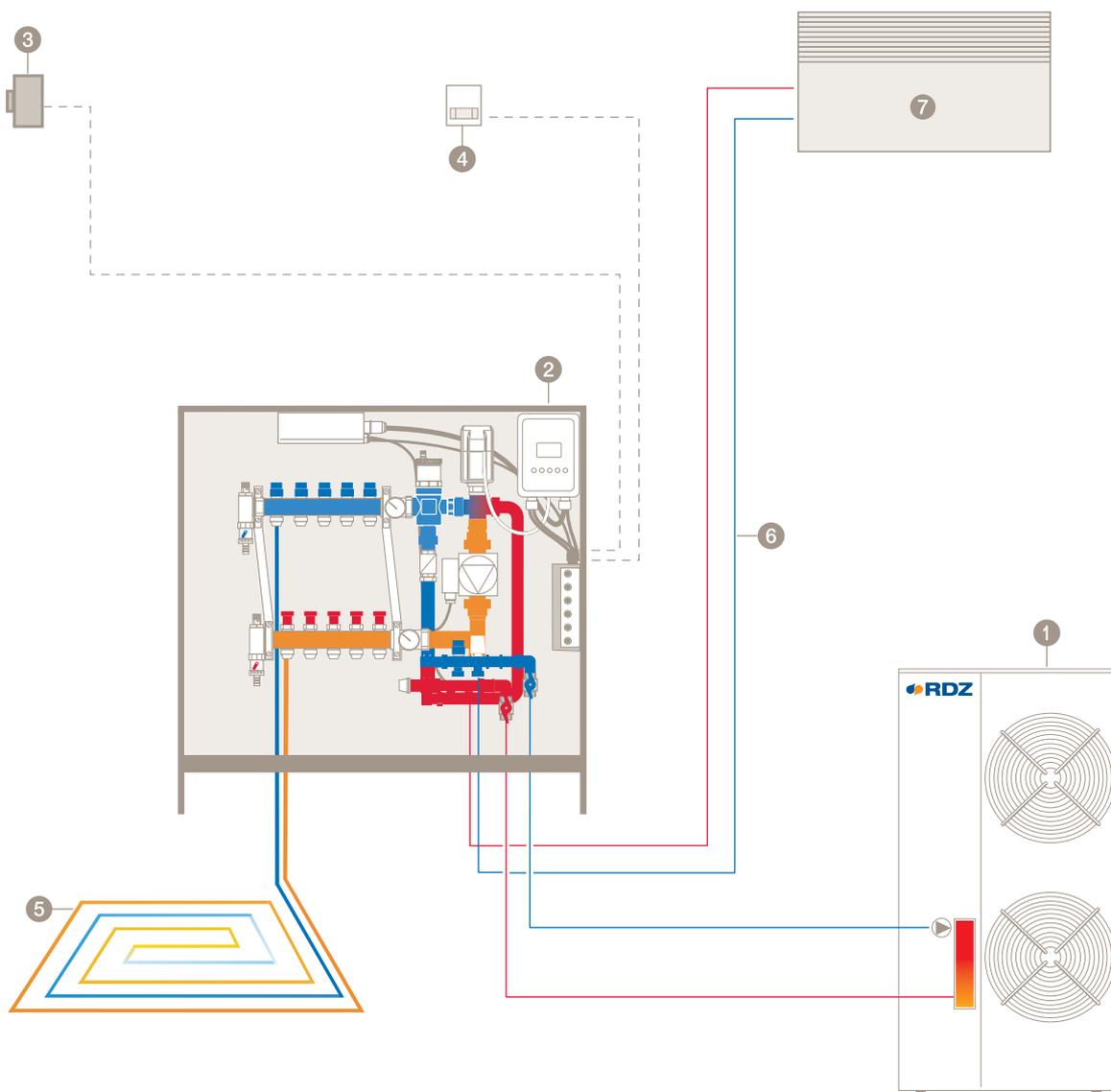
Wall-mounted room humidity and temperature sensor to display and control air conditioning for rooms during summer months.

2



RT -TEMPERATURE SENSOR

Room temperature sensor for wall mounted appliances. Equipped with adjusting potentiometer.



Equipped with
KIT CONTROL-CLIMA Duplex

- 1 HPAW-H heat pump (as an alternative to cooler and boiler)
- 2 Thermoregulation kit CONTROL-CLIMA DUPLEX
- 3 External sensor
- 4 RTU – temperature and humidity sensor
- 5 Underfloor system
- 6 Kit-dehumidifier hydraulic connection
- 7 RNW dehumidifier

The diagram shown is purely indicative.

MTR Control-Clima Thermoregulation.



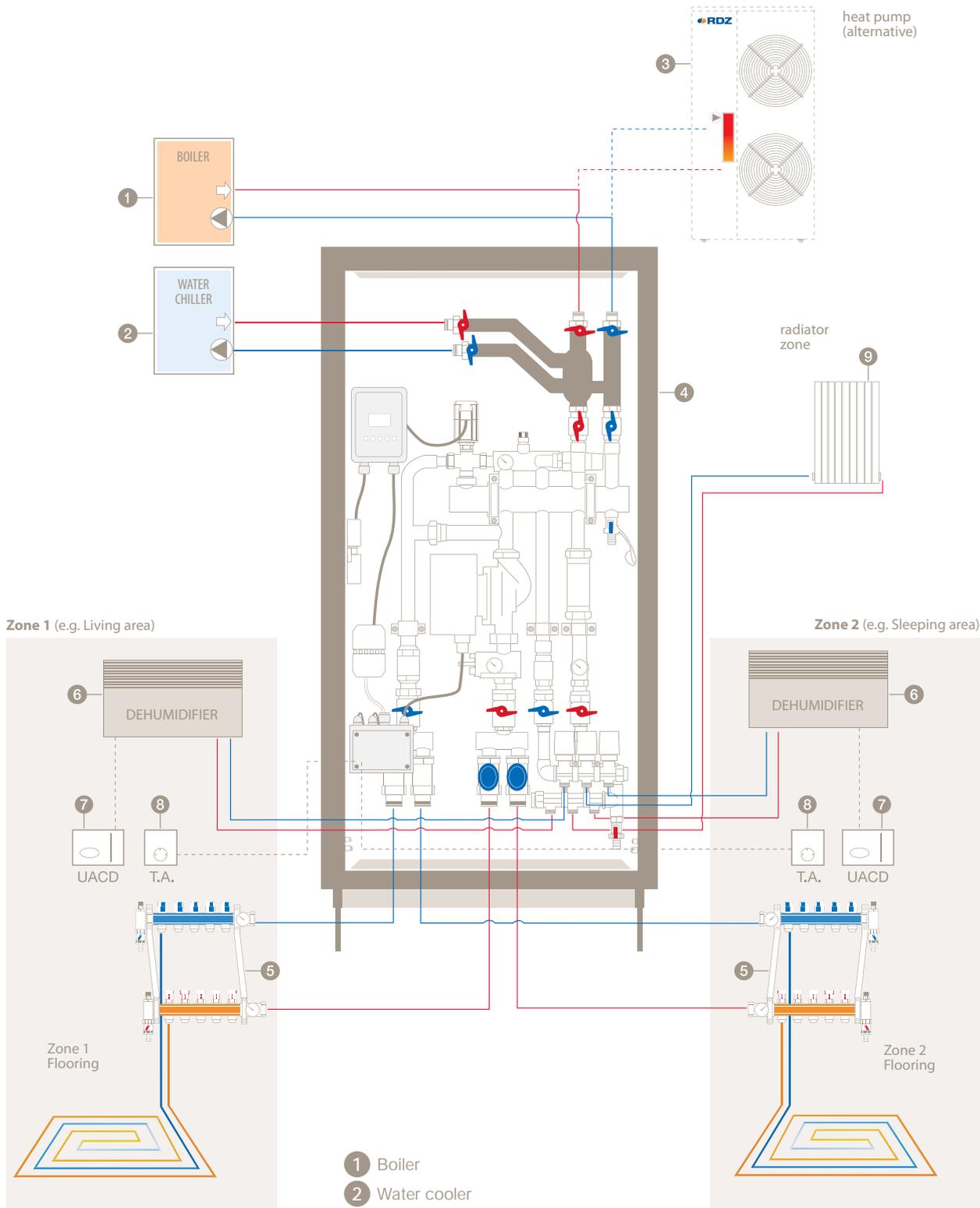
Solutions with MTR Control-Clima module are especially suitable for medium-large sized single-family property systems (up to approximately 400 metres of radiant surface).

MTR Control-Clima is a preassembled thermal power plant equipped with all the necessary components to control the radiant floor system both in summer and winter. Its electronic control unit operates water temperature based on external temperature readings (either summer or winter).

MTR module is hydraulically and electrically designed to manage three low-temperature zones and three zones heated using traditional systems.

Temperature control for each individual area is carried out via room thermostats connected to zone manifolds or electrothermal heads for each specific environment.

Relative humidity control is carried out by RDZ humidity regulators. These regulators activate dehumidification for the required zones.



- 1 Boiler
- 2 Water cooler
- 3 Heat pump (alternative to cooler or boiler)
- 4 MTR CONTROL-CLIMA
- 5 Floor manifolds
- 6 RNW dehumidifier
- 7 UADC humidity sensor
- 8 TA zone sensor
- 9 Radiator zone

Equipped with
MTR CONTROL-CLIMA

The diagram shown is purely indicative.

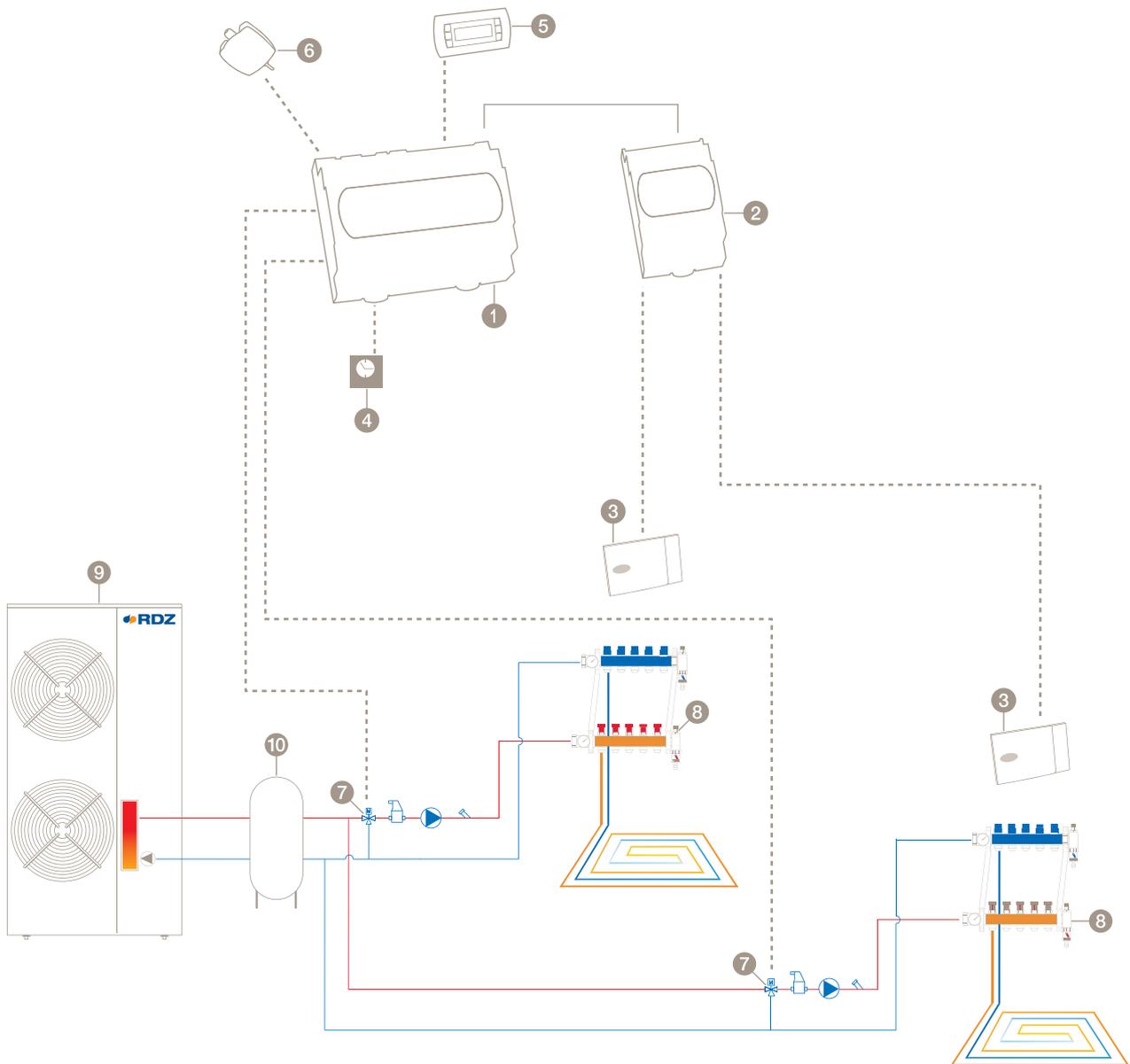
RC-EVO Control Units.

Solutions employing RDZ's RC or EVO electronic control units are some of the most technically advanced devices to be found currently on the market. Settings are specifically adjusted to manage under-floor and ceiling radiant heating and cooling systems and endure the perfect working order of all system parameters: water temperature, air temperature, and relative humidity.

The system can be controlled by VJ Kit or MTR VJ Kit or even mini power plants with multiple mixer valves and multiple zones to be controlled.

RC or EVO electronic control units are modular and expandable and, as such, suitable for both small systems with independent or centralized heat production or larger multi-zone systems.





Equipped with
RC-EVO THERMAL POWER PLANT and
MONITORING STATION

- 1 RC-B central unit
- 2 UC-Z expansion unit
- 3 TA/H (temperature & humidity) room environment sensor
- 4 Clock board
- 5 User interface
- 6 External temperature sensor
- 7 Floor manifolds
- 8 Inertial accumulator
- 9 Heat pump (alternative to cooler or boiler)
- 10 Mixer valves

The diagram shown is purely indicative.



Assembly set-up.

An underfloor cooling system requires some straightforward settings to be carried out in order to allow thermoregulation and dehumidification.

Thermoregulation

RDZ underfloor cooling setting and adjustment are carried out by RC – EVO controllers, equipped with temperature and humidity sensors, and Control-Clima climate control unit (included in Kit or MTR modules).

They can be used with reversible-control environment chronothermostats and humidity sensors.

Bathrooms

Bathrooms are generally excluded from cooling system operations. We recommend you install electrothermal heads in the specific circuits controlled by local zone room thermostats.

Dehumidification

This is an essential element for the correct working operations of underfloor cooling.

The operating system should always ensure that:

- 1 >** Each RNW dehumidifier is equipped with 2 attachments (inlet and outlet) for the cooling water circuit: this requires 2 pipes to be fitted and normally connected to the same underfloor circuit manifold.
- 2 >** There is a suitable power supply (230V-50Hz, single phase), with humidity control.
- 3 >** There is a collecting pipe to discharge condensation at each RNW dehumidification point.
- 4 >** Dehumidifiers must always be placed in a position in which they can be inspected.



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