GIACOKLIMA UNDERFLOOR SYSTEM

GIACOMINI
Technology in Comfort

GIACOKLIMA UNDERFLOOR SYSTEM

11.2009

System peculiarities

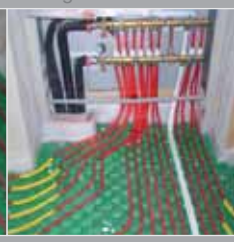
GIACOKLIMA underfloor systems

The Giacoklima underfloor radiant system is a heating and cooling system which uses low temperature water circulating in pipes made of plastic material, sunk in the layer of cement supporting the usual flooring in ceramic, marble, granite, grés or wooden materials. The heat is transferred from the pipes to the floor and from the latter to the whole room: in this way the whole surface of the floor itself becomes a radiant body.

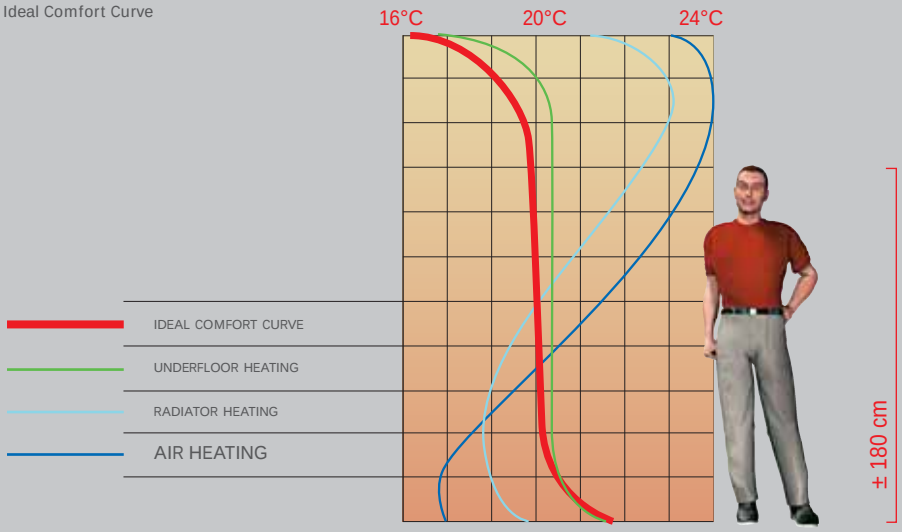
The transfer of heat from the floor to the environment and surfaces facing it takes place by means of radiation, thereby guaranteeing an excellent temperature distribution. The underfloor radiant system is that which comes closest to the ideal temperature curve, since it supplies a slightly milder temperature at foot level and gradually cools as it rises along the body to reach the head. The floor with a radiant system doesn't feel hot to the touch (it's around 25÷26°C), but neither does it feel chilly, as is typical of floors in traditionally heated environments, and one can easily walk around barefoot.

The Giacoklima underfloor system works both for heating and cooling and can therefore be used in all seasons. In winter mode the underfloor radiant system works with water the temperature of which varies from 25°C to 45°C in relation to outside temperature. As explained in the above process, it is the floor surface which transmits heat to the environment. Furthermore, thanks to the thermoregulation devices brought to us by the vast experience of Giacomini, excellent levels of comfort can be reached. In summer mode the system works with water the temperature of which ranges between 13÷14°C, with possible variations based on external conditions and environmental humidity level.

- COMFORT
- **UNIFORM TEMPERATURE, WITH NO STRATIFICATION OR DRAUGHTS**
- ENERGY SAVING
- AESTHETIC ADVANTAGES NO HEATER IN THE ENVIRONMENT
- SOUNDPROOFING
- DURATION
- UNI EN 1264



Ideal Comfort Curve



1 ▸ Installation examples

Comfort: uniform temperature, with no stratification or draughts

In order to calculate the heat requirement of a building it is necessary to consider the structure of the building itself, its degree of insulation and dispersion through the walls. Furthermore, the heat requirement may vary from one room to another, according to its intended use.

Following numerous studies on heating systems it has been agreed that a radiant panel system, correctly sized and using modern technology, provides the human body with greater comfort and well-being than normal heating systems: a feeling of comfort is obtained, with constant and uniform temperature in the various rooms.

The temperature distribution in a certain room is determined by the so-called ideal curve of thermal comfort, according to which the areas closer to the floor must have a slightly warmer temperature than those near the ceiling: when comparing the comfort curves of the various types of heating systems, it becomes apparent that the curve representing comfort derived from an underfloor radiant system is the nearest to the ideal .

It is well known that draughts, warm but above all cold ones, their speed and excessive difference from room temperature increase a feeling of discomfort in individuals, and consequently influence their state of health.

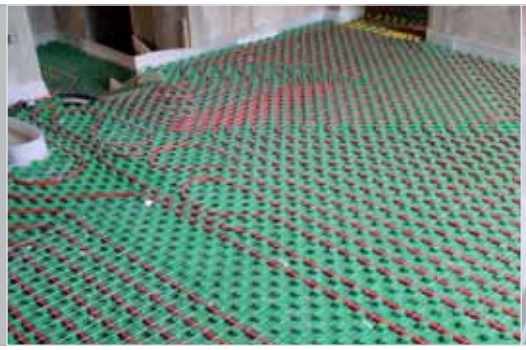
ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers INC) defines comfort as the mental and physical well-being of a person in relation to his/her environment. The evaluation of this condition is also achieved by means of parameters connected with the type of activity underway (MET), since one's activities influence the level of metabolism (1 met = 58 W/m2), and type of clothing (CLO), which approximates the thermal resistance offered by clothes (1 clo = 0.155 m2K/W).

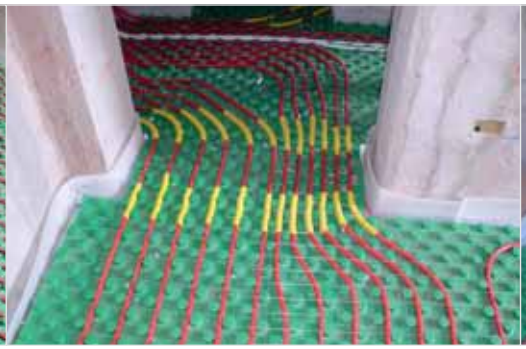
The index which best approximates physical and physiological variables of thermal comfort is the PMV (Predicted Mean Vote), which represents the average vote expected from a certain number of people on the conditions of well-being in a particular environment. Another very important evaluation index derives from the PMV is the PPD (Predicted Percentage of Dissatisfied), which considers the percentage of "dissatisfied" individuals based on certain microclimatic conditions.

ISO/DIS 7730 ("Determination of the PMV and PPD indexes and of specifications for thermal comfort conditions") foresees a condition of comfort according to PMV values ranging between + 0.5 and – 0.5, which corresponds to a <10% PPD.

Draughts causing annoying differences in temperature in the environment are totally eliminated by an underfloor radiant system.

THE CEN CR1752 REPORT DEFINES CERTAIN CATEGORIES IN RELATION OF THE PPD AND PMV VALUES:						
CATEGORY	GLOBAL THERMAL CONDITION OF THE INDIVIDUAL		LOCAL THERMAL DISCOMFORT			
	PPD	PMV	Percentage of dissatisfied persons due to draughts (Draught Rate) [%]	Vertical air temperature gradient [%]	Warm or cold floor [%]	Radiant asymmetry [%]
A	< 6	- 0.2 < PMV < + 0.2	< 15	< 3	< 10	< 5
B	< 10	- 0.5 < PMV < + 0.5	< 20	< 5	< 10	< 5
C	< 15	- 0.7 < PMV < + 0.7	< 25	< 10	< 15	< 10





- COMFORT
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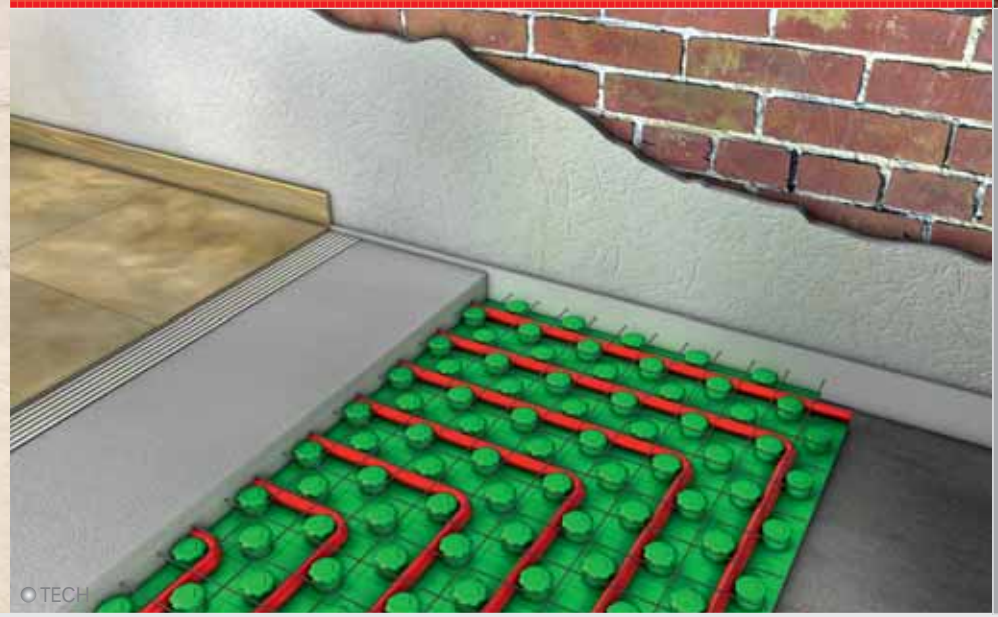

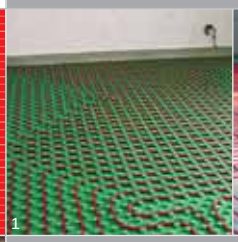

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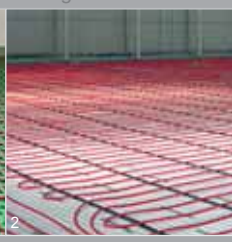


2

1 ▸ Installation with preformed panel

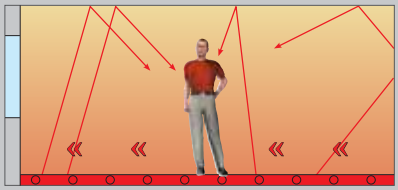
2 ▸ Industrial installation with flat panel and pipe-blocking track

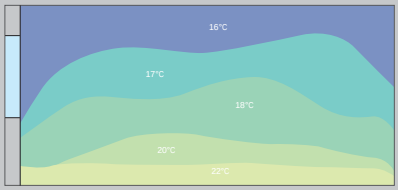
IT IS POSSIBLE TO ESTABLISH SOME REFERENCE VALUES FOR OPERATING TEMPERATURE AND VENTILATION IN CERTAIN TYPES OF APPLICATION IN ACCORDANCE WITH CR 1752 AND ISO/DIS 7730:

TYPE OF BUILDING	FIELD OF ACTIVITY PERFORMED [MET]	CAPACITY [persons/m²]	CATEGORY	OPERATING TEMPERATURE [°C]		MAXIMUM SPEED OF AIR IN THE ENVIRONMENT [m/s]		VENTILATION [m/s]	
				Summer	Winter	Summer	Winter	Basic	Value to be added in case of smokers
Individual office	1.2	0.1	A B C	24.5±1.0 24.5±1.5 24.5±2.5	22±1.0 22±2.0 22±3.0	0.18 0.22 0.25	0.15 0.18 0.21	2.0 1.4 0.8	- - -
"Open space"	1.2	0.07	A B C	24.5±1.0 24.5±1.5 24.5±2.5	22±1.0 22±2.0 22±3.0	0.18 0.22 0.25	0.15 0.18 0.21	2.0 1.4 0.8	- - -
Conference room	1.2	0.5	A B C	24.5±1.0 24.5±1.5 24.5±2.5	22±1.0 22±2.0 22±3.0	0.18 0.22 0.25	0.15 0.18 0.21	2.0 1.4 0.8	- - -

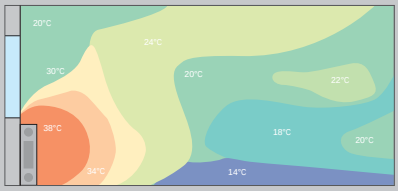
In this way, draughts causing significant and harmful temperature changes in our body are completely eliminated. In addition, by eliminating air movement we also remove any rustling, turbulence and dust moving around the rooms. With radiator systems, on the other hand, you always have moving air, since they are convector and not radiant systems.

The temperature actually perceived by our body is not just that of the air, but an average between the latter and the mean radiating from the surfaces surrounding us, as you can easily observe in the following graphs.





Distribution of heat with radiant floors



Distribution of heat with radiators

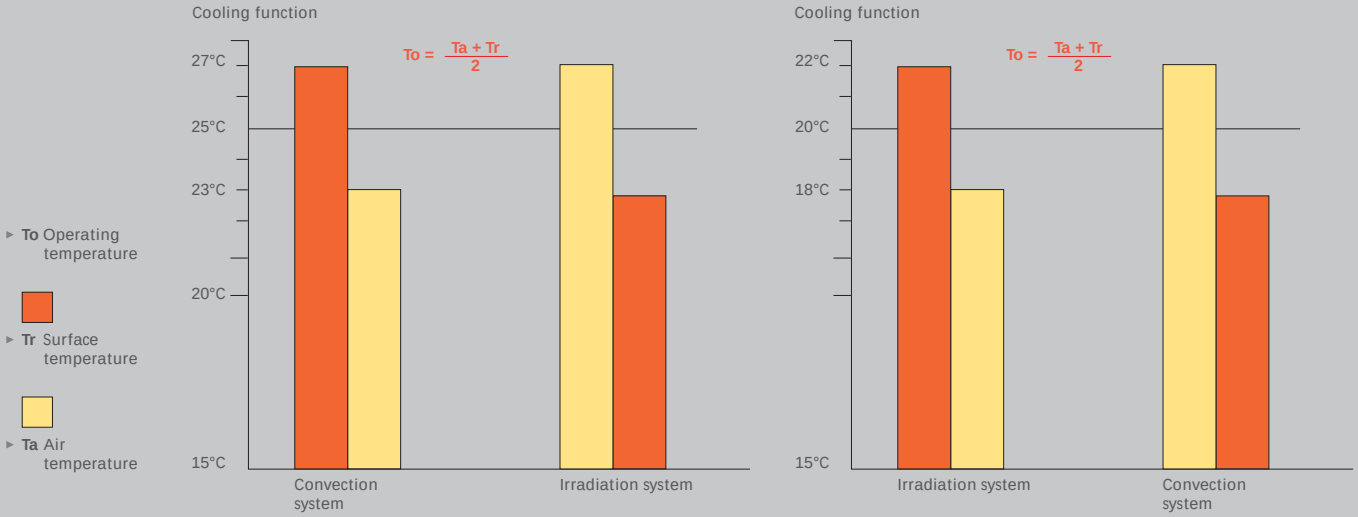
Since the floor proves to be an ample radiant surface, with this system it is possible to keep the air temperature lower while maintaining the same feeling of comfort. With a lower air temperature, in addition to improving its quality we can avoid the feeling of heaviness that sometimes oppresses us when entering an overheated environment.

Having a vast surface which heats with low water temperature means practically no air convector movement, as well as reducing the dryness of the air in the ambient. Furthermore this innovative technology avoids excessively high floor temperature which causes problems of poor blood circulation and leg swelling, as witnessed in the ‘50s and ‘60s installations. With this system a natural well-being is achieved, avoiding stratification of heating with great, useless heat dispersion upwards, as is the case with the traditional systems.

Energy saving

The Giacoklima underfloor system ensures intense well-being exploiting a lower temperature: the floor itself becomes an entire radiating surface and it is therefore possible for the user to obtain the same feeling of comfort maintaining the air temperature about 2 degrees lower. As a result there is less heating dispersion from the environment outwards and consequently an extremely interesting energy saving, conforming with recent regulations in this sector.

The Giacoklima system avoids stratification of heat on the ceiling, as happens with traditional installations, providing a feeling of well-being at standing height. In particularly tall buildings, such as churches for example, the advantages of the Giacoklima underfloor system are immediately noticeable since the heating or cooling is provided in the low region



of the environment and is therefore directly perceived by the human body.
Such low water supply temperatures therefore consent significant energy saving, as well as allowing the use of energy sources the performance of which improves when the temperature drops, such as solar panels, condensing boilers, heating pumps.

Aesthetic advantages: no heaters in the environment

This system allows to decorate premises in complete freedom, since there are no radiators occupying surfaces which would otherwise never be used. Nowadays living space flexibility represents a must, just as much as furnishing does: with the Giacoklima underfloor system there is no limit to creativity in furniture arrangement, and the aesthetic problems caused by unsightly radiators are ruled out.
The Giacoklima system is also successfully used in buildings of historical and religious importance, where it is almost impossible to have radiators in sight: with this system the ambient remains aesthetically unaltered, thereby guaranteeing an impeccable look. Another significant aesthetic advantage of the underfloor system is the absence of the so-called “fireplace effect” on the walls behind the radiators, thus avoiding the need to frequently redecorate the rooms.

Acoustic insulation

The low speed of the water circulating inside pipes made of synthetic material guarantees functioning in absolute silence. Furthermore the insulation panel has an important soundproofing purpose, since it absorbs noises between the various living storeys. The Giacomini insulation panels are in polystyrene foam with steam barrier, which is able to absorb treading noises on the floors.

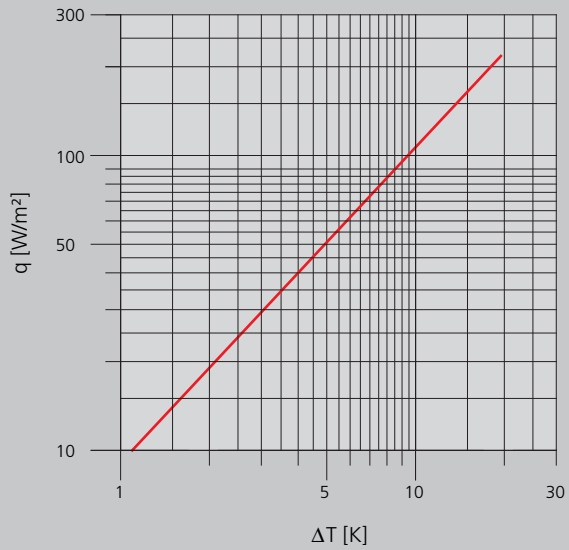
Duration in time

The Giacomini polystyrene foam insulation panels have an unlimited duration thanks to their closed-cell cellular composition which ensures that the product's characteristics remain unaltered when subjected to stress deriving from operational or environmental factors.

The Giacoklima system, moreover, does not require constant maintenance since it does not include mechanical parts subjected to wear or filters needing periodical cleaning.



Basic characteristic curve



UNI EN 1264

The European norm, applied in Italy as UNI EN 1264, which is divided in 4 parts, provides the basis for the calculation, design and installation of underfloor heating systems. UNI EN 1264-3 establishes the limits of floor surface temperatures: these limits are recognized as physiologically safe for the human being and are equal to 29°C for the living area, 35°C for peripheral areas and 33°C for bathrooms (ΔT=9 K). Corresponding to these temperatures there are limit characteristic curves of application which relate the mean temperature difference between air and water to the thermal emission of the floor, based on the Rλ,B thermal resistance of the floor. UNI EN 1264-2 provides the guidelines for the calculation of the output of an underfloor radiant system, specifically: $q = 8{,}92 \cdot (\theta_{f,m} - \theta_i)^{1.1}$

where: q= heat flow density [W/m²]

$\theta_{f,m}$ = mean temperature of floor surface [°C]

θ_i = nominal room temperature [°C]

$\theta_{f,m} - \theta_i = \Delta T$

Therefore, if we consider the various areas of application mentioned above, for example:

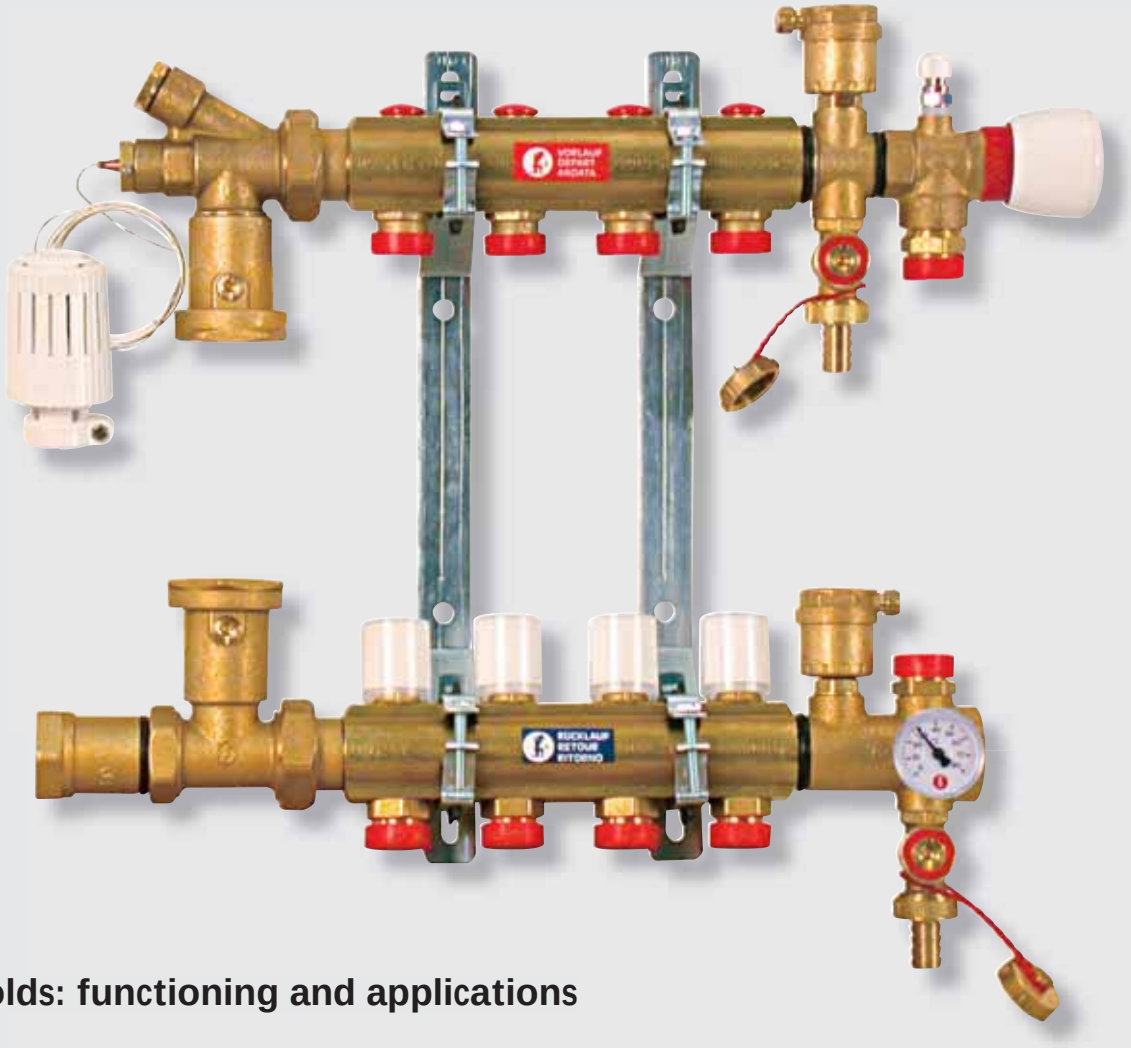
living areas: $\theta_{f,m}$ = 29°C , θ_i = 20°C → q = 100 W/m²

peripheral areas: $\theta_{f,m}$ = 35°C , θ_i = 20°C → q ≈ 175 W/m²

bathrooms: $\theta_{f,m}$ = 33°C , θ_i = 24°C → q = 100 W/m²



Components



Manifolds: functioning and applications

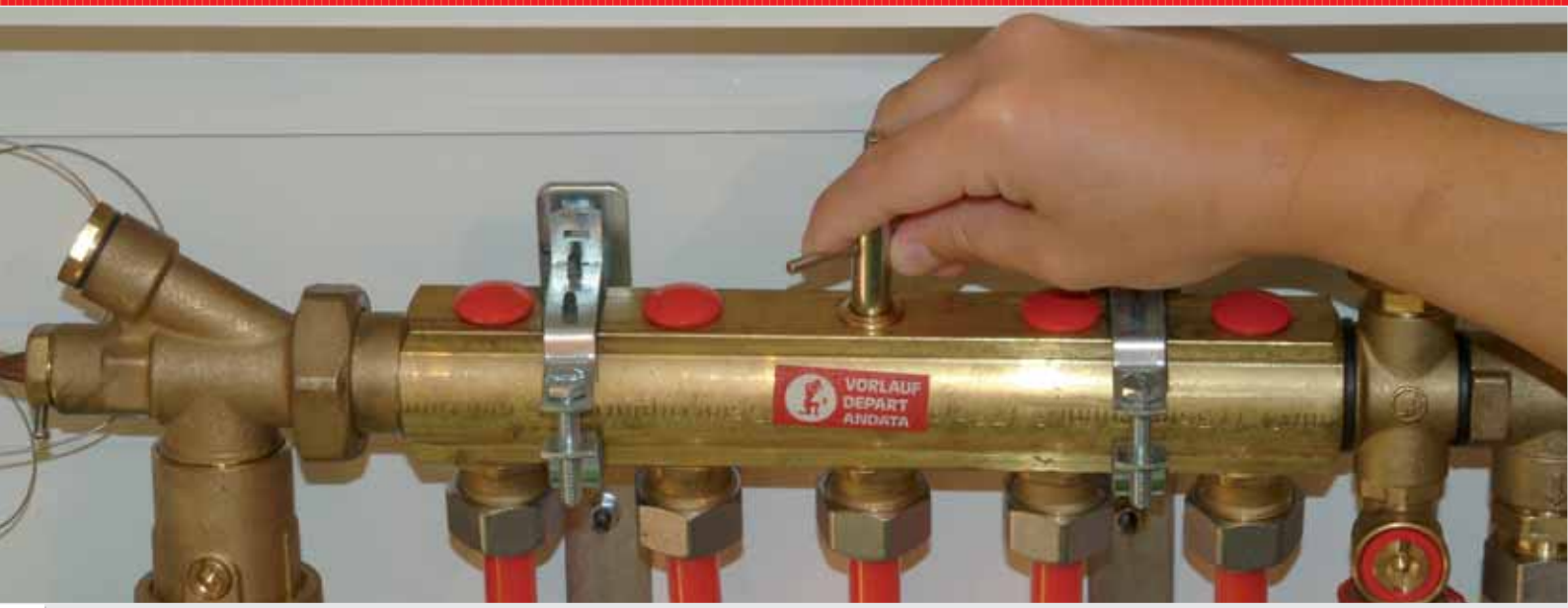
R557

The R557 mixing and regulation group consents the distribution of the low temperature water into the fixed point secondary circuit, drawing from a primary circuit with higher temperature, necessary for thermal actuators, towel dryers or boilers. This system is installed in applications where a cooling function is not foreseen and in which the installation of an electronic control unit is not justified.

The R557 preassembled manifold consists of:

- one R553S flow manifold equipped with regulation lockshields with mechanical memory
- one R553V return manifold with integrated thermostatic valves
- two R588L adjustable metal supports
- one R462L, temperature limiting thermostatic head with 20÷70 °C range
- two R554D and R554A intermediate fitting with drain tap

The R553S supply manifold includes a drawn brass bar in special alloy which incorporates, for each circuit, a regulation lockshield with mechanical memory which allows the assessment and maintenance of the gauging position of individual circuits, even in case of total interception. The mechanical memory consists of a special ring, regulated by the R558 key, allowing to limit maximum opening of lockshields at a chosen value in the balancing phase. In order to effect the regulation, proceed with complete opening of mechanical memory using the screwdriver end of the R558 key; then, using the hexagonal part of the same key, proceed with opening the lockshield until the required opening is achieved. Now proceed with the closing of the mechanical memory by using the screwdriver end of the R558 key.



The R553V return manifold has integrated thermostatic valves which consent the manual regulation and closing of the circuits. The automatic temperature control of the single rooms is possible by installing electrical actuators of the normally closed type (R473/R473M series) or of the normally open type (R478/R478M series) or R463 thermostatic controls equipped with capillary pipe and remote control.Assembly of the actuators takes place by unlocking the micrometric handwheels on the manifolds and releasing the valve connection.

Fixed point functioning is determined by a thermostatic head which is pre-set at a certain temperature in the flow of the radiant system. A differential valve is also mounted on the unit, which avoids sudden pressure changes induced by the closing of the electrical actuators.

TECHNICAL DATA	
Maximum water temperature	110°C
Maximum installation pressure	10 bar (1 MPa)

Head position	*	1	2	3	4	5	F.O.
T [°C]	20	25	34	45	56	67	70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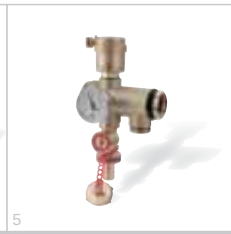
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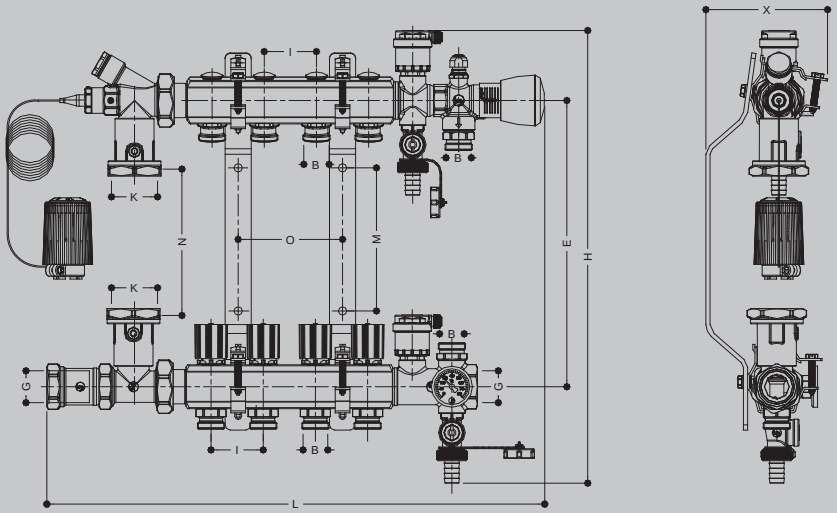
Overall size and dimensions



TECH

1 ▸ R553S: Bar manifold with lockshields provided with mechanical memory

2 ▸ R553V: Bar manifold with integrated thermostatic valves

3 ▸ R588L: Adjustable metal brackets

4 ▸ R462L: Thermostatic head with liquid distance sensor

5 ▸ R554D: Intermediate fitting with automatic air vent, drain, thermometer and self-sealing

6 ▸ R554A: Intermediate fitting with automatic air vent and drain with self-sealing

7 ▸ R558: Lockshields regulation key

INFO

R557-R557F	1”x18 - 1”x3/4”E
G	1”F
B	18 - 3/4”E
I	50
K	1”1/2
H	433-473
E	274-314
M	137
N	130-180
X	116,6

Outlets	2	3	4	5	6	7	8	9	10	11	12
O	/	/	100	150	200	250	300	350	400	450	500
L	377	427	477	527	577	627	677	727	777	827	877
suggested (*) cabinet R500, R501, R502,R509	R557Y051						R557Y052				

* considering the overall dimensions due to the valve with thermostatic option and the lockshield valve

R557R

Following the great success obtained over the years by the R557 manifold, Giacomini has developed the new pre-assembled and pre-wired R557R unit, which still consists of a set point regulation system, for heating installations only, but already offers the possibility of a mixed system inside the same cabinet, i.e. the simultaneous installation of heating actuators with high-temperature supply (heating appliances, towel dryers or radiators) and radiant panel circuits to be supplied with low temperature water. The new R557R unit is supplied pre-assembled and pre-wired with circulator and safety thermostat (K373) in the cabinet, as in the case of the R559 set, which makes it easy and practical to install. All hydraulic components within the pre-assembled R557R set are pre-assembled too.
The part of the R557R unit which is destined to the high temperature radiators consists of two bar manifolds, one flow and one return, and 2 or 3 connections according to the number of circuits for the panel installation.

The part of the R557R unit dedicated to the panel installation consists of:

- one R553M flow manifold equipped with flow meter (0,5-5 l/min) and regulation lockshields with mechanical memory
- one R553V return manifold with integrated thermostatic valves

The R553M supply manifold consists of a drawn brass bar in special alloy which incorporates, for each slot, a balancing lockshield with mechanical memory which consents the assessment and maintenance of the gauging position in the single circuits, even in case of total interception. The mechanical memory consists of a special ring, adjustable with the R558 key, allowing to limit maximum opening of the lockshield to the value chosen in the balancing phase. In order to make the results obtained with the regulation immediately visible, a flow meter is also provided with a graduation scale of 0,5-5 l/min (30-300 l/h). In order to proceed with the regulation, open the mechanical memory completely, using the screwdriver end of the R558 key; then use the hexagonal end of the same key to open the lockshield until the desired opening is achieved. Finally close the mechanical memory by using the screwdriver end of the R558 key.


1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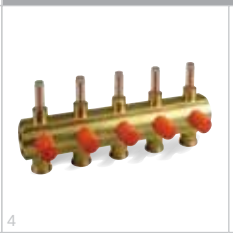
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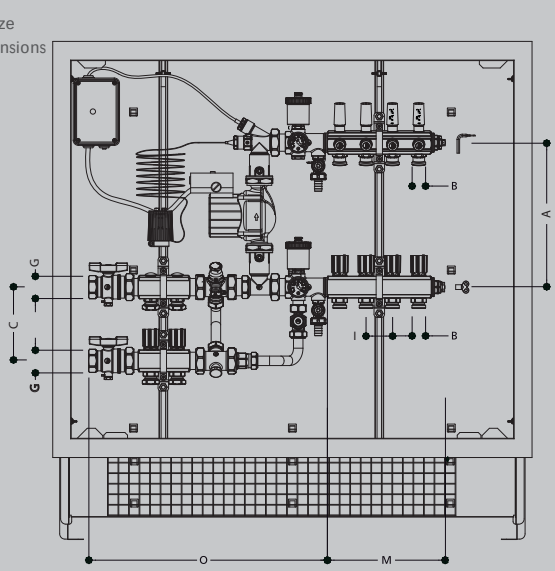
Overall size
and dimensions



1 ▸ R473: normally closed type electrical head

2 ▸ R478: normally open type electrical head

3 ▸ R179: synthetic pipe adaptor

4 ▸ R553M: Bar manifold with flow meter

5 ▸ R553V: Bar manifold with integrated thermostatic valves

TECH

INFO

R557R	1”x18 - 1”x3/4”E
G	1”
B	18-3/4”E
C1	140
I	50
C2	275
Hu	720
H	790
Hmax	930-1030
P	150-180

The R553V return manifold is provided with integrated thermostatic interception valves which allow the manual opening or closing of the circuits. The automatic temperature control in the single rooms can be obtained by installing electrical actuators of the normally closed type (R473/R473M series) or of the normally open type (R478/R478M series) or R463 thermostatic remote controls. The R557R unit is already provided with an electronic pump, but the installation of electrical actuators with end stroke microswitches is nevertheless recommended (R473M and R478M series) for on/off control of the circulator. The assembly of the actuators is effected by unblocking the micrometric handwheel on the manifolds and releasing the valve connection.

Outlets	3	4	5	6	7	8	9	10	11	12
Radiator outlets	2			3						
Lu	850			1000			1200			
L	920			1070			1270			

TECHNICAL DATA	
Maximum water temperature	110°C
Maximum installation pressure	10 bar (1 MPa)

Head position	*	1	2	3	4	5	T.A.
T [°C]	20	25	34	45	56	67	70

R553D

The R553D manifold belongs to the pre-assembled family: it ensures fine regulation thanks to the possibility of balancing the circuits by means of regulating lockshields on the supply and integrated thermostatic valves on the return.

The R553D pre-assembled manifold consists of:

- one R553S flow manifold equipped with regulation lockshields with mechanical memory
- one R553V return manifold with integrated thermostatic valves
- two R588 offset brackets to facilitate pipe connection
- a set of stickers to identify the circuits

The R553S supply manifold consists of a drawn brass bar in special alloy which incorporates, for each circuit, a balancing lockshield with mechanical memory consenting the assessment and maintenance of the gauging position in the single circuits, even in case of total interception. The mechanical memory consists of a special ring, regulated by the R558 key, allowing to limit the maximum opening of the lockshield at the value chosen in the balancing phase.

To proceed with the regulation, open the mechanical memory completely, using the screwdriver end of the R558 key; then use the hexagonal part of the same key to open the lockshield until the required opening is achieved. Finally close the mechanical memory by using the screwdriver end of the R558 key.

The R553V return manifold features micrometric thermostatic interception valves which consent the manual regulation and closing of the circuits. Automatic temperature control in the single rooms is possible by installing electrical actuators of the normally closed type (R473/R473M series) or of the normally open type (R478/R478M series) or R463 thermostatic type controls equipped with capillary pipe and remote control. The assembly of the actuators takes place by unblocking the micrometric handwheel mounted on the manifolds and releasing the valve connection.

TECHNICAL DATA	
Maximum water temperature	110°C
Maximum installation pressure	10 bar (1 MPa)


1


2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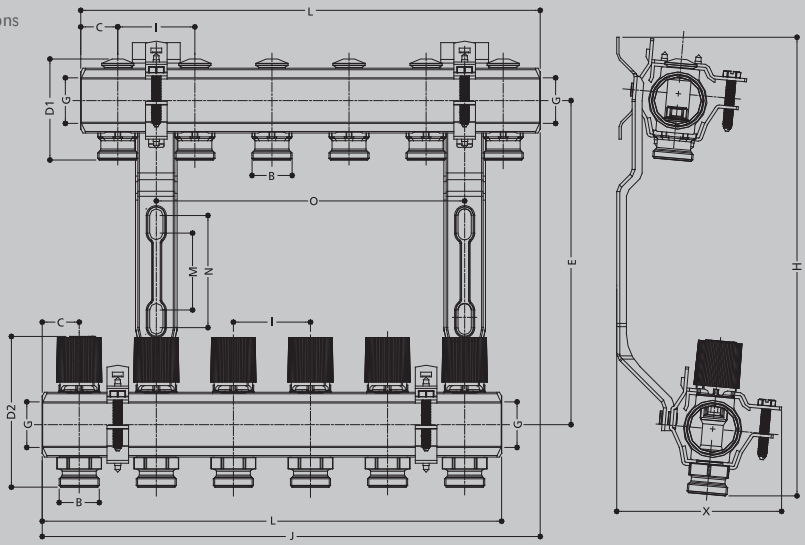
4


5

Overall size and dimensions



1 ▸ R553S: Bar manifold with lockshields complete with mechanical memory

2 ▸ R553V: Bar manifold with thermostatic valves

3 ▸ R473: Normally closed electrical head

4 ▸ R478: Normally open thermostatic head

5 ▸ R500: Stove-enamelled built-in cabinet

TECH

INFO

R553D	1”x18 - 1”x3/4”E	1”1/4 x18 - 1”1/4 x3/4”E
G	1”F	1”1/4F
B	18 - 3/4”E	18 - 3/4”E
I	50	50
C	24	24
D1	66	75
D2	96 ÷ 101	110 ÷ 115
E	213	213
M	50	50
N	73	73
X	108	108
H	249	249

Outlets	2	3	4	5	6	7	8	9	10	11	12
L	98	148	198	248	298	348	398	448	498	548	598
O	/	/	100	150	200	250	300	350	400	450	500
J	123	173	223	273	323	373	423	473	523	573	623
suggested (*) cabinet R500, R501, R502,R509	typeA	typeA	typeB	typeB	typeB	typeB	typeC	typeC	typeC	typeD	typeD

* considering the overall dimensions due to the valve with thermostatic option and the lockshield valve

R553F

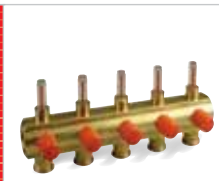
One of the problems encountered to achieve adequate domestic comfort, whether equipped with a radiant panel system or radiator system, is the correct balancing of the supply circuits. It is essential that the installer be able to rapidly proceed with the balancing of each adduction circuit, based on the project's specifications, thereby guaranteeing the required flow. In order to meet these requirements, Giacomini has developed the pre-assembled R553F manifold, equipped with flow meter and fine regulation: with this product it is immediately possible for the installer to check the effectiveness of his regulation, thus greatly reducing potential errors.

The pre-assembled R553F manifold consists of:

- one R553M flow manifold complete with flow meter (0,5-5 l/min) and regulation lockshield with mechanical memory
- one R553V return manifold with thermostatic valves
- two R588 offset brackets to facilitate tubing connection
- a set of stickers to identify the circuits.

The R553M flow manifold consists of a drawn brass bar in special alloy which incorporates, for each circuit, a balancing lockshield with mechanical memory, allowing for the assessment and maintenance of the gauging position in the single circuits, even in case of total interception. The mechanical memory consists of a special ring, regulated with the R558 key, allowing to limit maximum opening of the lockshield to the value established in the balancing phase. In order to see the results obtained with the regulation immediately, a flow meter with graduation scale of 0,5-5 l/min (30-300 l/h) is also provided. .

TECHNICAL DATA	
Maximum water temperature	110°C
Maximum installation pressure	10 bar (1 MPa)


1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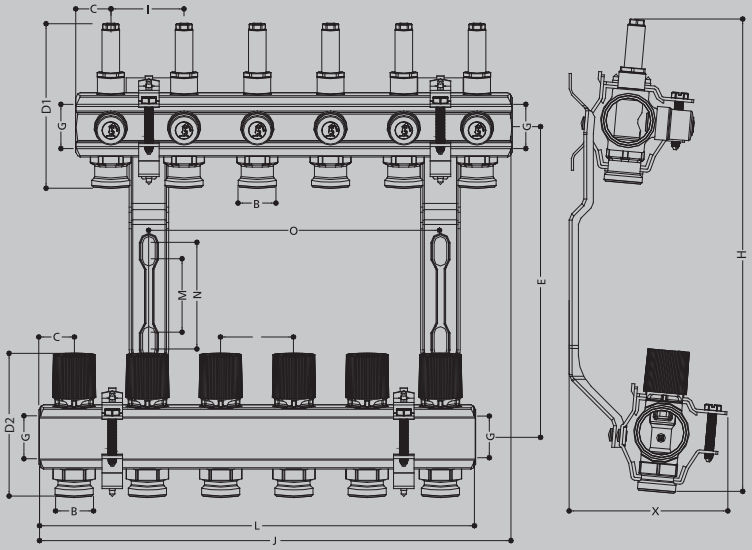
3


4


5

Overall size and dimensions



1 ▸ R553M: Bar manifold with flow meters

2 ▸ R553V: Bar manifold with thermostatic valves

3 ▸ R473: Normally closed electrical head

4 ▸ R478: Normally open electrical head

5 ▸ R500: Stove-enamelled built-in cabinet

TECH

INFO

R553F	1"x18 - 1"x3/4"E
G	1"F
B	18 - 3/4"E
I	50
C	24
D1	112
D2	96 ÷ 101
E	213
M	50
N	73
X	108
H	323

To proceed with the regulation, open the mechanical memory completely, using the screwdriver end of the R558 key; then use the hexagonal part of the same key to open the lockshield until the required opening is achieved. Finally close the mechanical memory by using the screwdriver end of the R558 key.

The R553V return manifold features micrometric thermostatic interception valves which consent the manual regulation and closing of the circuits. Automatic temperature control in the single rooms is possible by installing electrical actuators of the normally closed type (R473/R473M series) or of the normally open type (R478/R478M series) or R463 thermostatic type controls equipped with capillary pipe and remote control. The assembly of the actuators takes place by unblocking the micrometric handwheel mounted on the manifolds and releasing the valve connection.

Uscite	2	3	4	5	6	7	8	9	10	11	12
L	98	148	198	248	298	348	398	448	498	548	598
O	/	/	100	150	200	250	300	350	400	450	500
J	123	173	223	273	323	373	423	473	523	573	623
suggested (*) cabinet R500, R501, R502,R509	typeA	typeA	typeB	typeB	typeB	typeB	typeC	typeC	typeC	typeD	typeD

* considering the overall dimensions due to the valve with thermostatic option and the lockshield valve

R559

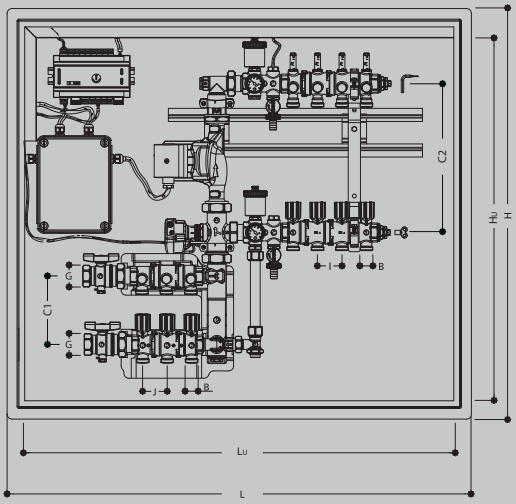
Aside from the performance guaranteed by the R557 described above, Giacomini has achieved an authentic jewel of mechanical and electrothermical technology: the pre-assembled and pre-wired R559 kits for mixed installations. The special attention paid during the production and development phases of the hydraulic and electronic components included in the R559 kits has produced easy to install systems which are able to control mixed installations, featuring a panel section that can also be dedicated to summer chilling.

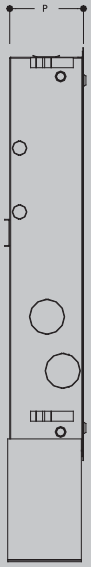
Within the R559 pre-assembled kits all the hydraulic components are pre-assembled; as far as the electronic components are concerned, there are pre-wired parts in the I/O KPM20 unit: the circulator, the K280 actuator for the R298 mixing valve, the transformer, the K363P sensor for controlling the flow temperature and the optional K363P sensor for controlling the return temperature. Therefore the following remain to be wired: the R478X105 or R473X105 electrical heads (to be ordered separately), the BUS thermostats, the optional K365P sensor for metering outside temperature in case climatic compensation is envisaged. If the installation is also expected to be used for summer cooling, it will be necessary to wire the K366A dew point sensor, too.


1


2


3





Overall size and dimensions

TECH

1 ▸ R473: Normally closed electrical head

2 ▸ K363P: Passive type flow temperature sensor

3 ▸ KPM20: Regulating control unit for Giacoklima installations

INFO

R559	1”x18 - 1”x3/4”E
G	1”
B	18-3/4”E
C1	140
I	50
C2	305
Hu	800
H	840
P	150-180

Outlets	4	5	6	7	8	9	10	11	12
Radiator outlets	3								
Lu	910					1210			
L	950					1250			

The R559 unit is available in three versions which differ from the point of view of primary regulation method:

R559A: fixed point regulation with adjustable set

The flow temperature is regulated by means of a PI (proportionate/integral) regulator: the required temperature can be set by means of the rotating potentiometer placed on the front of the I/O KPM20 unit according to the 20....80°C scale (heating mode) or 15....30°C (cooling mode).

R559B: regulation with climatic compensation

The flow temperature is regulated by means of the PI regulator but the required value automatically varies in accordance with a preconfigured compensation curve. In the case of heating and cooling installations the I/O KPM20 unit uses differentiated compensation curves. The temperature value set by means of the rotating power gauge placed on the front of the I/O KPM20 unit, in this case, represents the maximum flow temperature at the most severe external conditions.

TECHNICAL DATA
From 4 to 12 low temperature circuits for radiant panel installation
3 high temperature connections for heating actuators (radiators, towel dryers, etc.)
Low temperature mixing set with 3-way mixing valve
WILO circulator with manual 3-speed selector: Mod. RS25/6 for R559.../4 to R559/8 kits - Mod. RS25/7 for da R559.../9 to R559/12 kits
Supply 230V ~ ±10%
Connection via bus to other Giacomini regulation devices
3 high temperature connections for heaters (radiators, towel dryers, etc.)
Set point low temperature flow thermal regulation, with climatic compensation or with climatic compensation and temperature differential monitoring
Used with 24V ~ N.C. R473X105 or N.O. R478X105 electrical actuators
Connection with max 4 K366A dew point sensors
Preconfigured I/O KPM20 unit

Modular manifolds (R53SM/ST + R53VM/VT, R53MM/MT + R53VM/VT)

The push-fit modular manifolds represent an extremely versatile solution which allow the realization of manifolds characterized by a multiple number of connections and high water capacity, according to the site's requirements, in a very short time. The innovative aspects which characterize the Giacomini modular manifolds are:

- reliability and labour saving:
  The installation of the Giacomini modular manifolds does not require the use of tools or of additional means of support, since they are supplied with pre-lubricated sealing rings which guarantee excellent reliability;
- versatility
  the Giacomini range of modular manifolds is complete and flexible, since they can be installed both in sanitary and in heating system. The modules are available with connections both for adaptors (for copper, plastic and multilayer tubing) and for push-fitting connections (for copper and plastic pipes);
- storage economy:
  the innovative solution of the single module limits the coding of store supplies to just two codes, making work easier both for the distributors and for the plumbers themselves and reducing the expenses required for storage management: it is possible to compose manifolds with connections from 2 to N with just two codes.

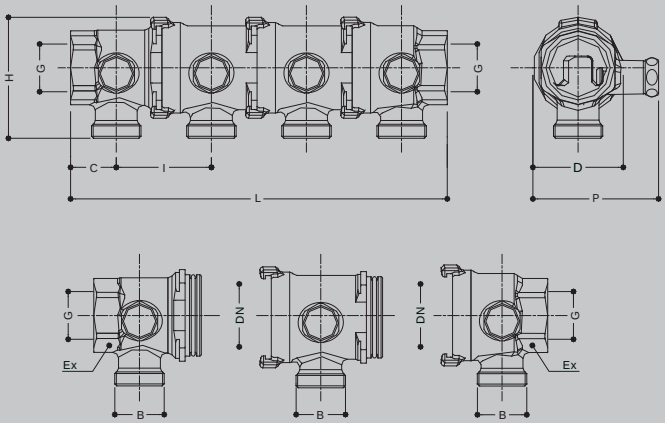
AVAILABLE VERSIONS	
R53SM/ST	Push-fit modular manifolds with balancing lockshields (DN32, 18 BASE or EUROCONE adapter connection)
R53VM/VT	Push-fit modular manifolds with thermostatic valve (DN32, 18 BASE or EUROCONE adapter connection)
R53MM/MT	Push-fit modular manifolds with flow meter (DN32, 18 BASE or EUROCONE adapter connection)


1


2


3

Overall size and Dimensions



1 ▸ R53MM/MT: Push-fit modular manifolds with flow meters and balancing lockshields

2 ▸ R53SM/ST: Push-fit modular manifolds with balancing lockshields

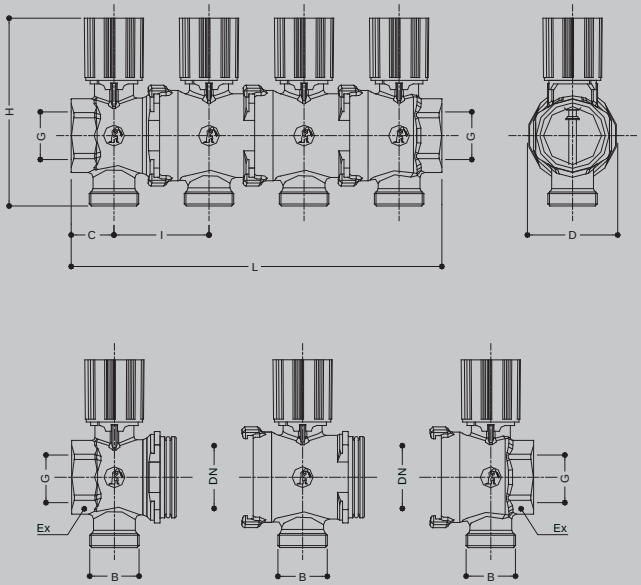
3 ▸ R53VM/VT: Push-fit modular manifolds with thermostatic valve

TECH

INFO

R53SM/ST			
		1”xDN32x18 1”xDN32x3/4”E	1”1/4xDN32x18 1”1/4xDN32x3/4”E
	G	1”	1”1/4
	B	18 - 3/4”E	18 - 3/4”E
	Ex	39	48
	I	50	50
	C	24	27
	D	48	48
	DN	32	32
	H	64	64
	P	66	66
OUTLETS		L	L
2		98	104
3		148	154
4		198	204
5		248	254
6		298	304
7		348	354
8		398	404
9		448	454
10		498	504
11		548	554
12		598	604

Overall size and Dimensions



TECH

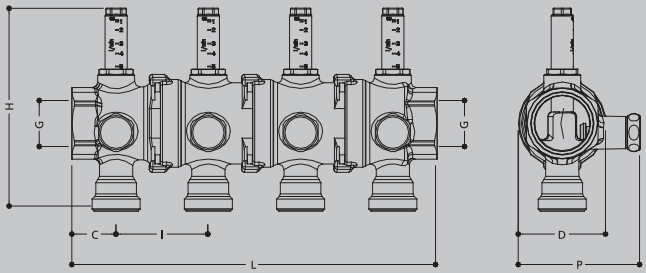
R53VM/VT			
		1”xDN32x18 1”xDN32x3/4”E	1”1/4xDN32x18 1”1/4xDN32x3/4”E
	G	1”	1”1/4
	B	18 - 3/4”E	18 - 3/4”E
	Ex	39	48
	I	50	50
	C	23	27
	D	48	48
	DN	32	32
	H	100	100
OUTLETS		L	L
2		95	104
3		145	154
4		195	204
5		245	254
6		295	304
7		345	354
8		395	404
9		445	454
10		495	504
11		545	554
12		595	604

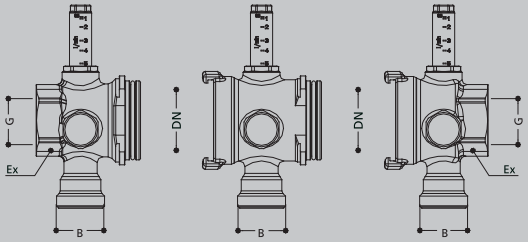
R53MM/MT			
		1”xDN32x18 1”xDN32x3/4”E	1”1/4xDN32x18 1”1/4xDN32x3/4”E
	G	1”	1”1/4
	B	18 - 3/4”E	18 - 3/4”E
	Ex	39	48
	I	50	50
	C	24	27
	D	48	48
	DN	32	32
	H	108	108
	P	66	66
OUTLETS		L	L
2		98	104
3		148	154
4		198	204
5		248	254
6		298	304
7		348	354
8		398	404
9		448	454
10		498	504
11		548	554
12		598	604


1


2


3





1 ▸ R53VM/VT: Push-fit modular manifolds with thermostatic valve

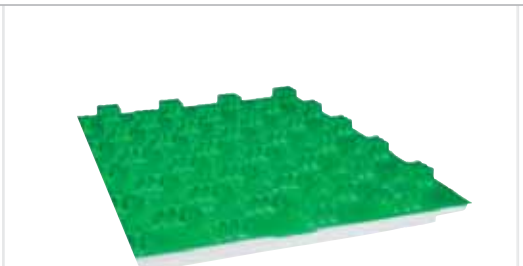
2 ▸ R53SM/ST: Push-fit modular manifolds with balancing lockshields

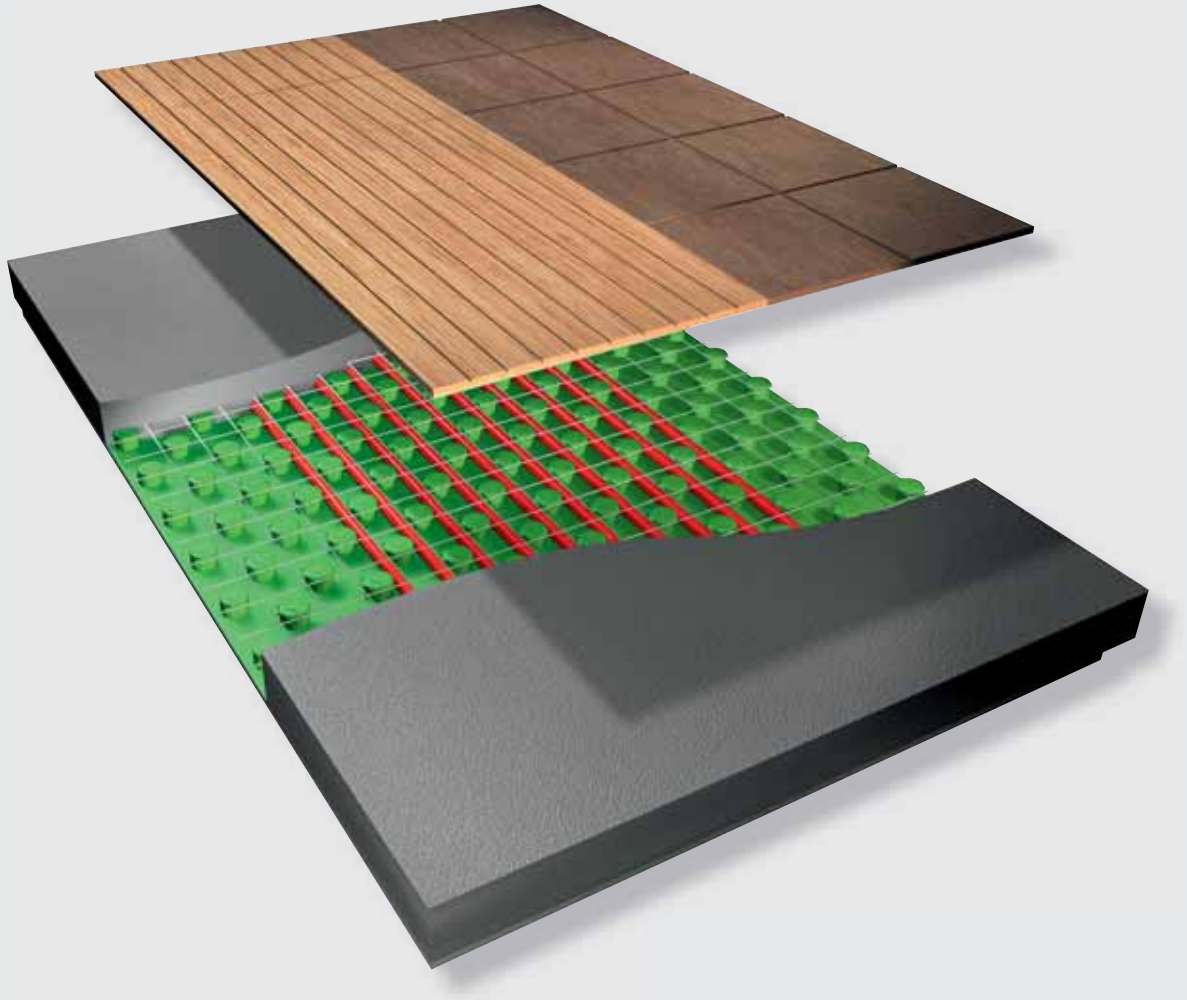
3 ▸ R53MM/MT: Push-fit modular manifolds with flow meters and balancing lockshields

INFO

Insulation panels

The Giacomini insulation panels, used for tubing insulation support in underfloor heating and cooling installations, are fundamental in the realization of modern and functional installations, since they ensure quick and power-saving heating of the environment, reducing heat dispersion downwards and, in the case of preformed panels, consenting rapid installation since the special mushroom-shaped elements guide the pipe in the circuit layout. Thanks to their characteristics, the insulation panels have given a great quality contribution, revaluing the traditional technique of embedded pipes directly into the floor structure and high temperature water supply, resulting in the total absence of physical discomfort and structural problems typical of old installation techniques. The density of the various types of insulation panels has been accurately chosen in order to obtain a proper compromise between thermal insulation capacity and compactness; furthermore these panels have a sound-absorbing function thanks to which it is possible to limit the annoying transmission of treading noises on the floor. After laying the K369 on the wall insulation (fundamental insulation to eliminate the thermal bridge along the edge and consent a slight floor expansion) one proceeds by laying and joining the panels so that the subsequent rows are staggered. Once the pipe is laid it is advisable to place above the panels an electrowelded net to add rigidity to the screed for a better weight distribution (excessive loads, such as very heavy furniture, could cause crushing). Installations realized in accordance with these guidelines are characterized by significant heating output and rapidly achieved efficiency, thanks to their limited thermal inertia.





R979

The new R979 Giacomini preformed insulation panel is used for tubing insulation in underfloor radiant heating and cooling systems. The R979 panel is realized in accordance with an innovative concept which foresees the coupling of two different items:

1. one preformed polystyrene insulation sheet
2. one surface lining thermoformed polystyrene sheet (thickness 0,6mm).

The combination of these two elements, together with their intrinsic individual qualities, produces a panel the density of which is actually lower than that of a Classic preformed insulation panel, but with decidedly superior characteristics of resistance to deformation caused by treading.

The special configuration of the mushroom-shaped element, with preformed protuberances, enables to firmly secure a wide range of pipe sizes (from 15mm to 18mm dia.)

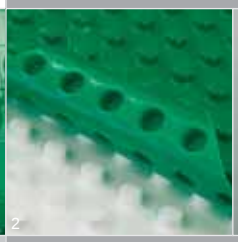
The R979Y005 version, in particular, with total height of 55mm, features an indented finish of the bottom surface which enhances its acoustic insulation function.

The use of the R979 preformed insulation panel consents significant labour saving in laying the pipes, thanks to the special clamp which "catches" the pipe more firmly, and consents the realization of circuits with multiples of 50mm pitches.

The two available thicknesses, with total height of 55mm and 32mm respectively, allow the user to realize underfloor heating and cooling systems in any building site, even when there are space limits, as in the case of restructuring interventions.

All R979 preformed insulation panels are furnished with a very simple and efficient coupling system: the dimensions of the thermoformed polystyrene surface lining element exceed by 50mm (only on two sides) those of the polystyrene insulation layer below. Consequently it is possible to overlap the two protruding edges with the neighbouring panels, guaranteeing reciprocal blockage and easier laying and obtaining a homogenous basis for the pipes without the problem of thermal sources which would otherwise arise by simply joining non-preformed panels.


1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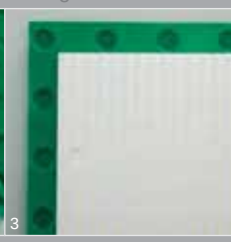
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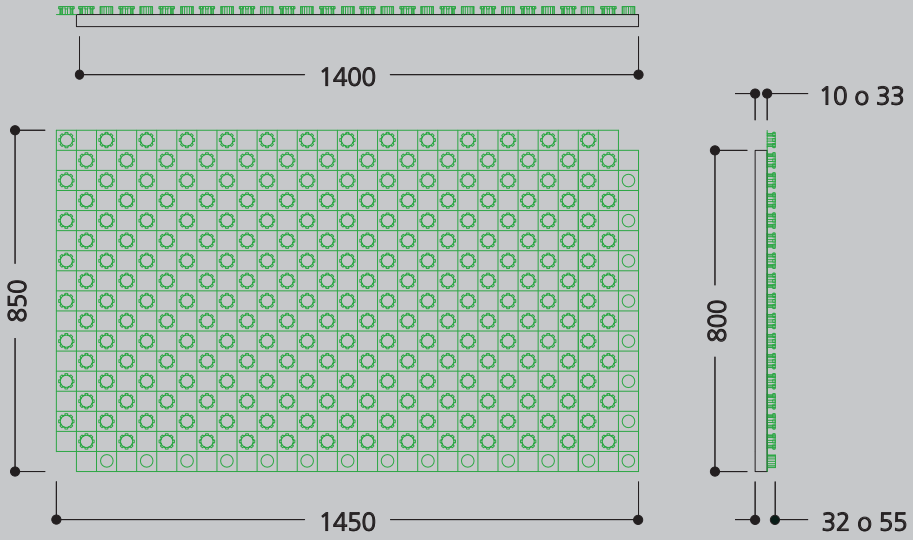


1 ▸ R979: Detail of the panel

2 ▸ R979: Structure

3 ▸ R979: View from below

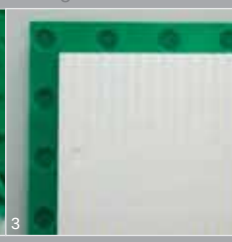
TECHNICAL DATA	
PREFORMED PANEL R979 T50-H32	
Code	R979Y003
Useful dimensions	1400 mm x 800 mm
Useful panel surface	1,12 m²
Panel dimensions	1450 mm x 850 mm
Panel surface	1,23 m²
Total thickness	32 mm - sheet: 10 mm + Clamp: 22 mm
Ideal tubing	Dia.15 mm ÷ 18 mm
Admitted panel pitches	Multiples of 50 mm
Tubing per m²	Pitch 100 mm: 10 m - Pitch 150 mm: 6,67 m
PREFORMED INSULATION PANEL	
Material	Foam polystyrene with steam barrier PS20 (EPS150)
Density	30 Kg/m³
Thermal conductivity	λ=0,035 W/m·K
Thermal resistance	R_λ = 0,286 m²·K/W
Min compression resistance to 10% crushing	150 kPa (1,5 kg/cm²)
Panel class according toDIN4102	B2 (euroClass E)
Classification according to EN13163	EPS – EN13163 – T1 – L1 – W1 – S1 – P3DS(N)5 – DLT(3)5 – BS250 – CS(10)150
STEAM BARRIER	
Material	Thermoformed polystyrene
Thickness	0,6 mm

TECHNICAL DATA	
PREFORMED PANEL R979 T50-H55	
Code	R979Y005
Useful dimensions	1400 mm x 800 mm
Useful panel surface	1,12 m²
Panel dimensions	1450 mm x 850 mm
Panel surface	1,23 m²
Total thickness	55 mm - sheet: 33 mm + clamp: 22 mm
Ideal tubing	15 mm ÷ 18 mm
Admitted panel pitches	Multiples di 50 mm
Tubing per m²	Pitch 100 mm: 10 m - Pitch 150 mm: 6,67 m
PREFORMED INSULATION PANEL	
Material	Foam polystyrene with steam barrier PST – TK 5000
Density	23 Kg/m³
Thermal conductivity	λ=0,040 W/m·K
Thermal resistance	R_λ = 0,825 m²·K/W
Max load capacity (def. 2%)	5,0 kPa
Compression resistance	2 mm
Dynamic rigidity	30 MN/m³
Panel class according to DIN4102	B2 (euroClass E)
Classification according to EN13163	EPS – EN13163 – T4 – L1 – W1 – S1 – P3BS100 – DS(N)5 – SD30 – CP2
STEAM BARRIER	
Material	Thermoformed polystyrene
Thickness	0,6 mm

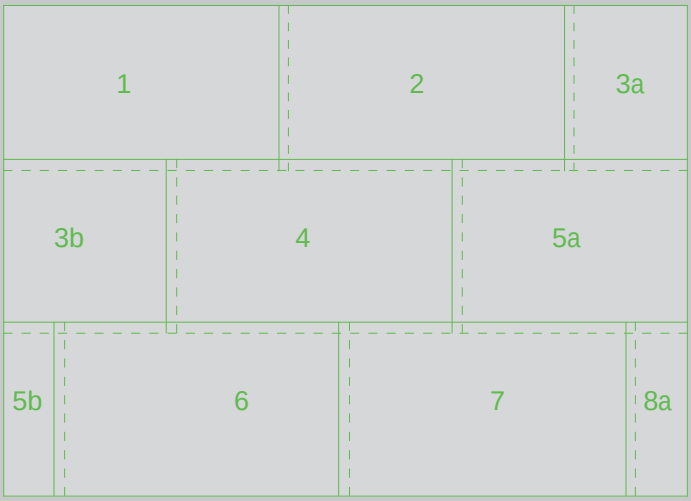
PACKAGING AND DIMENSIONS
Size: T [Pitch (mm)] – h [height (mm)]

CODE	SIZE	NR. OF SHEETS	TOTAL USABLE SURFACE [m²]
R979Y003	T50-H32	12	13,44
R979Y005	T50-H55	6	6,72





Installation plan



1 ▸ R979: Detail of the panel

2 ▸ R979: Structure

3 ▸ R979: View from below

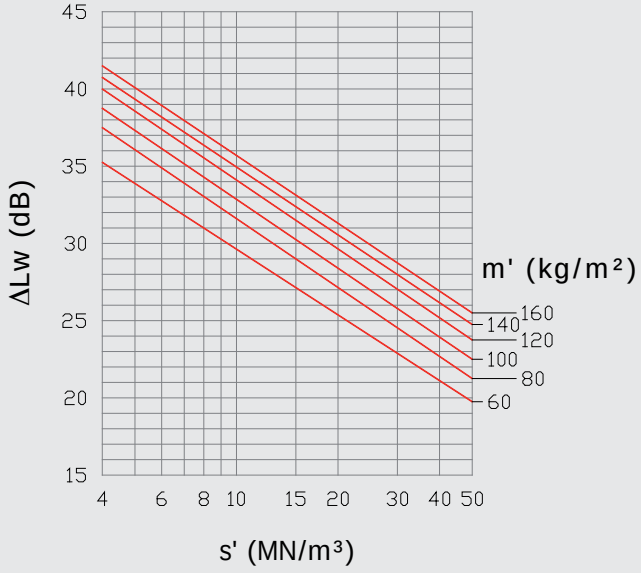
INSTALLATION

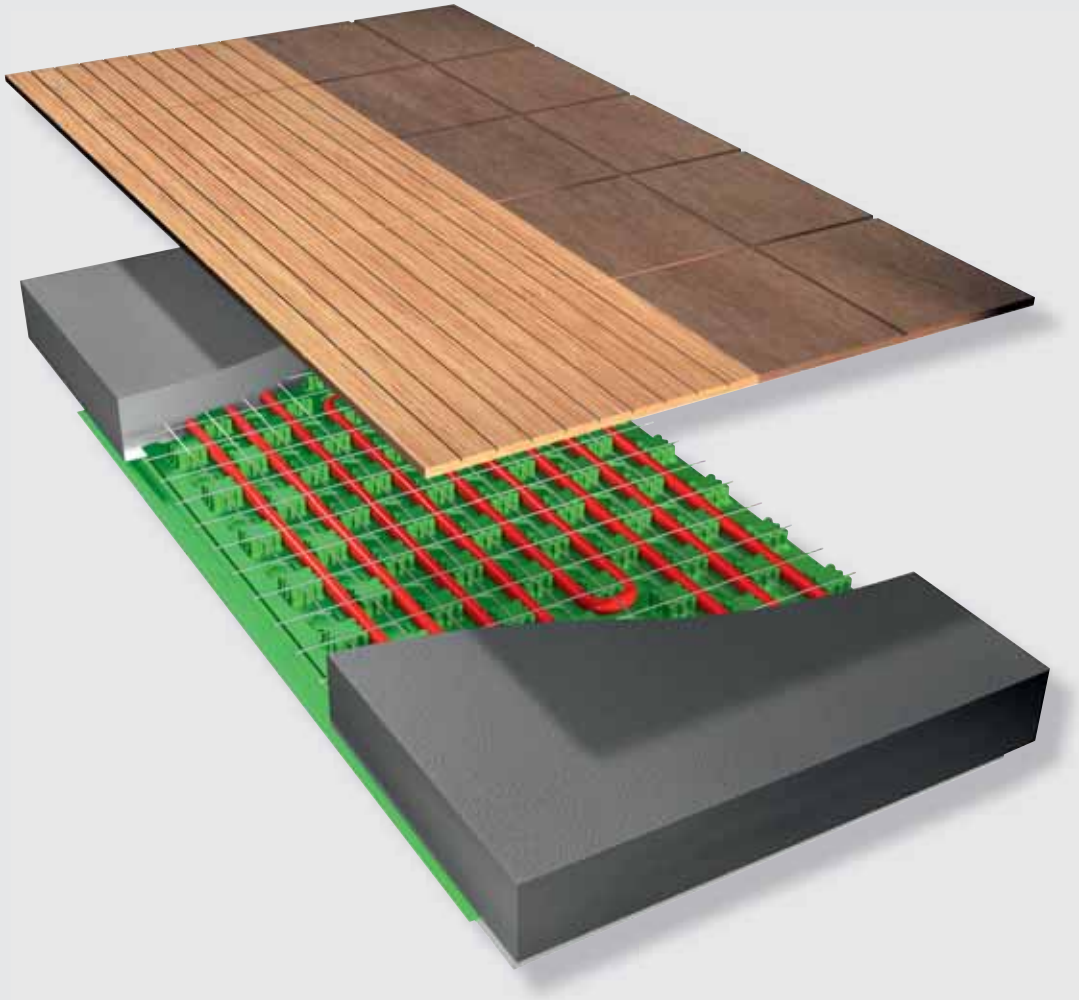
The installation of the R979 insulation panels is a quick and easy operation, thanks to the edges protruding on two sides which allow a perfect joining of the panels.
In order to speed up the installation phase it is always advisable to start from the left-hand corner, as illustrated. The protruding edges will have to be removed from sheet nr. 1 (using a simple cutter) before placing it in the left-hand corner. Sheet nr. 2 will have to be cut only on the long side; the edge on the short side will consent coupling with sheet nr. 1. This operation will have to be repeated on all the sheets of the first row.R979Y003 T50-H32 panels are recommended for use strictly in cases where there are problems with total thickness available for the realization of the radiant floor.
The ideal thickness required for the realization of a radiant panel installation in a home is approx 10÷12cm, 5,5cm of which are taken up by the R979Y005 insulation panel, 3÷4cm are necessary for the screed with solution and 1÷2cm for the superficial finish of the room.

SOUNDPROOFING

The R979 T50 – h55 (R979Y005) preformed insulation panel is characterized by the moulded profile of the bottom surface, a feature which is also a characteristic soundproofing element.
Indeed the R979Y005 panel, EN 13163 conformant, is rated Class SD 30, which implies a dynamic rigidity equal to s' ≤ 30 MN/m³, calculated according to EN13172.

Illustration C1 of the UNI EN 12354-2 (fig. 7) Norm shows how, for an equal mass per surface unit m' of the screed, a limited value of the dynamic rigidity s' determines a higher grade of soundproofing for treading noises ΔLW.

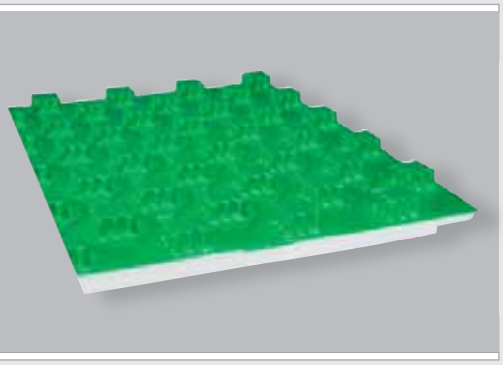


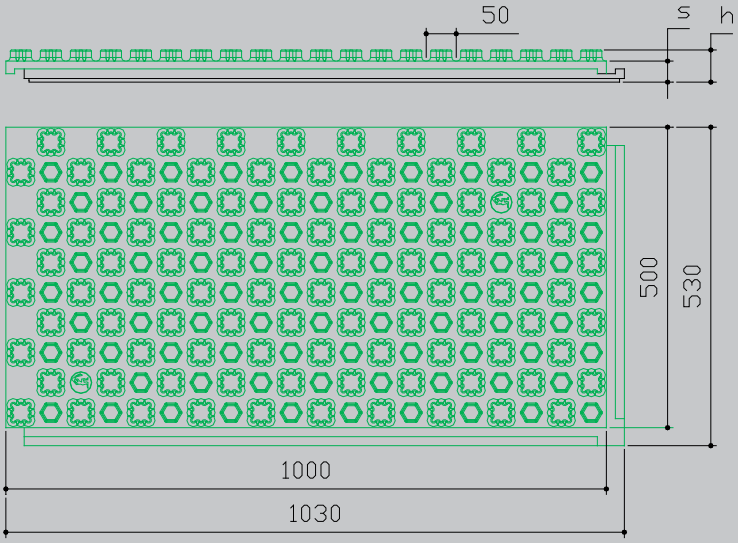


R982Q

The R982Q preshaped panel is used in the underfloor systems as an insulating support for the pipes.
The use of the panel is essential for the installation of a modern and functional system, since it allows to air-condition the rooms rapidly and with reduced power engaged, limiting the mass of radiant structures and reducing the heat dispersions towards the bottom. Using insulating panels the underfloor systems took the lead in terms of quality, with respect to both comfort and energy saving.
The use of preshaped insulating panels in addition allows keeping temperatures of environmental comfort, though limiting the surface temperature of the floor in the terms provided for by the standard EN 1264 (max. 29°C for the sitting room areas), with the consequent absolute absence of physiological discomfort and structural problems typical of the old installation techniques no longer used. Thanks to the contribution of insulating panels the quantities of pipes laid down are reduced, thus limiting thee number of radiant circuits, the circulating water flow rates, the diameters of supply pipes, the heads of circulators and the power engaged, with consequent immediate complex savings and environmental friendly.

1





TECH

1 ▸ R982Q preshaped insulating panel is pre-shaped along the external perimeter with a male-female profile to consent perfect coupling between adjacent elements for easy installation, meanwhile providing a uniform base on which to rest the piping without the problem of thermal bridges.

2 ▸ The layout and geometry of "mushroom shaped elements" determines a lateral accommodating surface, during the installation of pipes that deforms creating a solid and precise seat for radiant circuits. This characteristic allows reducing significantly the use of tube-fastening clamps.

INFO

CHARACTERISTICS

The R982Q preshaped insulating panel, realized in syntherized foam polystyrene (EPS) according to EN 13163 norm, features a coupling with a special 0,4 mm steam barrier in polystyrene (PS). The high thickness of the coating allows in fact obtaining an excellent mechanical resistance of mushroom shaped elements, creating the most appropriate panel density for the characteristics of heat and sound insulation required.

The solutions adopted in the definition of profiles allow a solid and precise coupling between panels, the installation of radiant circuits without using tube fastening clamps, in most of installations, and a good result in the screed with additive, avoiding the formation of air pockets that would inevitably reduce the underfloor system performance. The use of the R982Q preshaped panel allows significant labour saving when installing the piping and consents the neat realization of circuits characterized by 50 mm-multiple pitches (typical of underfloor heating and cooling systems) even in the most difficult plant engineering situations. In the model with total thickness equal to 52 mm, in addition to the function of heat insulation and support for radiant circuits, the improvement of acoustic insulation from walking noise equal to 26 dB is obtained thanks to the SD30 class dynamic stiffness.The model with total thickness equal to 39 mm, instead, grants the opportunity to realize underfloor systems in any building site, even when there are problems of space, as in the case of renovation operations.

SOUNDPROOFING

The R979 T50 – h55 (R979Y005) preshaped insulating panel is characterized by the moulded profile of the bottom surface, a feature which is also a characteristic soundproofing element.
Indeed the R979Y005 panel, EN 13163 conformant, is rated Class SD 30, which implies a dynamic stiffness equal to s' ≤ 30 MN/m³, calculated according to EN13172.

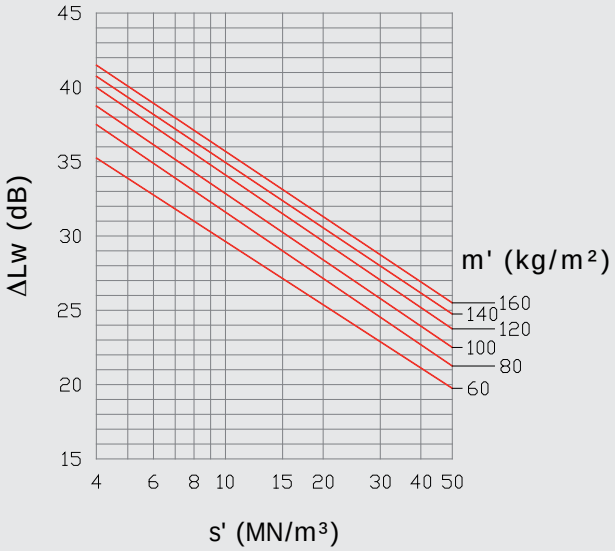


Illustration C1 of the UNI EN 12354-2 (fig. 7) Norm shows how, for an equal mass per surface unit m' of the screed, a limited value of the dynamic stiffness determines a higher grade of soundproofing for treading noises ΔLW.

TECHNICAL DATA	
T50 - H39 PRESHAPED INSULATING PANEL	
Code	R982QY003
Useful dimensions	1000 mm x 500 mm
Useful surface	0,50 m²
Panel dimensions	1030 mm x 530 mm
Panel surface	0,55 m²
Total thickness	39 mm slab: 20 mm + Mushroom-shaped element: 19 mm
Tubing diameter	15 mm ÷ 18 mm
Admitted panel pitches	50 mm- multiple
Tubing per m²	100 mm pitch: 10 m - 150 mm pitch: 6,67 m
PRESHAPED INSULATING SLAB	
Material	Sinterized foam polystyrene PS30 (EPS150)
Density	30 Kg/m³
Thermal conductivity	λ=0,034 W/m·K
Thermal resistance	R_λ= 0,55 m²·K/W
Min. compression resistance to 10% crushing	150 kPa (1,5 kg/cm²)
Fire protection in compliance with DIN4102 B2	B2 (euroclass E)
Classification in compliance with EN13163	EPS - EN13163 - T1 - L1 - W1 - S1 - P3DS(N)5 - DLT(1)5 - BS250 - CS(10)150
STEAM BARRIER	
Material	Polystyrene PS
Thickness	0,4 mm

TECHNICAL DATA	
T50 - H52 PRESHAPED INSULATING PANEL	
Code	R982QY005
Useful dimensions	1000 mm x 500 mm
Useful surface	0,50 m²
Panel dimensions	1030 mm x 530 mm
Panel surface	0,55 m²
Total thickness	52 mm slab: 33 mm + + Mushroom-shaped element: 19 mm
Tubing diameter	15 mm ÷ 18 mm
Admitted panel pitches	multiple di 50 mm
Tubing per m²	100 mm pitch: 10 m - 150 mm pitch: 6,67 m
PRESHAPED INSULATING SLAB	
Material	Sinterized foam polystyrene PST - TK 5000
Density	23 Kg/m³
Thermal conductivity	λ=0,038 W/m·K
Thermal resistance	R_λ= 0,90 m²·K/W
Max load capacity	5,0 kPa
Compression resistance	2 mm
Dynamic rigidity	30 MN/m³
Panel class according to DIN4102	B2 (euroclass E)
Classificatio in compliance with EN13163	EPS - EN13163 - T4 - L1 - W1 - S1 - P3DS(N)5 - BS100 - SD30 - CP2
STEAM BARRIER	
Material	Polystyrene (PS)
Thickness	0,4 mm

PACKAGING AND DIMENSIONS			
CODE	SIZE	NR OF SHEETS	TOTAL USABLE SURFACE [m²]
R982QY003	T50-H39	15	7,50
R982QY005	T50-H52	12	6

REGULATORY REFERENCES

UNI EN 1264

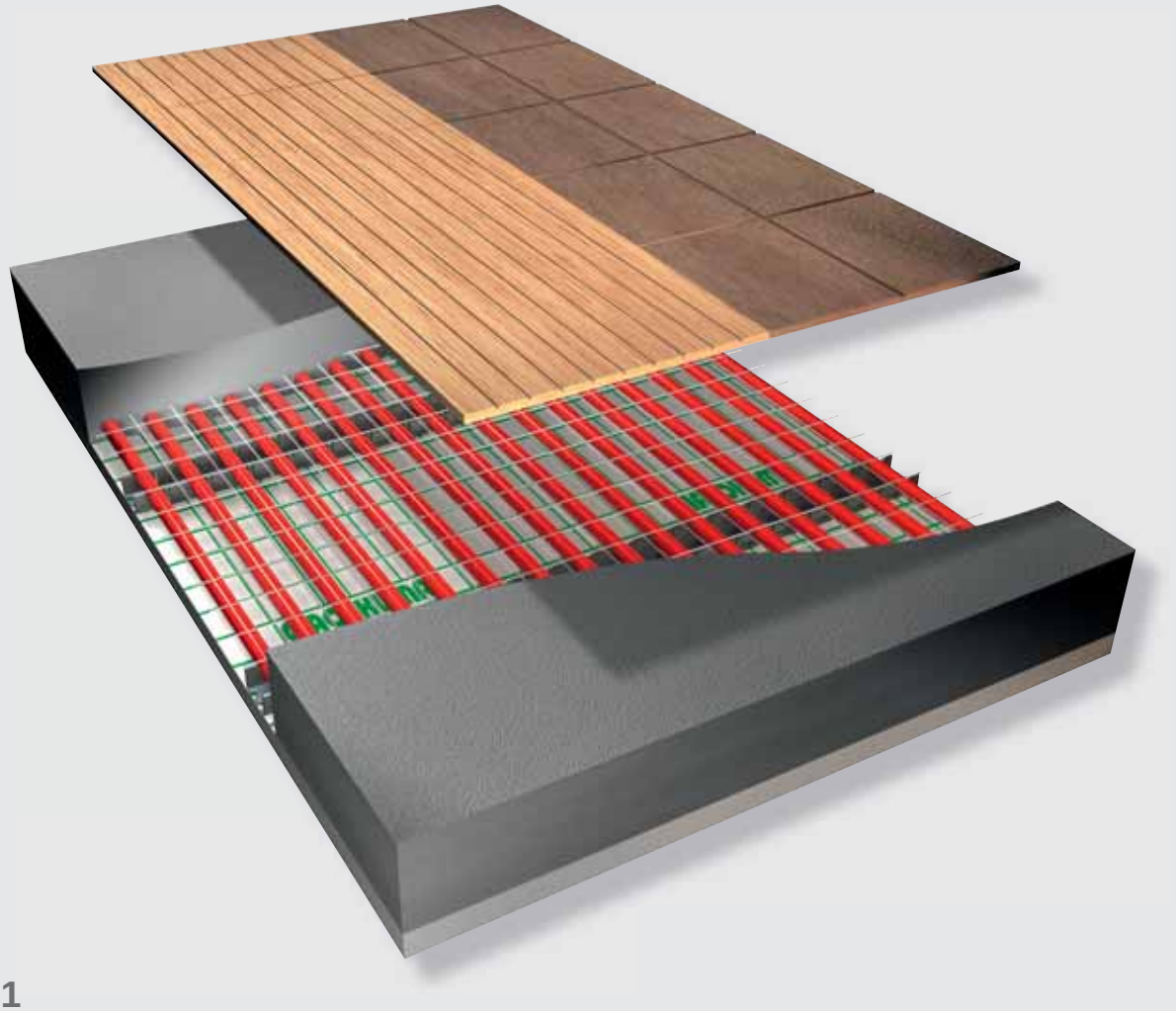
Floor heating - Systems and components.

EN 13163

Thermal insulation products for buildings - Factory made products of expanded polystyrene (EPS) - Specification.

UNI EN 12354-2

Acoustic in the building sector - Evaluations of acoustic performances of buildings starting from the performances of products - Acoustic insulation from walking noise between the rooms.



R981

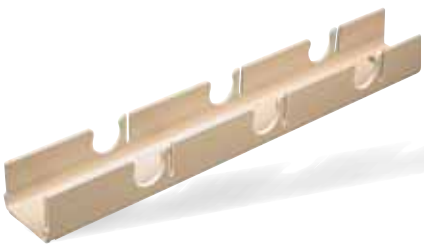
The smooth R981 panel is used in radiant floor heating systems as insulation support for the pipes. The R981 insulation panel is realized in foam polystyrene the density of which has been accurately devised in order to achieve a satisfactory compromise between thermal insulation capacity and compactness, a fundamental aspect to ensure the necessary resistance to crushing in the installation phase of the tubing and when the floor is finished.

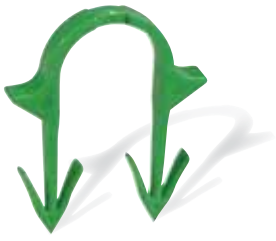
R981 H30 PREFORMED PANEL	
TECHNICAL DATA	
Panel dimensions	1000x1000 mm
Panel surface	1 m^2
Thickness	30 mm
Weight of single panel	900 g ca.
Material	Closed-cell foam polystyrene (CFC-free)
Density	30 Kg/m^3
Thermal conductivity (10°C)	λ= 0,034 W/mK (UNI 7745 o UNI 7891)
Thermal resistance (10°C)	Rλ= 0,88 m^2K/W
Thermal conductivity (20°C)	λ= 0,035 W/mK (UNI 7745 o UNI 7891)
Thermal resistance (20°C)	Rλ= 0,86 m^2K/W
Min compression resistance to 10% crushing	180 kPa UNI 6350 (1,8 kg/cm^2)
Reaction to fire	Class 1

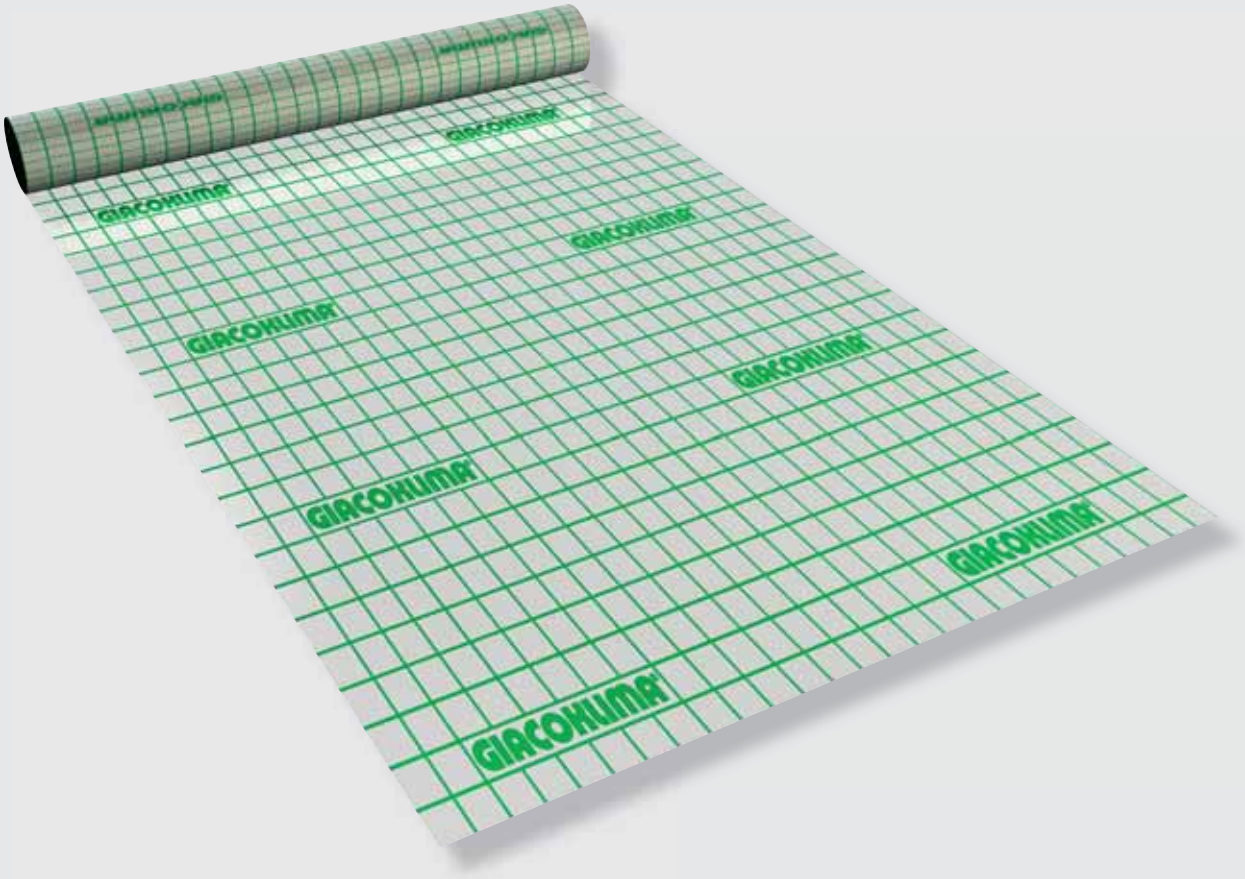
PACKAGING AND DIMENSIONS			
CODE	SIZE	NR. OF SHEETS	USEFUL PANEL SURFACE [m²]
R981Y003	T1000-H30	10	10

INSTALLATION

Installation of the R981 panels is a quick and simple operation. Above these, an R984 sheet is subsequently rolled out. To install tubing, the K389 pipe-clamping track system and R983Y500 clips for smooth panel are used.
Pipe installation operations are facilitated by the fact that on the R984 covering sheet a 50 mm. pitch square grid is printed in green. In case of critical load situations (industrial floors, gyms, etc.) the dimensions of the stiffening net and the thickness of the screed must be evaluated appropriately.







R984 covering sheet

The Giacomini R984 covering sheet is a fundamental accessory when realizing underfloor heating systems utilizing R981 smooth polystyrene insulation panels. Its use is typical in lightweight applications (open spaces for offices, gyms, supermarkets, show-rooms) or heavyweight applications (warehouses, industrial floors, heated driveway ramps, car parks) where the use of preformed panels is not indispensable, while on the contrary in domestic applications it is.
This system consents the realization of very long circuits with an extremely limited number of curves. The partial overlapping (100 or 150mm) of two edges of the covering sheet, associated with the gluing of the two with adhesive tape, avoids the creation of thermal bridges in the subsequent phase of laying the screed.

The R984 sheet, realized in transparent polyethylene, is characterized by the presence of a square grid layout guide, with 50 mm pitch, printed on the sheet itself. As a result, the covering sheet facilitates the laying of the circuits as well as providing its normal protection through thermal insulation, from crushing (treading) damages and steam barrier functions.

R984 COVERING SHEET	
TECHNICAL DATA	
Coil width	1,85 m
Coil length	100 m
Total surface	185 m^2
Thickness	0,2 mm (200m)
Coil weight	30 kg
Material	Low density polyethylene (PELD)

PACKAGING AND DIMENSIONS		
CODE	SIZE	USEFUL PANEL SURFACE [m^2]
R984Y005	1,35x100 m	185

GIACOKLIMA DRY SYSTEM RADIANT PLANT

The GIACOKLIMA dry system for radiant heating and cooling, is the ideal solution for floor applications in which overall sizes and loads as well as execution times are limited. The solution by Giacomini, avoiding the concrete screed installation, actually allows operating in small spaces, lightening the structure and avoids waiting for the screed to dry. The simple and fast operations of installation make of this an excellent system in case of renovation or installations on already existing floors, mainly in the residential context. The GIACOKLIMA dry system uses a preformed panel in polystyrene, of thermal diffusers with the function of thermal diffuser and synthetic or multilayer pipes, for the distribution of the heat carrier fluid. To reduce further the overall size, the layer of support can be composed of a double layer of zinc-plated thin plates, which guarantee the uniform distribution of loads. In less than 5 centimetres of thickness Giacomini offers a solution that guarantees environmental health, energy saving and architectural freedom. The elements characterising it are:

- K369 perimetrical belt;
- R883 preformed polystyrene panel;
- K802P thermal diffuser;
- Pe-RT 16x2 pipe, with anti-oxygen barrier;
- K809 pipe fastening clamp, 50x26 mm;
- R984 polyethylene multifunction sheet;
- support layer (dry screeds or other specific applications for floating floors and/or to reduce the dimensions);
- surface finish.

R883 (R883Y002)Panel

Preformed polystyrene panel, for the serial installation, with channels for the installation of K802P thermal diffusers and Pe-RT 16x2 pipe, with anti-oxygen barrier.

Material	EPS 200
Dimensions	1000 x 500 mm
Thickness	25 mm
Installation PITCH	16,7 cm with the application of thermal diffusers
Density	36,9 kg/m³

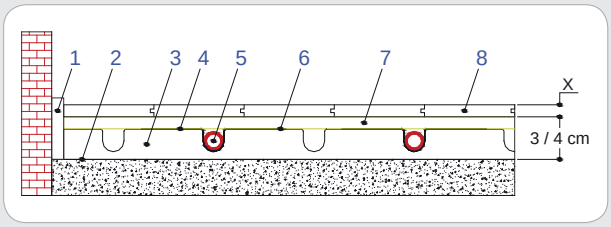
Thermal conductivity λ	0,035 W/mK
Thermal resistance Rλ	0,628 m²K/W
Classification in compliance with EN 13163	EPS-EN 13163-T1-L1-W1-S1-P3-DS(N)5-DLT(1)5-BS250-CS(10)150
Reaction to fire in c ompliance with EN 13501-1	Euroclass E
Brand CE	0919 CE 0312048
Packages	10 m² / box
Minimum compression resistance at 10% of squashing	150 kPa (1,5 kg/cm²)

K802P (K802PY002) Thermal diffuser

Thermal diffuser to install on preformed panel R883 for the installation of Pe-RT 16x2 pipe, with anti-oxygen barrier.

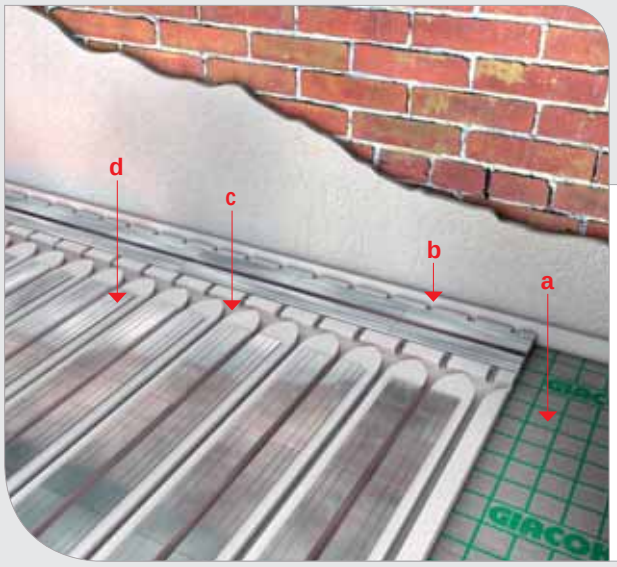
Material	Zinc-plated steel
Dimensions	997 x 120 mm
Thickness	0,4 mm
Package	40 pz. / box

Radiant floor section



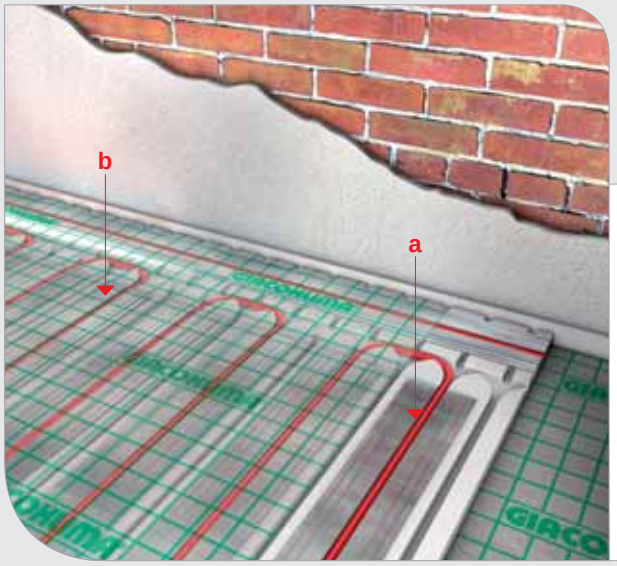
1) K369 perimetrical belt
2) R984 polyethylene multifunction sheet - first layer
3) R883 preformed polystyrene panel
4) K802P thermal diffuser
5) Pe-RT 16x2 pipe, with anti-oxygen barrier
6) R984 polyethylene multifunction sheet - protection layer
7) Support layer
8) Surface finish

Installation



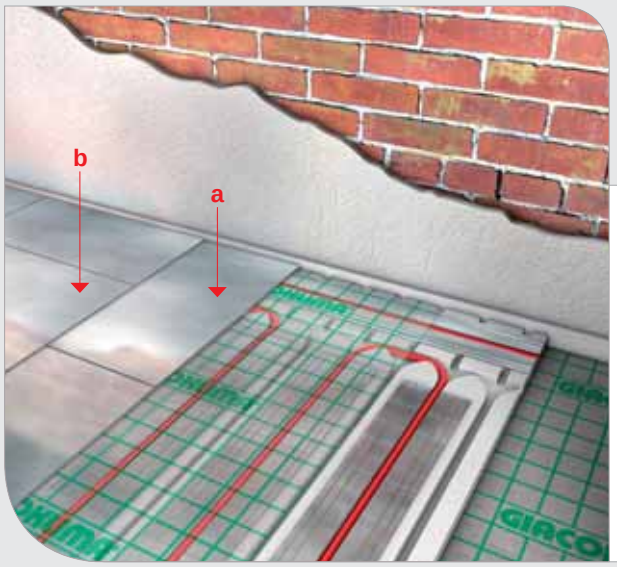
a) R984 polyethylene multifunction sheet - first layer
b) K369 perimetrical belt
c) R883 preformed polystyrene panel
d) K802P thermal diffusers

Fase 1. Installation of the first layer of the R984 polyethylene multifunctional sheet, installation of K369 perimetrical belt, of the R883 polystyrene preformed panel and successive installation of K802P thermal diffusers along the routes planned for conditioning circuits.



a) Pe-RT 16x2 pipe with anti-oxygen barrier
b) R984 polyethylene multifunction sheet - protection layer

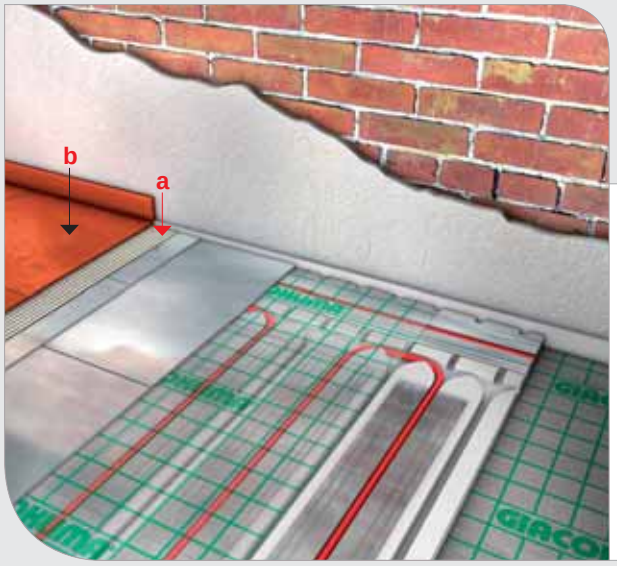
Step 2. Installation of Pe-RT 16x2 pipe, with anti-oxygen barrier, making a coil type route, and installation of the R984 polyethylene multifunctional sheet, as protection layer between those of insulation and support.



a) K805P thin plates in zinc-plated steel - first surface
b) K805P thin plates in zinc-plated steel - superposed surface, with the application of thermal melting adhesives, with staggered elements

Step 3. Installation of the support layer. To further reduce the overall sizes, in the dry GIACOKLIMA system the support layer can be composed of a first surface of K805P thin plates in zinc-plated steel (250x500 or 500x500) to which a similar surface with staggered elements is superposed, with the application of thermal melting adhesives; so a consolidated load sorter is created.

Filling the perimetrical spaces, hard to reach with R883 preformed polystyrene panel and mainly with K805P thin plates in zinc-plated steel, can be made with a self-levelling screed, not radiant, separated from the slab with the first layer of the R984 polyethylene multifunction sheet, and made up to a dimension equivalent to the one of the system, including the support layer.
This solution can be used also for a self-levelling screed, not radiant, in areas where very concentrated loads very high or anyway higher than the ones that can be borne by the support layer used.



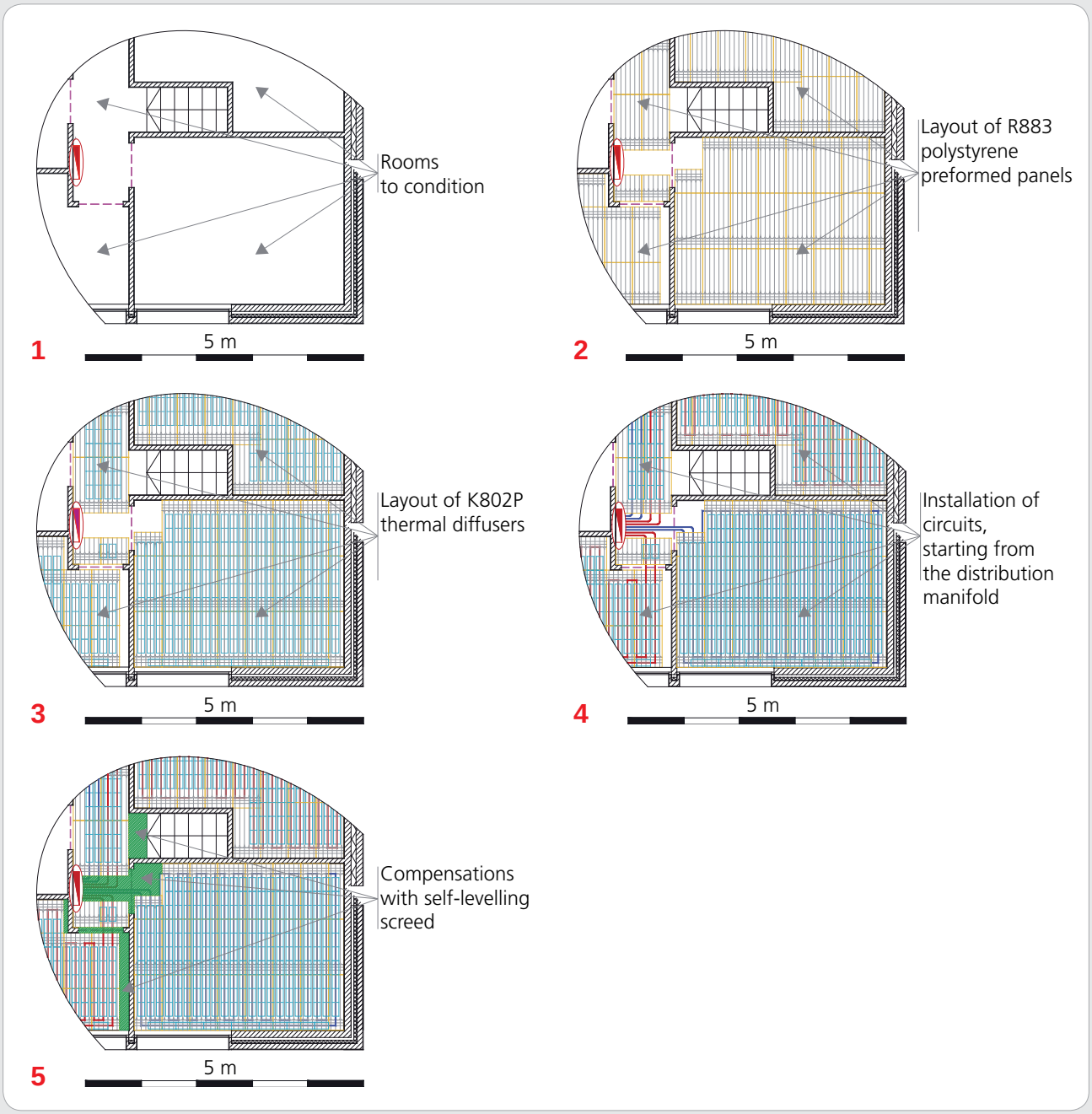
a) Bicomponent adhesive with polyurethane base
b) 40x40 cm Ceramic tile

Step 4. Installation of superficial finish, made with a floating parquet flooring, laid on a special pad, or with ceramic materials, glued on floating systems with three components or directly in zinc-plated steel thin plates, using bicomponent adhesive with polyurethane base.

Also in the applications of the GIACOKLIMA dry system for underfloor systems it is essential to refer to the EN 1264 regulation, concerning the design and installation of system and structure, complying strictly with the test and first switching on procedure.

Design

Thanks to the experience in planning of the "R&D" department of Giacomini S.p.A. also for the GIACOKLIMA dry systems a detailed bill of materials is drawn up as well as a technical report, which contains the hydraulic characteristics of the system and the corresponding thermal output calculated according to the EN 1264 regulation. The working drawing, in addition, can report, according to the complexity of the system and/or the opportunity of providing the installer with a valid instrument during the installation operation, the layout of elements that characterize the system, as well as the drawing of the heating/cooling circuits.

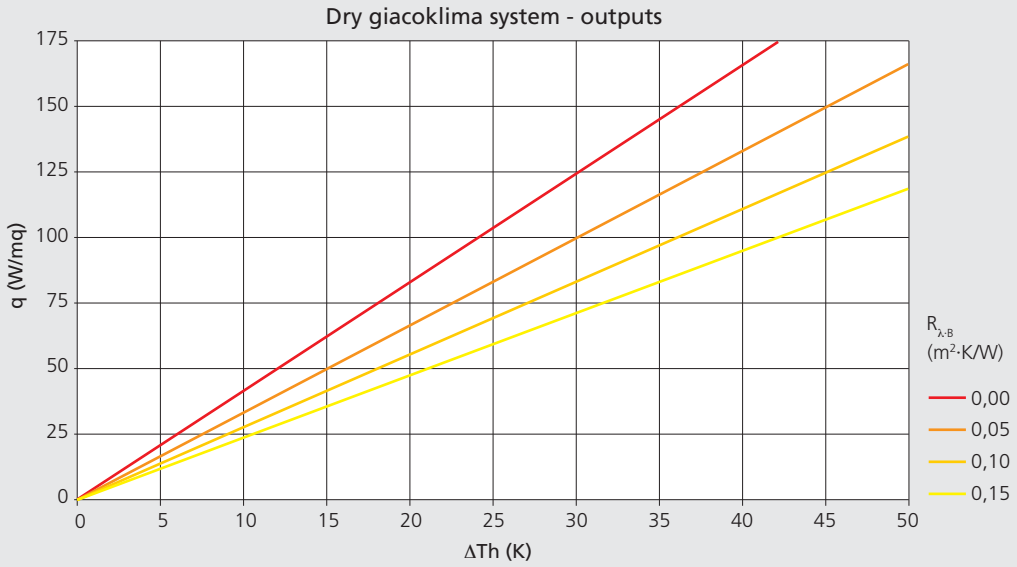


Regulatory references

- EN 1264
  Floor heating: systems and components
- EN 13163
  Thermal insulation products for buildings - Factory made products of expanded polystyrene (EPS) - Specification

Characteristic curves, according to EN 1264-3

The characteristic curves refer to the dry GIACOKLIMA system, with installation pitch 16,7 cm and support layer made with K805P thin plates in zinc-plated steel: superposed elements, with the application of thermal melting adhesives, and staggered.



Technical specifications items

R883 -Polystyrene preformed panel

Polystyrene preformed panel, for serial installation, with channels for the installation of K802P thermal diffusers and of Pe-RT 16x2 pipe, with anti-oxygen barrier.

K802P - Thermal diffuser

Thermal diffuser to install on the preformed panel R883 to install the pipe Pe-RT 16x2, with anti-oxygen barrier.

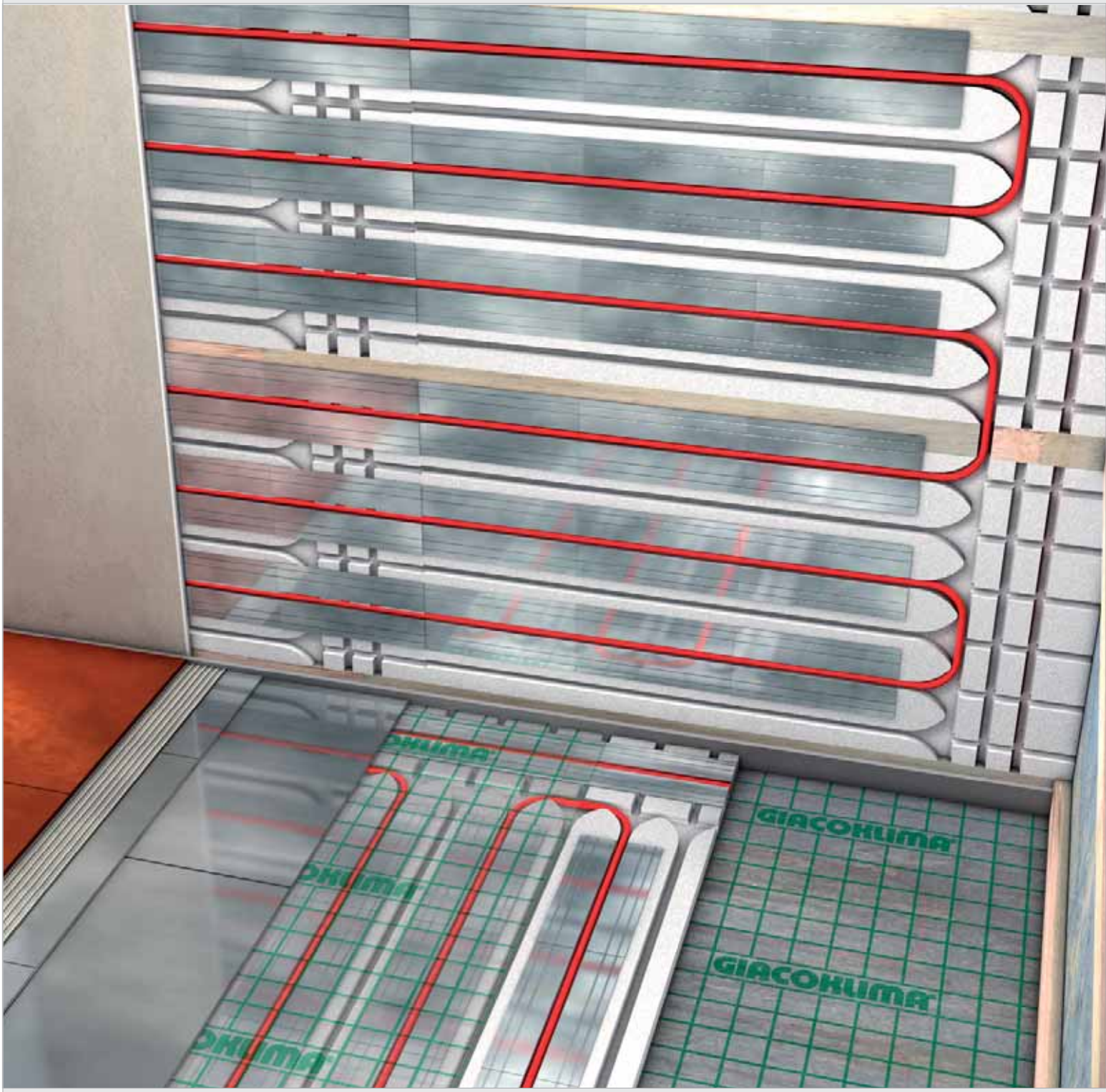
K805P - Zinc-plated steel thin plate

Zinc-plated steel thin plate, 250x500/500x500 - 1mm thick, to make the support layer with superposed elements, with the application of thermal melting adhesives, staggered.

installation of underfloor system

detail of distribution, starting from manifold R559

Example of wall mounting



In the above pictures the dry wall mounting of the GIACOKLIMA system, for example in a bathroom, allows total integration of sanitary systems.

PLASTIC PIPES

In radiant floor systems, a fundamental role is played by the synthetic material tubing which is laid on the insulation panels. These pipes are flexible and therefore easy to install, as well as having chemical-physical characteristics suitable for radiant systems. Giacomini pipes in PE-X, Pb and PE-RT are equipped with an anti-oxygen barrier (BAO), which prevents the risk of corrosion of iron components of the installation, since the quantity of oxygen permeating from outside becomes totally negligible.

The ISO 10508 norm refers to tubing in plastic material for conveyance of hot and cold water and establishes a subdivision of the various types of pipes in application classes.

TUBING TYPES							
APPLICATION CLASS	OPERATING TEMPERATURE T_0 [°C]	TIME T_0 [years]	Tmax [°C]	TIME Tmax [years]	EXCESSIVE TEMPERATURE DUE TO MALFUNCTIONING T_M [°C]	TIME T_M [hours]	FIELD OF APPLICATION
1*	60	49	80	1	95	100	Sanitary hot water (60°C)
2*	70	49	80	1	95	100	Sanitary hot water (70°C)
4	20 40 60	2,5 20 25	70	2,5	100	100	Underfloor heating and low temperature radiators
5	20 60 80	14 25 10	90	1	100	100	High temperature radiators

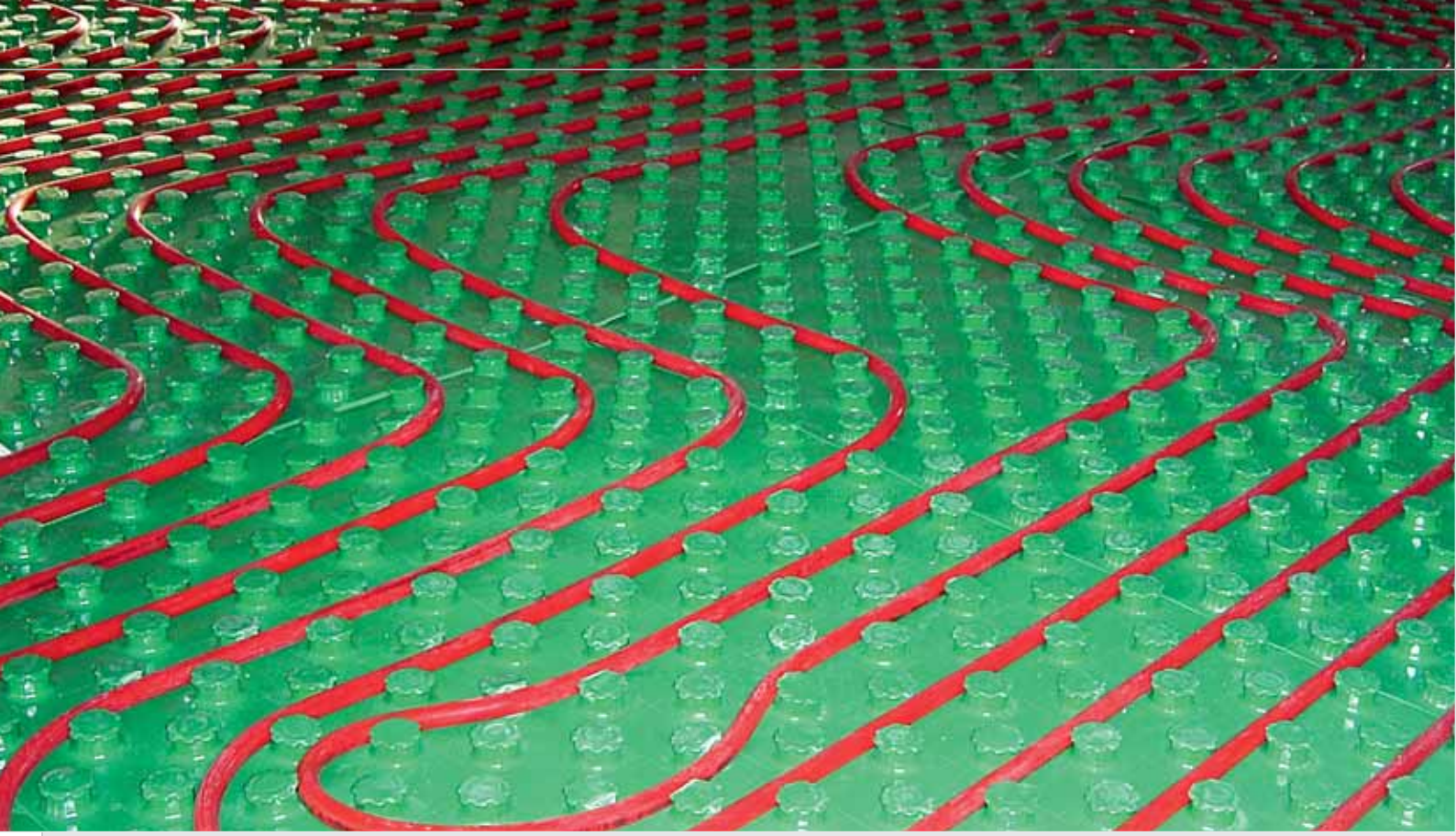
(*) Classes 1 and 2 depend on international, national or local regulations

The Giacomini plastic material pipes in PE-X, Pb, PE-RT, PE-X/Al/PE-X and PE-RT/Al/PE-RT used for radiant floor systems all fall within class 4 of the chart above.
Giacomini tubing in synthetic material is produced in accordance with the norms in force and undergoes technological controls as established by the same.

PRECAUTIONS

Synthetic material pipes require certain necessary precautions to guarantee duration and functionality:

- keep the pipes in their special packaging until the moment of use,
- store the pipes in dry, covered position to avoid packaging being damaged by humidity,
- avoid pipes coming into contact with sharp objects which could cause cutting,
- sever the pipes with special pipe cutters in order to achieve a clean, perpendicular to axis, snag-free cut,
- avoid formation of ice, since the change of status can damage the pipe and cause breaking,
- keep the pipe away from free flames,
- avoid contact with chemical solvents or paint which could damage the pipe.



PE-X

The Giacotherm high-density reticular polyethylene pipe with anti-oxygen (BAO) barrier allows pressurized distribution of hot and cold water in heating and cooling radiant panel systems, offering many advantages as compared with the traditional copper or iron distribution thanks to the significant duration of the PE-X pipe and the fact that it is not liable to suffer from encrustation or electro-chemical problems, it is easy and simple to install, as well as user-friendly.

The chemical reticulation process ensures the correct mechanical, chemical and thermal characteristics and the high quality and reliability standards appropriate for its use.
The scrupulous manufacturing and detailed controls ensure the achievement of high standard quality tubing which guarantee a durable and reliable performance.

R996T TUBING IN PE-X WITH BAO	
TUBE TECHNICAL DATA	
Density	0,939 g/cm³
Degree of reticulation	> 70%
Breaking load	31 MPa
Lengthening at 23°C breaking	520%
Elasticity module at 23°C	540 MPa
Coefficient of linear expansion	$1{,}9 \cdot 10^{-4}$ 1/K
Thermal conductivity of tube	λ = 0,38 W/mK

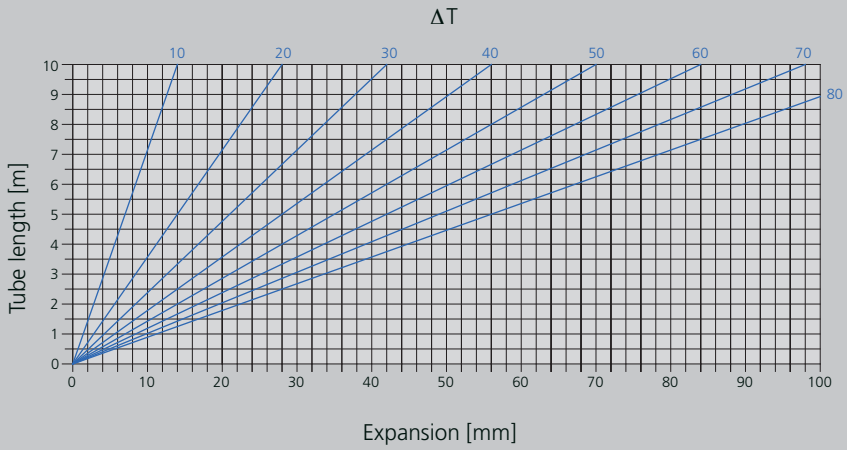
INSTALLATION

For the operations of installation of pipes GIACOTHERM R996T in Pe-X some practical rules should be followed concerning the choice of the fittings, the respect of the minimum curving radiuses and protection from sun rays and possible accidental damage. The connection to the distribution manifolds and to the terminals of the system should be made through the Giacomini adapters for synthetic pipes. To make the proper connection it is essential to cut the pipes with tools able to operate a clean cut, without burring and perpendicular to their axis). In the operations of installation of the pipes it is necessary to make curves with minimum radius equal to 5 times the external diameter of the pipe itself. After the installation of the pipes a system test under pressure should be made, so to highlight immediately any fluid leakages. In case of radiant panel systems the installation of the foundation covering the pipe should be made cautiously, paying attention not to scratch the pipes with palettes or squeezing them when passing with the wheelbarrows. Avoid that pipes stay exposed for long periods to sun rays or to fluorescent lamps, keeping the unused rolls in the specific boxes, to avoid that ultraviolet rays alter their chemical and physical characteristics. With the radiant panel systems installing above the pipes a foundation of at least 3 cm is a good technique, to avoid cracks due to heat dilatation. Across any dilatation joints it is important to protect the pipe with a gasket, in order to avoid excessive mechanical strain.

PRECAUTIONS

The use of pipes GIACOTHERM R996T in Pe-X requires certain necessary precautions to guarantee duration and functionality. The main precautions are:

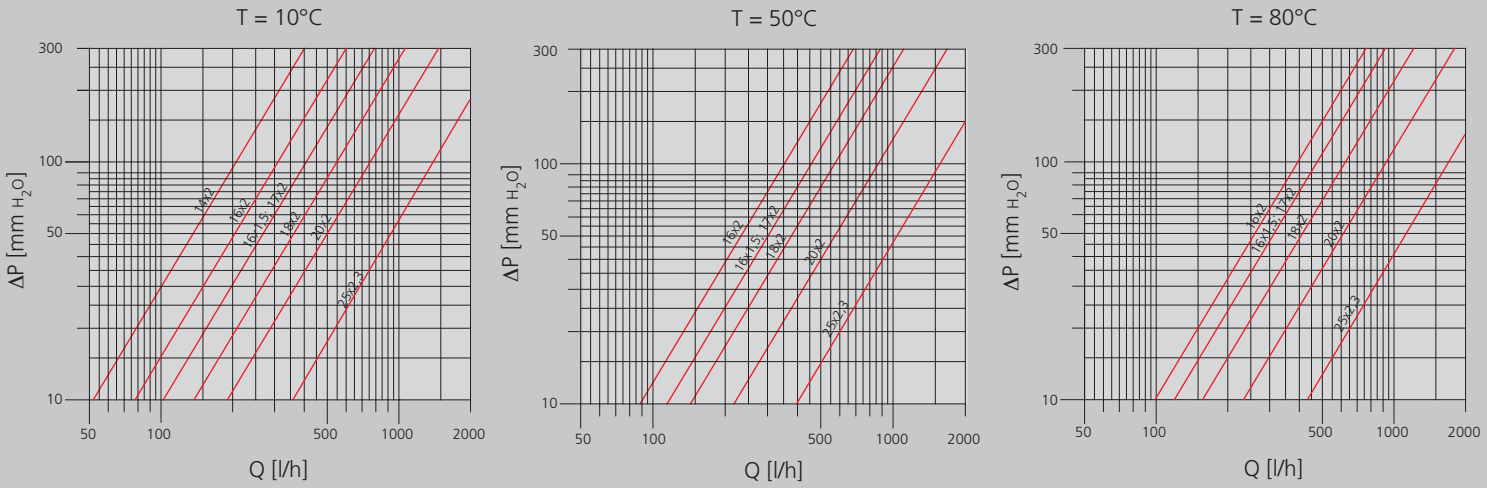
1. Keep the pipes in their special packaging, avoiding their direct exposure to sun rays, and in dry, covered places to avoid packaging being damaged by humidity.
2. Avoid pipes coming into contact with sharp objects which could cause scratches and cutting phenomena, paying a lot of attention in the stages of installation and transportation.
3. Avoid formation of ice, since the change of status can damage the tube and cause breaking.
4. Keep the tube away from free flames, able to cause melting even partial.
5. During the fastening, if any, to electro-welded meshes, use plastic material bands, rather than metallic, to avoid damaging pipes.
6. Avoid contact with chemical solvents or paint which could damage the tube.



The Giacotherm pipe in PE-X is supplied in coils of various sizes and distributed in special carton boxes which facilitate storage and protect the pipe both from sunlight and accidental damage.

PACKAGING AND DIMENSIONS			
CODE	SIZE	ANTI-OXYGEN BARRIER	COILS LENGTH [m]
R996TY047	16 x 1,5	BAO	100 m
R996TY048	16 x 1,5	BAO	240 m
R996TY027	16 x 2	BAO	100 m
R996TY019	16 x 2	BAO	240 m
R996TY064	16 x 2	BAO	600 m
R996TY054	17 x 2	BAO	100 m
R996TY033	17 x 2	BAO	240 m
R996TY052	17 x 2	BAO	600 m
R996TY049	18 x 2	BAO	100 m
R996TY020	18 x 2	BAO	240 m
R996TY050	18 x 2	BAO	500 m
R996TY021	20 x 2	BAO	100 m
R996TY022	20 x 2	BAO	240 m
R996TY053	20 x 2	BAO	400 m
R996TY068	25 x 2,3	BAO	320 m

Pressure drop



CONNECTIONS

Connection to distribution manifolds must be implemented by means of the Giacomini R179 adaptors, of the appropriate size for the pipe being used.

THERMAL EXPANSION

In the design and installation phases of applications with PE-X pipework the thermal expansion phenomenon must be born in mind.

Thermal expansion is calculated as:

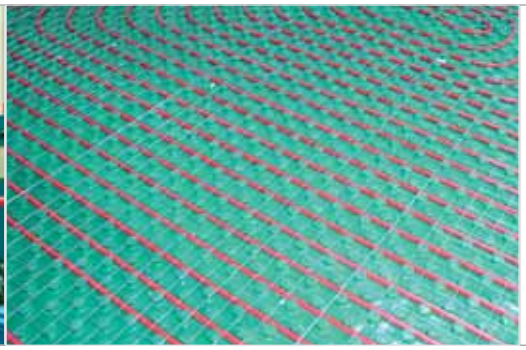
$\Delta l = \alpha \cdot L \cdot \Delta T$

where: Δl = expansion [mm]

α = coefficient of linear thermal expansion (0,14 [mm/mK])

L = pipe length [m]

ΔT = temperature variation [K] o [°C]

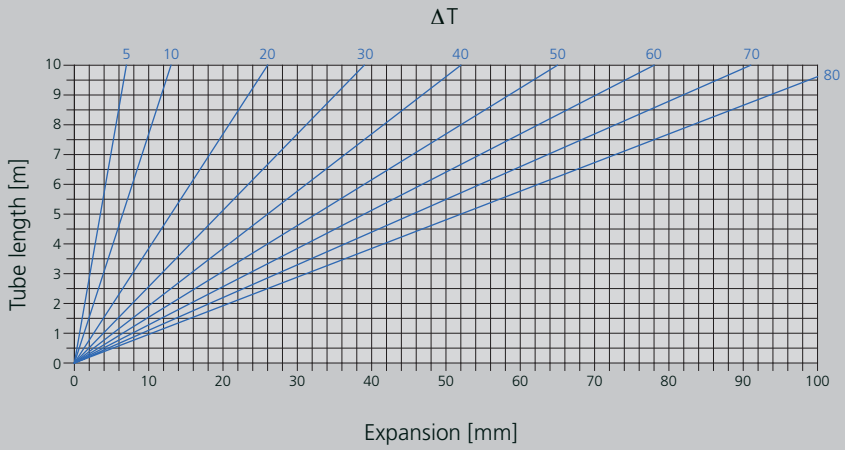


Pb

The R986 Giacomini polybutylene pipe is employed for hot and cold water distribution in heating and cooling radiant panel systems, in traditional heating systems distribution and in the distribution of hot and cold water for sanitary use.
The manufacturing of the Pb pipe starts from the 1-buthene monomer and realizing a specific stereo polymerization assisted by the Ziegler Natta catalyzer: this stereo-specificity of the reaction allows the achievement of neat and crystalline molecular structures with high standard mechanical characteristics.

R986 PB PIPE	
PIPE TECHNICAL DATA	
Max operating temperature	95°C
Softening temperature	113°C
Density	937 kg/m^3
Yielding point	17,6 N/mm^2 (176 bar)
Breaking strength	33,4 N/mm^2 (334 bar)
Lengthening at breaking	280%
Elasticity module	265 N/mm^2
Weakening temperature	-21°C
Melting point	124°C ÷ 126°C
Coefficient of thermal expansion	1,3·10-4 1/K
Pipe thermal conductivity	λ = 0,22 W/mK
Fusion latent heat	100 kJ/kg
Min radius of curvature without pipe curving device	5·D_{est}

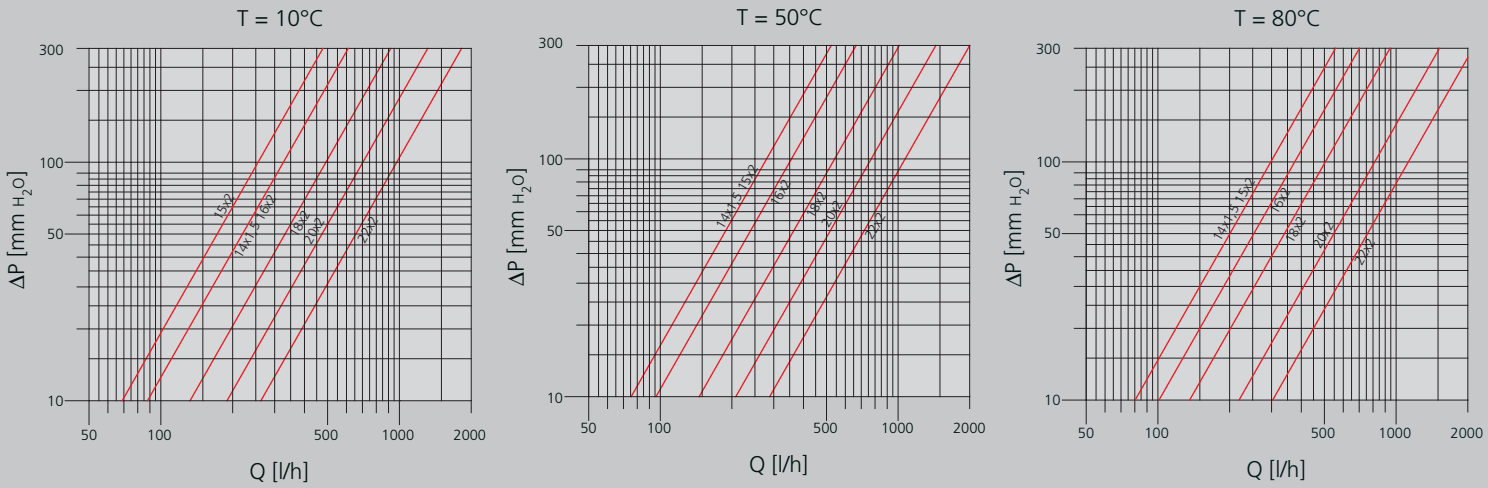
Thermal expansion



The R986 polybutylene pipe is supplied in coils of various sizes distributed in special carton boxes to facilitate storage and protect the pipe both from sunlight and accidental damage.

PACKAGING AND DIMENSIONS			
CODE	SIZE	ANTI-OXYGEN BARRIER	COIL LENGTH [m]
R986Y116	16 x 2	BAO	100 m
R986Y117	16 x 2	BAO	240 m
R986Y118	18 x 2	BAO	100 m
R986Y119	18 x 2	BAO	240 m

Pressure drop



CONNECTIONS

Connection to distribution manifolds must be implemented by means of the Giacomini R179 adaptors, of the appropriate size for the pipe being used.

THERMAL EXPANSION

In the design and installation phases of applications with PE-X pipework the thermal expansion phenomenon must be born in mind.

Thermal expansion is calculated as:

$\Delta l = \alpha \cdot L \cdot \Delta T$

where: Δl = expansion [mm]

α = coefficient of linear thermal expansion (0,13 [mm/mK])

L = pipe length [m]

ΔT = temperature variation [K] o [°C]

PE-RT

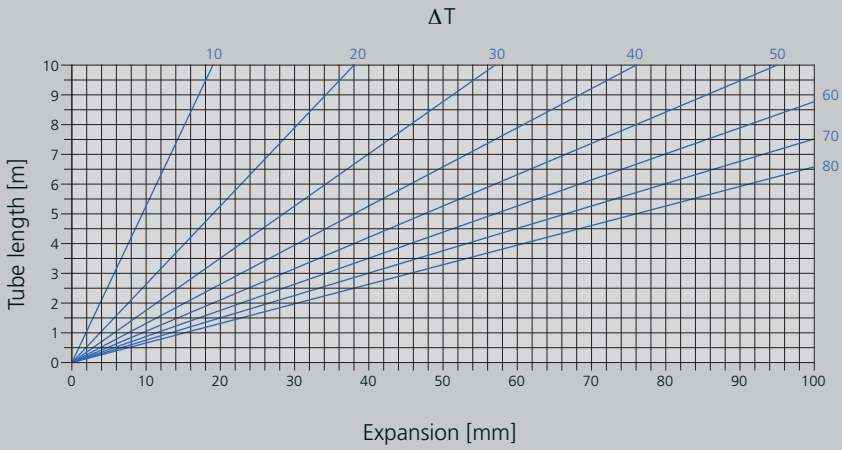
The PE-RT R978 polyethylene pipe with enhanced thermal resistance differs from the well-known reticulated polyethylene PE-X starting from the raw material with which they are respectively produced, since the compound used for PE-RT is specifically designed for this production: on a molecular level it consists of a polyethylene polymer chain which includes a minimal percentage of 1-ottene molecule. In fact this is a co-polymer providing a far greater thermal resistance than the traditional polyethylene.

The resistance to combined "pressure/temperature" stresses performed by PE-RT pipes is such as to indicate this product as suitable for the distribution of mixed water in panel installations.
A series of advantages motivate its use, including the simplicity and rapidity of installation, with notable labour-saving, the absence of welding and mechanical joints under the track which could in time induce fluid leakage, the high durability of this material which is not subject to encrustation or electro-chemical phenomena.

The scrupulous manufacturing and detailed controls ensure the achievement of high standard quality tubing which guarantee a durable and reliable performance.

The PE-RT R978 Giacomini pipe is supplied in coils of various sizes and distributed in special carton boxes which facilitate storage and protect the pipe both from sunlight and accidental damage.

Thermal expansion



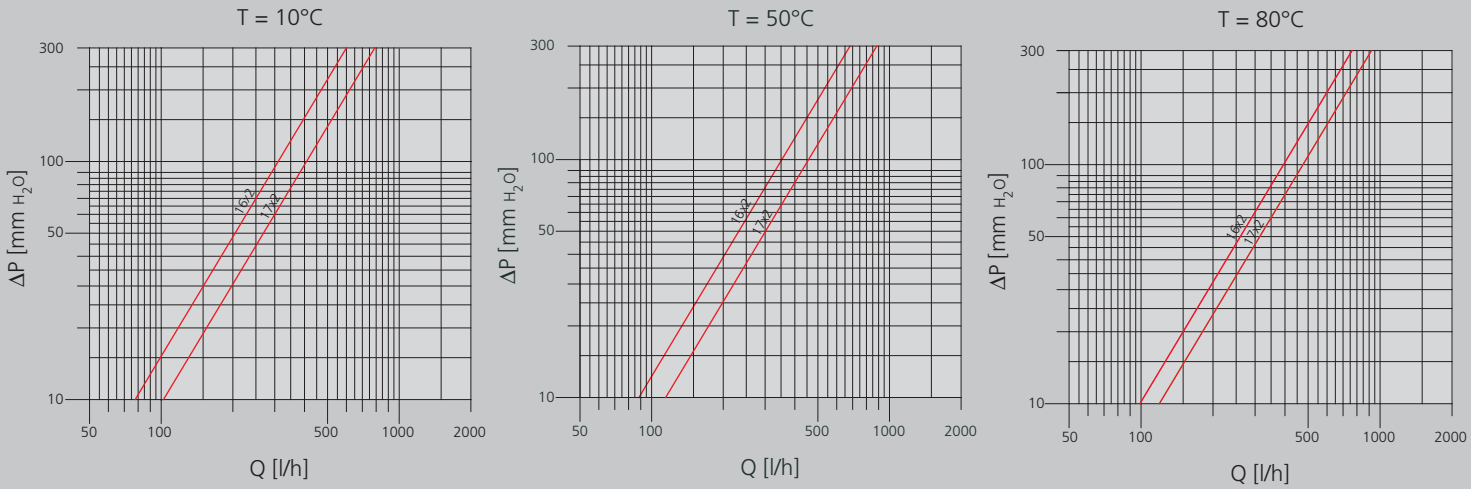
TECH

R978 PE-RT PIPE	
PIPE TECHNICAL DATA	
Maximum operating temperature	70°C
Softening temperature	123°C
Density	933 kg/m^3
Yielding point	16,7 N/mm^2 (167 bar)
Breaking strength	34,3 N/mm^2 (343 bar)
Lengthening at breaking	800%
Elasticity module	5600 N/mm^2
Coefficient of thermal expansion	1,9·10^{-4} 1/K
Pipe thermal conductivity	λ = 0,40 W/mK
Min radius of curvature without pipe curving	5·D_{est} (per curve a 90°) 5,5·D_{est} (per curve a 180°)

PACKAGING AND DIMENSIONS

CODE	SIZE	ANTI-OXYGEN BARRIER	COIL LENGTH [m]
R978Y223	16 x 2	BAO	100 m
R978Y224	16 x 2	BAO	120 m
R978Y225	16 x 2	BAO	200 m
R978Y226	16 x 2	BAO	240 m
R978Y227	17 x 2	BAO	600 m
R986Y233	17 x 2	BAO	100 m
R986Y234	17 x 2	BAO	120 m
R986Y235	17 x 2	BAO	240 m
R986Y237	17 x 2	BAO	600 m
R986Y255	20 x 2	BAO	240 m
R986Y256	20 x 2	BAO	400 m

Pressure drop



CONNECTIONS

Connection to distribution manifolds must be implemented by means of the Giacomini R179 adaptors, of the appropriate size for the pipe being used.

THERMAL EXPANSION

In the design and installation phases of applications with PE-X pipework the thermal expansion phenomenon must be born in mind.
Thermal expansion is calculated as:

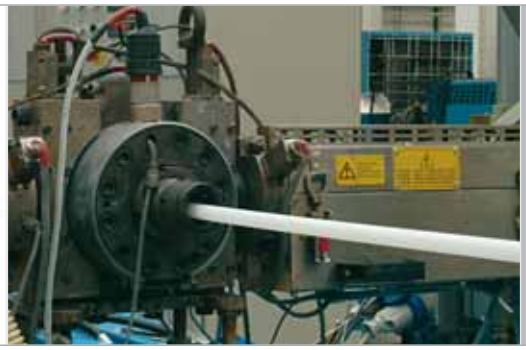
$\Delta l = \alpha \cdot L \cdot \Delta T$

where: Δl = expansion [mm]

α = coefficient of linear thermal expansion (0,19 [mm/mK])

L = pipe length [m]

ΔT = temperature variation [K] o [°C]



PE-X/Al/PE-X MULTILAYER

The Giacomini R999 multilayer pipe in PE-X/Al/PE-X can be used in the realization of hot and cold distribution systems for sanitary applications, heating and cooling radiant panel systems, traditional heating systems with cast iron, aluminium or steel heating elements.

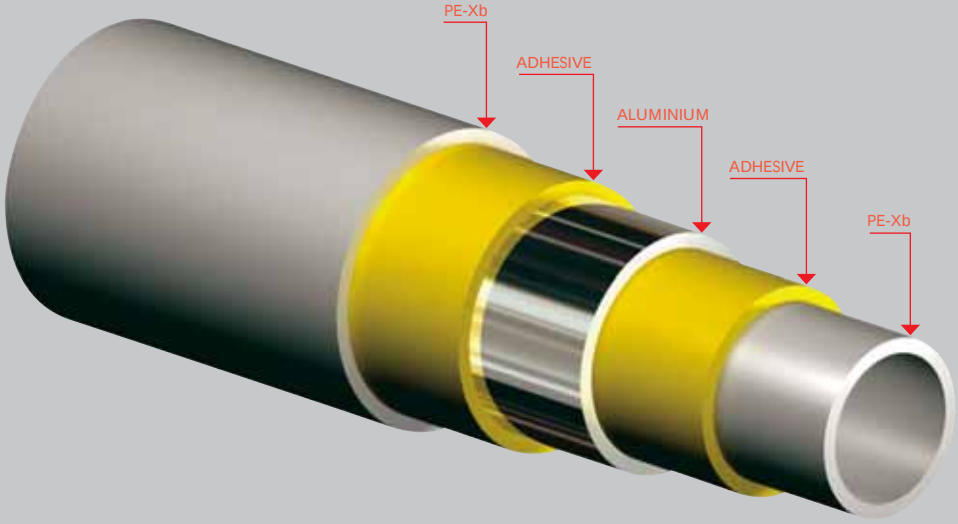
The water distribution with synthetic material pipes provides enormous advantages:

- the limited internal roughness of the pipe creates limited pressure drop, thereby guaranteeing the minimum pressure to the appliances usability even when the upriver pressure available in the installations is low
- the high acoustic insulation performance allows the realization of low-noise installations;
- very low thermal conductivity: approx 700 times lower than copper, 100 times lower than iron.

The presence of the aluminium layer, welded head-to-head with laser technology, guarantees a secure barrier against oxygen and other gases, as well as conferring excellent crushing resistance to the product.
The multilayer PE-X/Al/PE-X pipe is suitable for conveying potable water according to the norms in force.

The multilayer PE-X/Al/PE-X pipe is characterized by an internal layer in PE-Xb, an intermediate layer in aluminium, longitudinally welded with laser technology, and by an external layer in PE-Xb. The intermediate layers of adhesive homogenously bind the aluminium and PE-Xb layers.

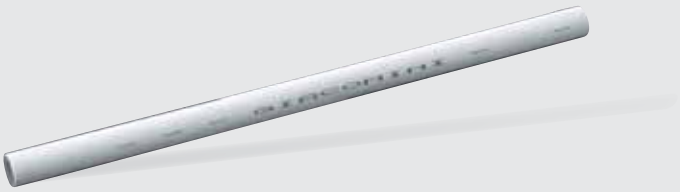
1

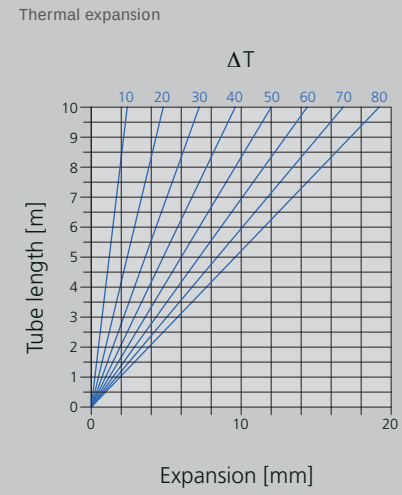


1 ▸ Multilayer PE-X/Al-PE-X pipe with adapter R179AM

Before market distribution, the Giacomini multilayer pipe undergoes a continuous series of controls which are necessary to guarantee high quality standards. The productive cycle foresees controls of the chemical-physical characteristics, dimensional controls and hydraulic controls such as to identify any possible defects which in time could give way to malfunctioning or leakage.

R999 MULTILAYER PE-X/AL/PE-X PIPE	
PIPE TECHNICAL DATA	
Maximum operating temperature	95°C
Operating pressure	10 bar
Density	933 kg/m^3
Coefficient of linear expansion at 20°C	2,4·10^{-5} 1/K
Pipe thermal conductivity	λ = 0,4 W/mK
Internal roughness	ε = 7·10^{-6} m
Min radius of curvature without pipe curving unit	5·D_{est}





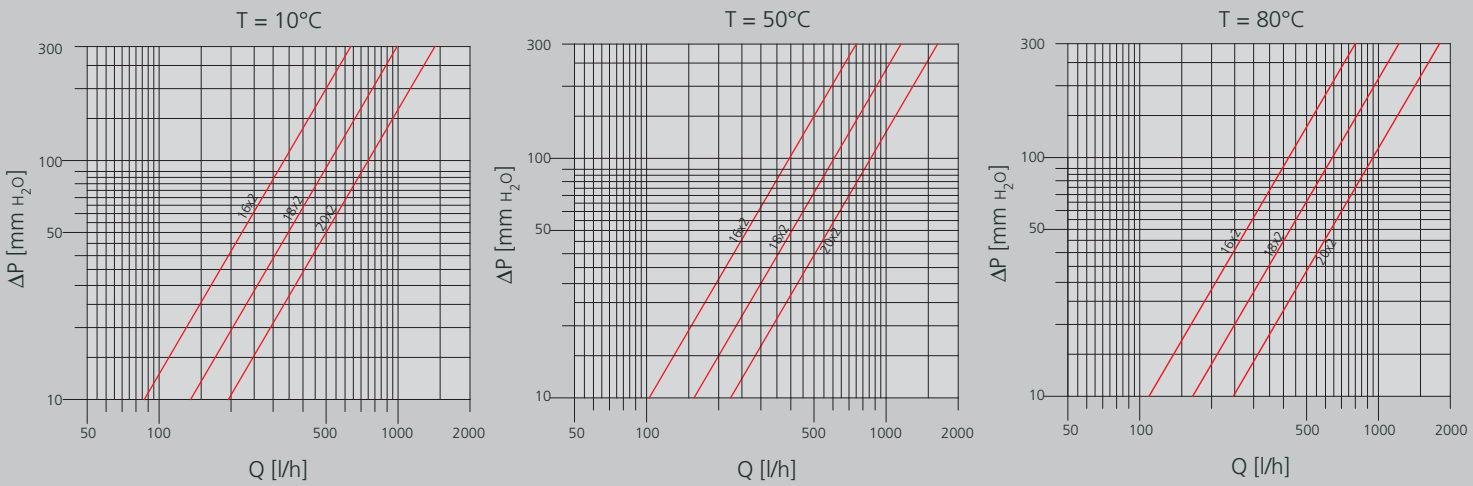
TECH

DIMENSIONS						
ARTICLE	D_{est} [mm]	D_{int} [mm]	Sp. [mm]	WEIGHT [g/m]	WATER CONTENT [l/m]	MIN RADIUS OF CURVATURE (without pipe curving unit)
R999 16 x 2	16	12	2	115	0,113	80
R999 18 x 2	18	14	2	132	0,154	90
R999 20 x 2	20	16	2	148	0,201	100

The multilayer PE-X/Al/PE-X pipe is supplied in 100m and 200m coils packed in carton boxes which facilitate storage and protect the pipe both from sunlight and accidental damage.

PACKAGING AND DIMENSIONS			
CODE	SIZE	ANTI-OXYGEN BARRIER	COIL LENGTH [m]
R999Y122	16 x 2	0,2	100
R999Y123	16 x 2	0,2	200
R999Y124	16 x 2	0,2	500
R999Y232	18 x 2	0,2	100
R999Y233	18 x 2	0,2	200
R999Y142	20 x 2	0,2	100
R999Y143	20 x 2	0,2	200
R999Y272	26 x 3	0,2	4
R999Y273	26 x 3	0,2	50
R999Y282	32 x 3	0,2	4
R999Y283	32 x 3	0,2	50

Pressure drop



CONNECTIONS

For applications using the multilayer PE-X/Al/PE-X pipes in radiant underfloor systems, Giacomini proposes the R179AM adaptors, which foresee a separation segment to insulate the aluminium in the pipe from the fitting in order to avoid galvanic corrosion phenomena.

THERMAL EXPANSION

In the design and installation phases of applications with PE-X pipework the thermal expansion phenomenon must be born in mind.

Thermal expansion is calculated as:

$\Delta l = \alpha \cdot L \cdot \Delta T$

where: Δl = expansion [mm]

α = coefficient of linear thermal expansion (0,024 [mm/mK])

L = pipe length [m]

ΔT = temperature variation [K] o [°C]

PE-RT/Al/PE-RT multilayer

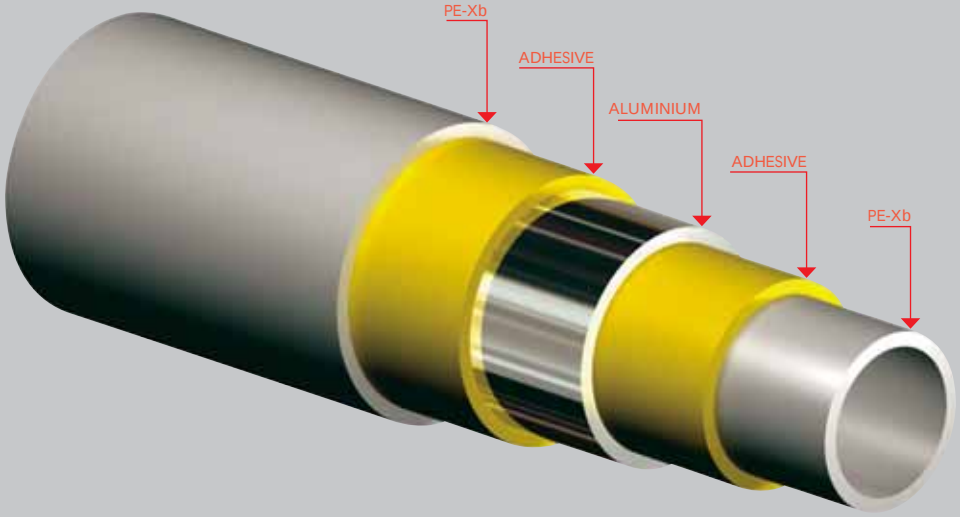
The presence of the aluminium layer, welded head-to-head with laser technology, guarantees a secure barrier against oxygen and other gases, as well as conferring excellent crushing resistance to the product.

Water distribution with synthetic material pipes provides enormous advantages:

- the limited internal roughness of the pipe creates limited pressure drop, thereby guaranteeing the minimum pressure to the appliances usability even when the upriver pressure available in the installations is low;
- the high acoustic insulation performance allows for the realization of low-noise installations;
- very low thermal conductivity: approx 700 times lower than copper, 100 times lower than iron.

The presence of the aluminium layer, welded head-to-head with laser technology, guarantees a secure barrier against oxygen and other gases, as well as conferring excellent crushing resistance to the product.
The multilayer PE-RT/Al/PE-RT pipe is characterized by an internal layer in PE-RT, an intermediate layer in aluminium, longitudinally welded with laser technology, and by an external layer in PE-RT. The intermediate layers of adhesive homogenously bind the aluminium and PE-RT layers.

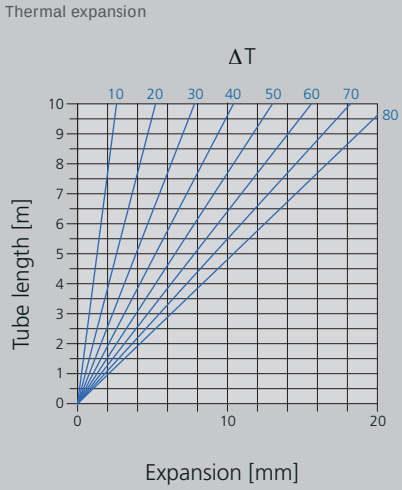
1



1 ▸ Multilayer PE-RT/Al/PE-RT pipe with adapter R179AM

Before market distribution, the multilayer R977 pipe undergoes a continuous series of controls which are necessary to guarantee high quality standards. The productive cycle foresees controls of the chemical-physical characteristics, dimensional controls and hydraulic controls such as to identify any possible defects which in time could give way to malfunctioning or leakage.

PE-RT/AL/PE-RT PIPE	
PIPE TECHNICAL DATA	
Maximum operating temperature	95°C
Operating pressure	10 bar
Coefficient of linear expansion at 20°C	$2{,}6 \cdot 10^{-5}$ 1/K
Pipe thermal conductivity	λ = 0,4 W/mK
Internal roughness	$\varepsilon = 7 \cdot 10^{-6}$ m
Min radius of curvature without pipe curving device	$5 \cdot D_{est}$



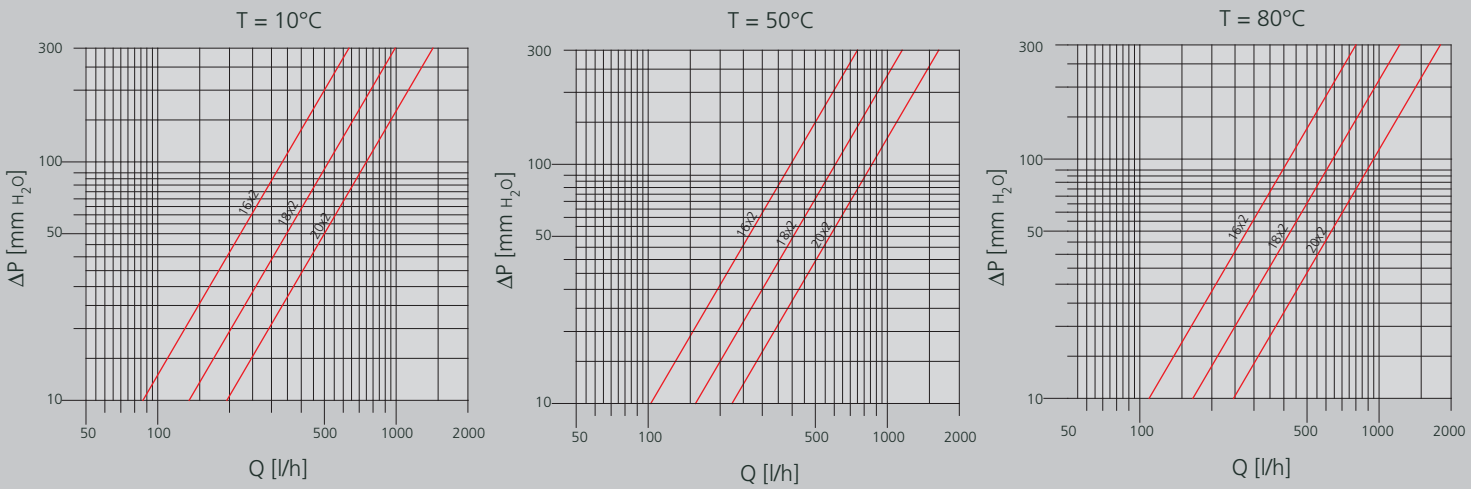
TECH

DIMENSIONS					
ARTICLE	D_{est} [mm]	D_{int} [mm]	Sp. [mm]	WATER CONTENT [l/m]	MIN. RADIUS OF CURVATURE (without pipe curving unit)
R977 16 x 2	16	12	2	0,113	80
R977 18 x 2	18	14	2	0,154	90
R977 20 x 2	20	16	2	0,201	100

The multilayer PE-RT/Al/PE-RT pipe is supplied in 100m and 200m coils packed in carton boxes which facilitate storage and protect the pipe both from sunlight and accidental damage.

PACKAGING AND DIMENSIONS			
CODE	SIZE	THICKNESS Al [mm]	PIPE LENGTH [m]
R977Y122	16 x 2	0,2	100
R977Y123	16 x 2	0,2	200
R977Y142	20 x 2	0,2	100
R977Y143	20 x 2	0,2	200
R977Y173	26 x 3	0,2	50
R977Y183	32 x 3	0,2	50

Pressure drop



CONNECTIONS

For applications using the multilayer PE-RT/Al/PE-RT pipes in radiant underfloor systems, Giacomini proposes the R179AM adaptors, which foresee a separation segment to insulate the aluminium in the pipe from the fitting in order to avoid galvanic corrosion phenomena.

THERMAL EXPANSION

In the design and installation phases of applications with PE-RT/Al/PE-RT pipework the thermal expansion phenomenon must be born in mind.

Thermal expansion is calculated as:

$\Delta l = \alpha \cdot L \cdot \Delta T$

where: Δl = expansion [mm]

α =coefficient of linear thermal expansion (0,026 [mm/mK])

L = pipe length [m]

ΔT = temperature variation [K] o [°C]

MANIFOLD CABINETS

R500

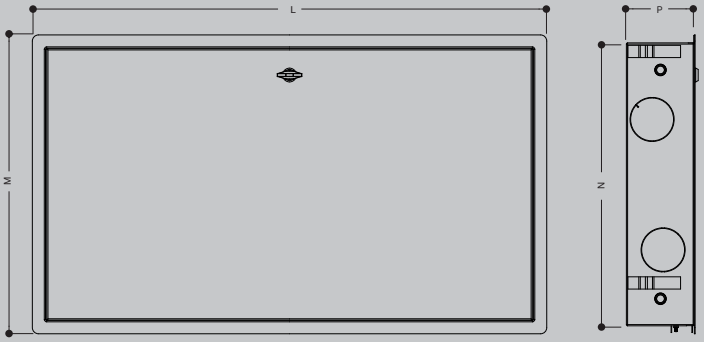
The series R500 cabinets are built-in stove-enamelled cabinets designed and manufactured to consent the housing and inspection of manifolds. The R500 series features no less than four types of cabinets (A, B, C, D) in various sizes which can be adapted to the different manifold dimensions.

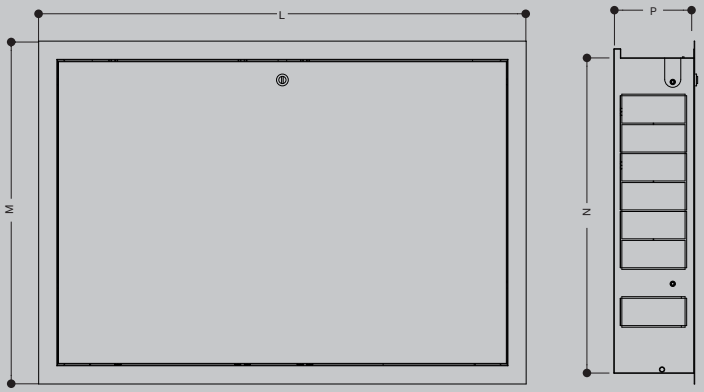
TYPE	NET USABLE DIMENSIONS	L [mm]	M [mm]	N [mm]	P [mm]
A	400 x 460 x 110	440	490	462	112
B	600 x 460 x 110	640	490	462	112
C	800 x 460 x 110	840	490	462	112
D	1000 x 460 x 110	1040	490	462	112

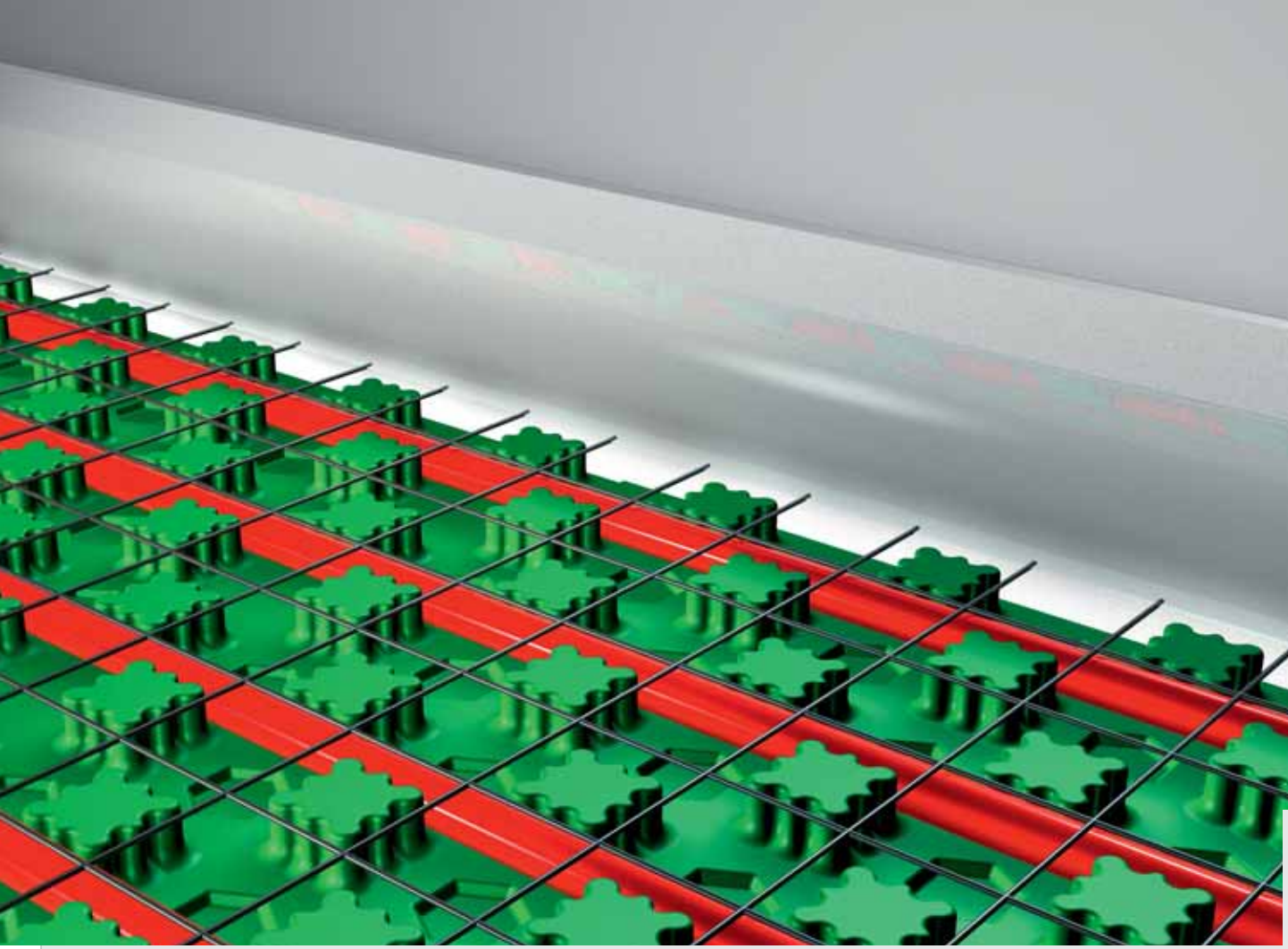
R557I

The series R557I cabinets are built-in stove-enamelled cabinets designed and manufactured to consent the housing and inspection of the manifolds. The series R557I features three types of cabinets in different sizes adaptable to the various manifold dimensions.

CODE	NET USABLE DIMENSIONS	L [mm]	M [mm]	N [mm]	P
R557Y051	850 x 605 x150	910	640	605	150
R557Y052	1000 x 605 x 150	1060	640	605	150


L
M
P
N


L
M
P
N



ACCESSORIES

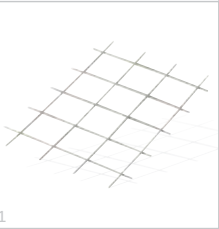
K393 electrowelded metallic net

The electrowelded metallic net is placed on the radiant system once the pipe is laid and is therefore inserted into the screed. The electrowelded metallic net provides good screed distribution and guarantees better resistance to deformation caused by shrinking phenomena. The Giacomini K393 zinc-plated electrowelded metallic net consists of 55mm side meshes and dia. 2mm wire.

PACKAGING AND DIMENSIONS		
CODE	SIZE	PANEL SURFACE
K393Y001	net 50x50 mm	2 m^2 (1x2m)

K369 wall insulation

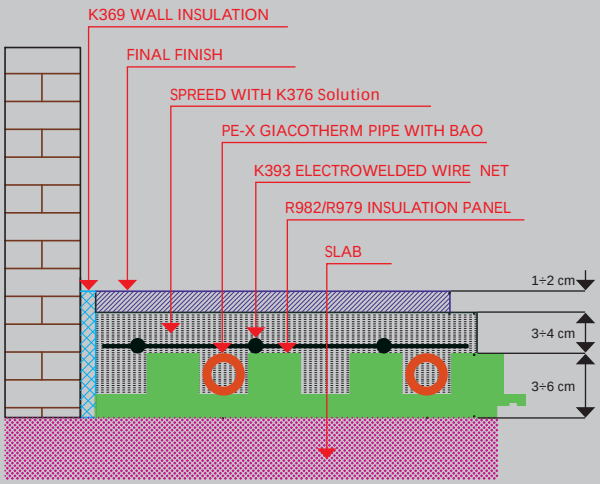
The K369 wall insulation is a polyethylene band which is applied along the walls in order to absorb any possible minimal bed settlement movements of the radiant underfloor. The insulation is available is two versions, with 15mm height and 0.8cm thickness or with 25mm height and 1 cm thickness respectively (the latter being particularly recommended for industrial installations, where the screed reaches greater thickness).


1


2


3

Lateral view
of floor section



1 ▸ Zinc-plated electrowelded net

2 ▸ K369: wall insulation

3 ▸ K369D: Expansion joint insulation

In order to facilitate its application, the insulation is provided with a 5 cm adhesive strip along one side, to make it quick and easy to stick to the wall.

TECHNICAL DATA	
Material	Polyethylene with closed cell cellular structure
Temperature at use	-10 ÷ +80°C
Specific weight	22 ÷ 25 kg/m³

PACKAGING AND DIMENSIONS	
CODE	SIZE
K369Y021	15 x 0,8 cm
K369Y022	25 x 1 cm

K369D expansion joint belt

The K369D belt is a polyethylene band which is applied as expansion joint as prescribed by the UNI EN 1264-4 norm "...joint surfaces must not exceed 40 m2 with max length of 8m. In case of rectangular rooms, surfaces of joints may exceed these dimensions, with a maximum length ratio of 2 to 1".

TECHNICAL DATA	
Material	Polyethylene with closed cell cellular structure
Temperature at use	-10 ÷ +80°C
Specific weight	22 ÷ 25 kg/m³

PACKAGING AND DIMENSIONS	
CODE	SIZE
K369DY001	15 x 0,8 cm

R872D expansion joint profile

The R872DY001 profile is used for installing expansion joints with the K369D insulation. Its base is supplied with an adhesive strip for correct positioning and its central part is elastic so as to adapt to the thickness of the expansion joint.
The profile is supplied in 2m bars.

PACKAGING AND DIMENSIONS	
CODE	BAR LENGTH
R872DY001	2 m

The profile is supplied in m bars.

K389 K389W pipe-fixing track

The K389 and K389W (also for wall mounting) are used to fix the tubes to the panel in large surface applications when adopting the R981 flat insulation panel.
Once inserted in the special rail tracks, the tube is protected from any damage and cannot shift due to the particular conformation of the seat in which it is laid.
The rail is fixed to the panel by means of clamps or clips to secure its positioning

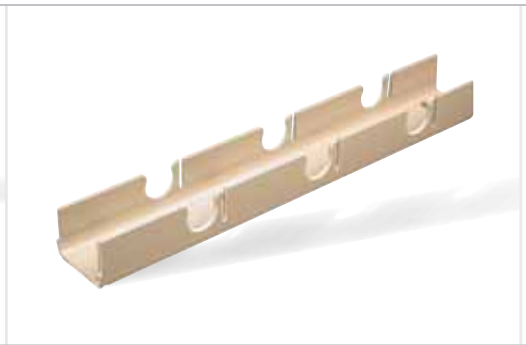
PACKAGING AND DIMENSIONS	
CODE	SIZE
K389Y002	Φ 20 mm, pitch 5 cm
K389Y003	Φ 20 mm, pitch 10 cm

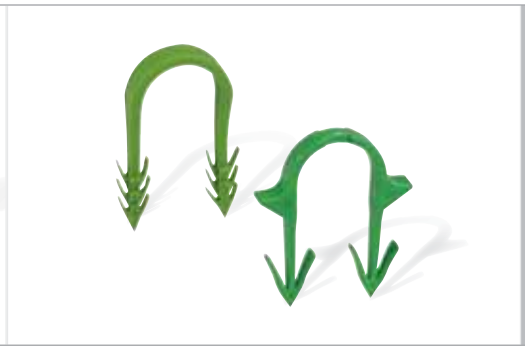
The track is supplied in 4m bars.

R983 pipe-fixing clips

The R983 plastic material pipe-fixing clips are available in two versions, according to their use.

- R983Y001 clips are used to fix pipes to insulation panels having a 45÷60mm thickness, while R983Y003 clips are for fixing pipes to insulation panels with 30mm thickness.
- R983Y500 clips are used on the R981 flat panel and are laid by means of a clip-fixing gun.





R863 clip-fixing gun

The R863 clip-fixing gun, in aluminium, is used to secure the R983Y500 clips to the R981 flat panel, consenting its rapid positioning.

R549P bend support

The new R549P bend support represent a professional solution for the organization of supply and return pipes in the manifolds.
They are high-temperature resistant, made of a strong and durable, corrosion-proof material and above all are easy and simple to install.

PACKAGING AND DIMENSIONS	
CODE	PIPE SIZE
R549PY003	Φ 16-18 mm
R549PY004	Φ 20 mm
R549PY007	Φ 25 mm

K376 fluid solution for rendering

The Giacomini K376 fluid solution is a concentrated solution with high fluxing performance, particularly suitable for cement mixes destined to cover the pipework of heating and cooling floor installations.

Once the solution is blended into the cement mix, the latter becomes very runny and therefore easy to spread over the tubing with the aid of a simple spatula, thanks to its self-levelling characteristics. When using the K376 solution it is not necessary to vibrate the mixture, since it is devised to fill in all the spaces between the tubing and the insulation panel, avoiding the formation of dangerous air pockets which can reduce the performance of the floor installation.
The principal characteristic of the K376 solution is its ability to slow down the cement maturing time, allowing to achieve a smooth bed, with good mechanical characteristics, low shrinkage and high water–proofing. The solution improves the compactness of the floor, enhancing its thermal conductivity.
The special composition of the K376 solution does not contain substances which harm the concrete, which therefore maintains unaltered characteristics in time, and in no way damages metallic and plastic materials. The solution has been studied specifically for floors with radiant installations but can in any case be used for the screed of any type of substructure thanks to its high fluxing performance.

DOSES

Thanks to its fluxing action, the use of the product consents up to approx 20% reduction of water used in the mixture, with consequently lower shrinkage during the maturing phase.
The K376 solution can be put straight into the mixer during the preparation of the cement mix in the amount of 1 litre per 100kg of cement.

PRECAUTIONS

- Do not expose the solution to temperatures below 0°C
- If exposed to freezing, remix the product before use and if necessary heat it slightly to return it to ideal conditions
- The product is not toxic, avoid anyway the contact wih eyes and do not swallow
- Keep away from children.

K375 antiscale

The Giacomini K375 product is a protective scale remover for heating installations: it is devised to avoid formation of calcareous deposits and prevent the corrosion of installations and tubing.

It is a mixture of substances which protects both ferrous and non-ferrous metals.
Oxygen induces corrosion in the ferrous components of the installation with consequent release of material: transported by water, this material can deposit on the inner walls of the installation, thus forming agglomerates which could obstruct the correct water circulation inside the pipes themselves.

A solution to the problem is represented by the use of synthetic pipes with oxygen barrier, but the greatest risk to the installation lies in the pump gaskets or the automatic vent valves: the K375 protective scale is the complete solution to the problem, since it protects the metal surfaces of the installation in such a way as to avoid oxidation and corrosion.

DOSES

Each bottle contains 1 litre. One bottle is enough for approx 200 litres of installation water.
A yearly repetition of this addition with the same doses is recommended to renew maximum level protection

Heating-cooling control


1

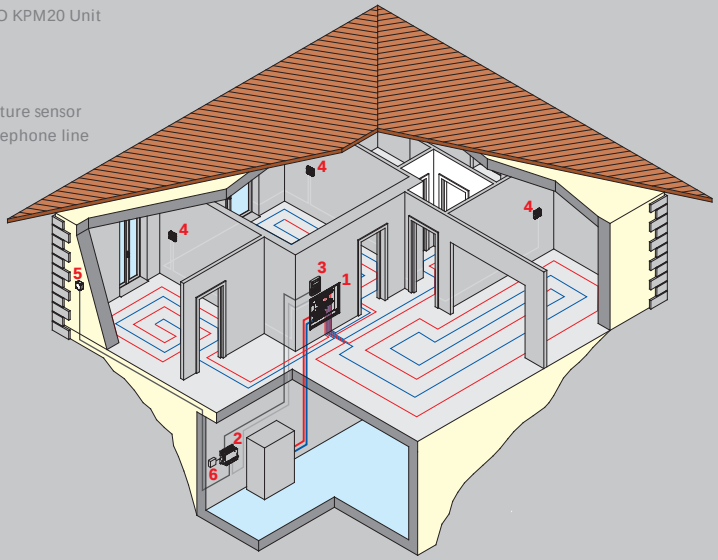

2


3


4

TECH

- 1 R559B manifold with I/O KPM20 Unit
- 2 KM203 controller
- 3 KD200 display unit
- 4 K481B thermostat
- 5 K365P outside temperature sensor
- 6 Dedicated analogue telephone line



INFO

1 ▸ R292: Zone valve

2 ▸ R473: Normally closed electrical actuator

3 ▸ R478: Normally open electrical actuator

4 ▸ K483: Built-in digital electronic thermostat

System regulation, both primary and secondary, plays a fundamental role in the realization of underfloor radiant systems. As far as primary regulation is concerned, two types of system are possible: fixed point or with climatic compensation. In fixed point regulation a water flow temperature is programmed, which remains unvaried when external conditions change. The regulation with climatic compensation, on the other hand, depends directly on outside temperature conditions since the water flow temperature within the installation varies in accordance with external temperature variations. The regulation of the single rooms is effected by means of room thermostats, which in turn trigger the electrical actuators (R473/R473M or R478/R478M) or the zone valve motors.

Giacoklima electronic regulation

The Giacoklima regulation system offers a vast range of products for the regulation of heating and/or cooling underfloor radiant systems, namely electronic panels, room thermostats, control modules and user interfaces which interact with actuators for primary and/or ambient regulation.

Unit Giacoklima K370A

The Giacoklima K370A unit is designated for the regulation of heating and/or cooling underfloor radiant systems.
The unit includes:

- Regulator (K361A)
- Flow temperature sensor (K363A)
- Outside temperature sensor (K365A)
- Dew point sensor (K366A)
- Dew point sensor bearing (K367)
- Temperature gauge housing (R227)

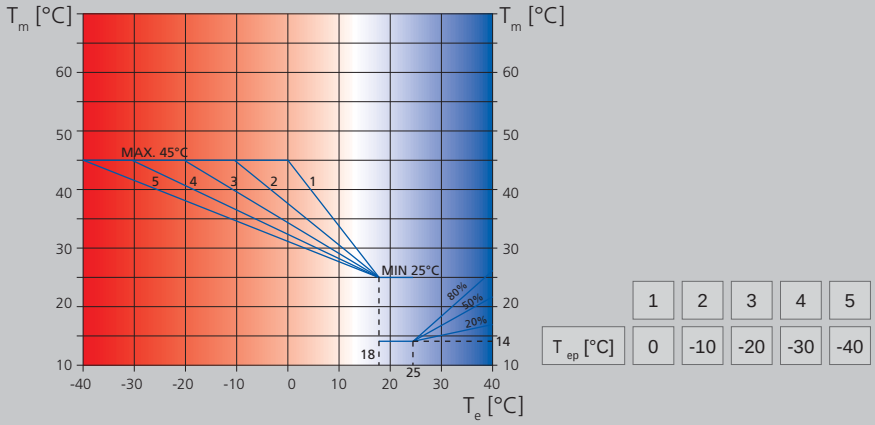
K361A regulator

The K361A regulator consents automatic regulation of water supply temperature for heating and/or cooling underfloor radiant system in accordance with outside temperature variation. Compensation of flow temperature, when outside temperature varies, results in a combination of energy saving and comfort.
In cooling mode functioning, by means of its special sensors the regulator can control the supply temperature as well as prevent the formation of dew on surfaces which are too cold compared to the air humidity in the environment.

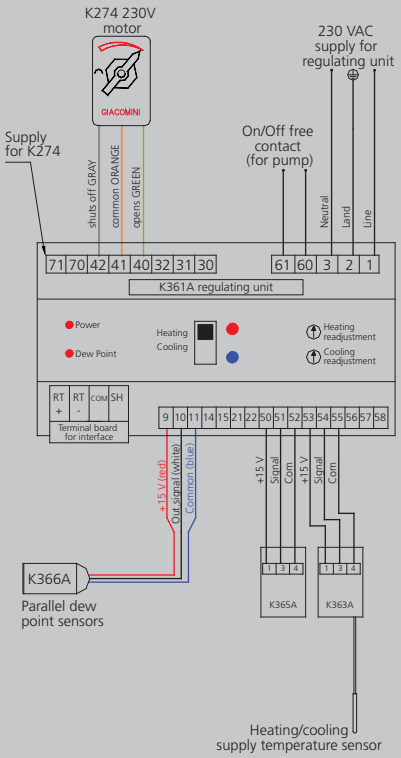
Characteristics:

- Power supply 230V~ 50Hz
- Absorbed power 10VA
- Working environment -10÷+50°C, with 10÷90% of relative non-condensing humidity
- ON/OFF contact with 230V~ 10A voltage-free relay

Compensated curves for underfloor heating and cooling systems



	1	2	3	4	5
T ep [°C]	0	-10	-20	-30	-40



K363A flow temperature sensor

The K363A temperature sensor is a probe which meters the temperature of the underfloor radiant heating and/or cooling system supply water and is installed in a housing placed on the flow tubing.

Characteristics:

- Power supply 15V
- Application range 0÷100°C
- Signal 0÷10V

K365A outside temperature sensor

The K365A temperature sensor is a probe which meters outside temperature and is installed on a north-facing external wall of the building.

Characteristics:

- Power supply 15V
- Application range -40÷ +50°C
- Signal 0÷10V

K366A dew point sensor

In order to avoid formation of dew the K366A sensor is installed on underfloor cooling systems. The K366A sensor correlates the screed temperature (always significantly lower than ambient temperature) with the environment's humidity level: when the combination of these two parameters reveals approaching dew formation conditions, the sensor sends a signal to the control unit, which consequently increases the supply temperature by 3°C, so as to recreate safety conditions.

Characteristics:

- Power supply 15V
- Application range 0÷50°C
- Signal ON/OFF

K367 bearing for dew point sensor

The K367 bearing for the K366A dew point sensor is designed to transmit screed temperature to the dew point sensor itself. The K367 bearing is installed above the insulation panel and then drowned into the screed, making sure that the upper part emerges uncovered in the ambient.

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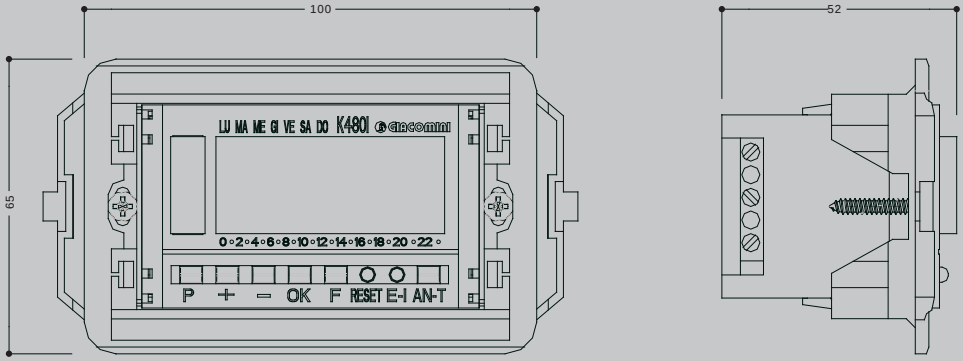
Overall size and dimensions



1 ▸ Esempio di installazione del termostato K480I

TECH

INFO

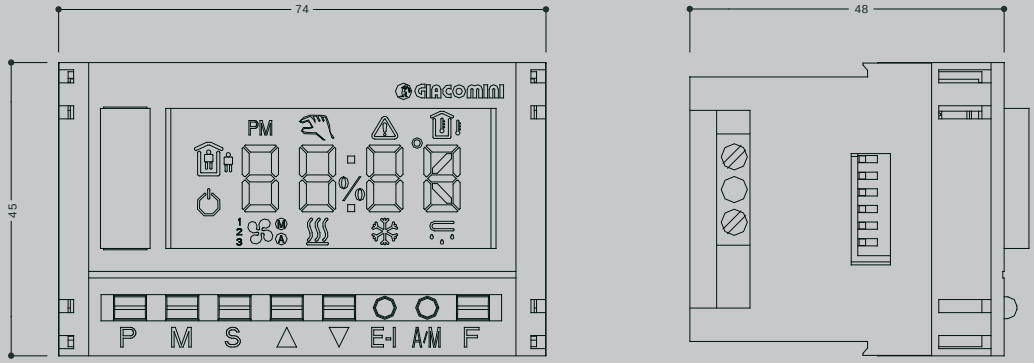
K480I chronothermostat

The K480I is a high-performance electronic thermostat to be embedded with daily/weekly programming. It consents extremely accurate ambient temperature (heating and cooling) regulation of the room in which it is installed and is therefore able to satisfy the user's requirements in terms of ambient comfort and energy saving. The K4801 is easily programmed by means of the digital keys on the front of the unit; a vast display allows constant visual monitoring of functioning data. The K4801 chronothermostat guarantees an "aesthetic" harmony of the climatic control unit with the other devices of installations installed in a modern residential building.

Characteristics:

- Power supply 230V~ 50Hz
- Temperature regulation range 6÷38°C
- Minimum temperature regulation interval 0,1°C
- Ambient temperature visualization 0÷40°C with a resolution of 0.1°C
- Minute-by-minute temperature adjustment
- Output with relay contacts
- Daily/weekly programming
- LCD display
- Summer/winter (cooling/heating) switch

Overall size and dimensions



K482 Digital electronic thermostat

Digital electronic thermostat for the control of the room temperature, installation in 3 places wall mounting box to be embedded, 230V supply. Optionally, the thermostat can have a sensor of integrated relative humidity, for the survey of hygrometry conditions of the ambient.

Characteristics:

- Power supply 230V~ 50Hz
- Temperature regulation range 12÷28°C
- Minimum temperature regulation interval 0,1°C
- Ambient temperature visualization 0÷40°C with a resolution of 0.1°C
- LCD display
- Summer/winter (cooling/heating) switch

K373 safety termostat

In underfloor radiant installations the K373 has a thermostat limiting function for excessive temperature: in case of a malfunction, should the water supply temperature exceed the pre-set value, the thermostat emits a signal (clean contact) which can be used to block the circulation pump.
The K373 thermostat equipped with immersion sensor is used in applications requiring a temperature control in the range of 40÷80°C by means of an ON/OFF type regulator.
It is supplied with a pre-set intervention temperature of 50°C.

Characteristics:

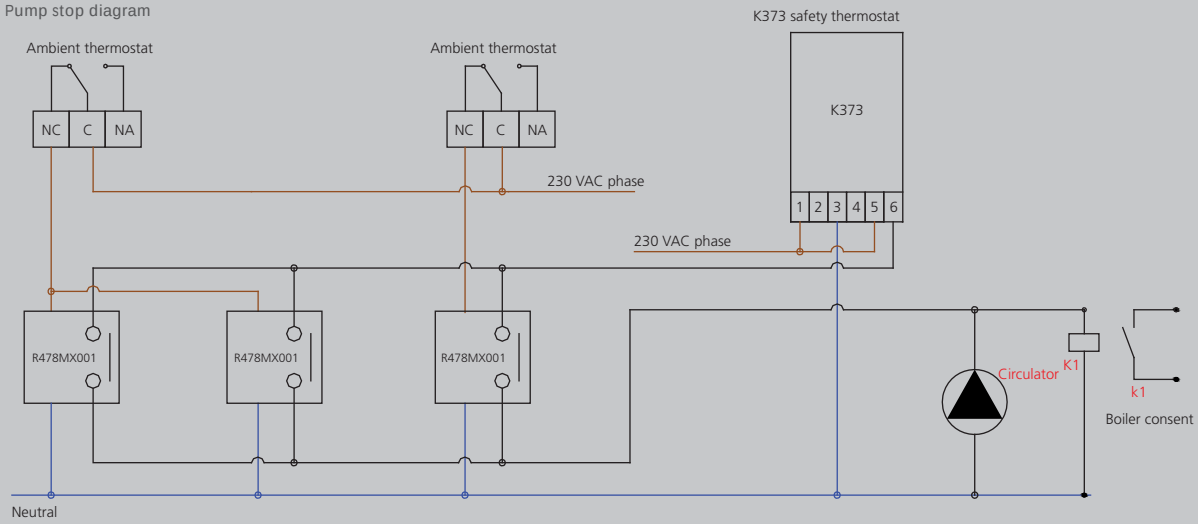
- Power supply 230V~ 50Hz
- Outlet through 7A relay with voltage free contacts
- Equipped with immersion sensor with cable
- Regulation trimmer with 40÷80°C graduated scale
- Automatic reset
- Pull-out terminal connection

KF200

The KF200 command module is a component of the GIACOKLIMA series to be combined with the digital thermostats K482F or K483F for use with dual-pipe ventilation convector terminal actuators in Giacomini radiant underfloor heating and/or cooling systems combined with the KM20x controller, the KD200 display unit and the KPM20 I/O unit.
The KF200 module can be installed directly on the ventilation convector cabinet using self-tapping screws.
The K482F or K483F digital thermostat can control up to a maximum of four KF200 simultaneously: one KF200 module for each ventilation convector.
Characteristics

- Power supply 230V~
- Installation directly on the ventilation convector cabinet
- 4 digital inlets for K482F or K483F digital thermostat programming
- 1 power supplied digital outlet, for controlling ON/OFF actuator of the valve on the water battery
- 3 power supplied digital outlets for controlling a three-speed ventilator
- Time-delay protection fuse (250V~, 3,1A) for ventilator and actuator of the ventilation convector battery valve.

Pump stop diagram



TECH

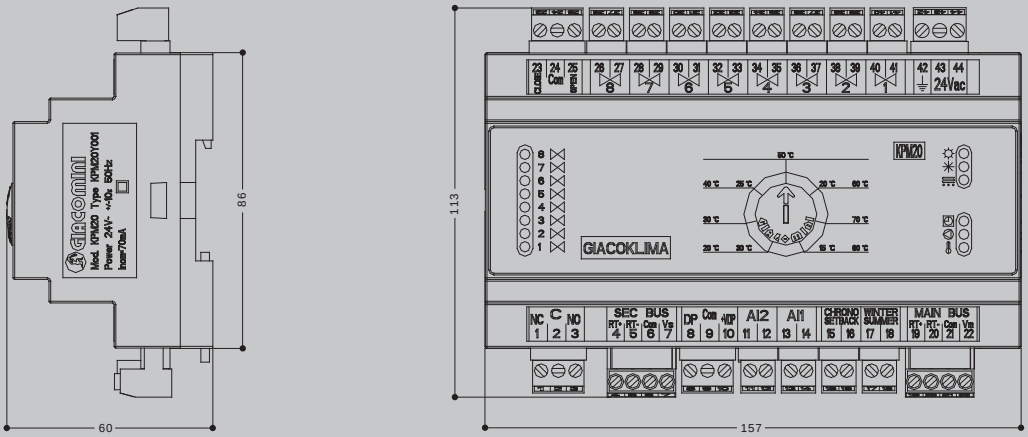
Regulation with connection via bus signal

The new Giacoklima regulation system offers devices which are able to exchange information thanks to the adoption of the modern "bus" technology, a cabling system used to transfer signals. In a "bus" system a "point to point" connection between the sensors (ambient thermostats) and the actuation devices (control actuators for electrical heads or motors for zone valves) is no longer necessary; it is enough to connect all the devices to the signal cable without having to respect any particular sequence.

The Giacoklima "bus" regulation system offers a number of advantages as compared to traditional solutions:

- Simplicity, since cabling for connection of the devices is significantly reduced
- Extendibility according to customer requirements, thanks to the modularity of the system
- Versatility, thanks to the possibility to configure the system for different regulation modes
- Safety
- Communication, since each unit can communicate via "bus"
- Comfort and energy saving

Overall size and Dimensions



KPM20 regulation unit

The KPM20 I/O unit is a unit intended for use in the Giacoklima bus system destined for the regulation of radiant underfloor or ceiling heating and/or cooling systems, combined with the K481 and K483 thermostats, the KM20x controller and the KD200 display unit.

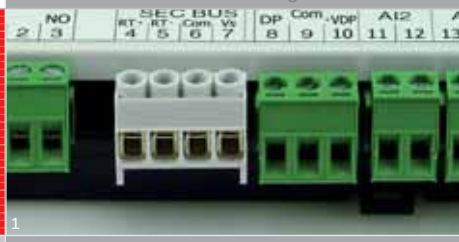
The KPM20 allows for rapid connection to R478 (N.O.) or R473 (N.C.) electrical actuators and to K481 or K483 thermostats without using auxiliary devices such as distribution cabinets and/or interface relays.

The system also includes the automatic management of the intervention of a circulator and the operation of a mixing valve.

The KPM20 I/O unit is able to drive actuators R478 or R473 according to the status of the bus-connected thermostats.

By adopting an appropriate combination of connections and software configurations of the I/O unit it is possible to realize the following primary regulation modes:

- Fixed point with adjustable unit: the supply temperature is regulated by means of a PI (proportional/integral) regulator;
- With climatic compensation: the supply temperature is adjusted by means of a PI (proportional/integral) regulator and the required value automatically varies according to a preconfigured compensation curve;
- With climatic compensation and thermal jump monitoring: the supply temperature is regulated by means of PI (proportional/integral) regulator and the required value varies automatically according to a preconfigured compensation curve, but when the temperature drop is higher than a preconfigured value (equal to 6°C by default) the climatic compensation is excluded and the required supply temperature corresponds to the maximum accepted value.
- Power supply 24V~ 50 Hz
- Enables independent management of up to 8 K481 or K483 ambient thermostats connected on secondary bus
- 8 outlet channels, independently manageable
- Enables direct control of a maximum of two R478 (N.O.) or R473 (N.C.) 24V~ electrical actuators for each outlet channel
- Management of circulator start with time delay of approx 3 minutes at the opening of one of the water circuits after the completely closed condition



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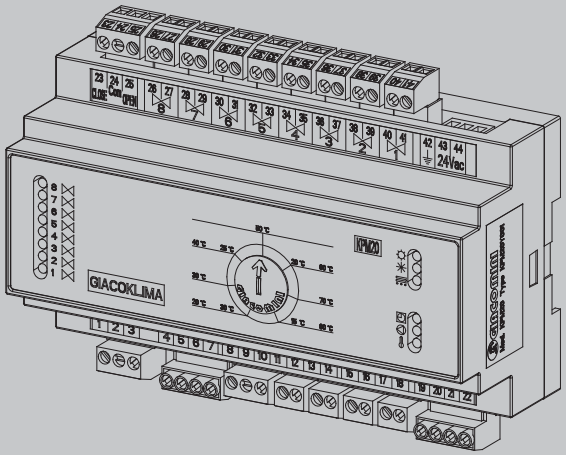
1 ▸ KPM20 1 details



INFO

- Control of 1 motor with 3-point 24V~ command for mixing valve
- Enables setting of required temperature for mixing unit (set point regulation) or maximum temperature (climatic compensation regulation) by means of the rotating potentiometer on the front of the unit
- 1 inlet for connection of the K363P sensor for metering supply temperature
- 1 inlet for connection of the K365P sensor for metering outside temperature or, alternatively, a K363P sensor for metering return temperature
- 1 inlet for connection of a maximum of 4 parallel K366A dew point sensors
- 1 inlet (clean contact) dedicated to a unit for the centralized commutation of the summer/winter conduction mode for all thermostats and for regulation mode
- 1 inlet (clean contact) dedicated to a set-back unit (centralized signal for all thermostats connected to the secondary bus for the temperature drop corresponding to the night mode)
- Enables connection to KM20x controller via primary bus for advanced functions and remote control
- Visualization by means of LED indicators
- Microswitch for address selection in applications with primary bus and KM20x controller

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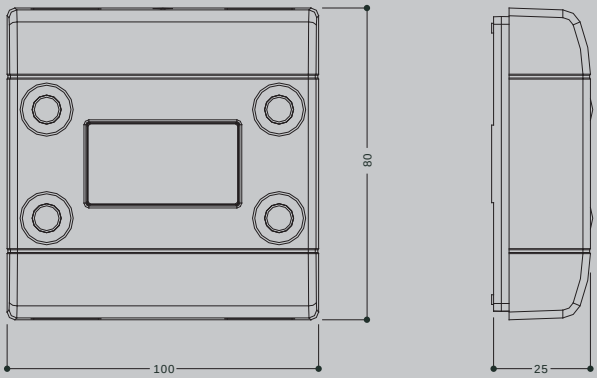
1 ▸ Internal electronic details of the K481 1 thermostat

Overall size and Dimensions



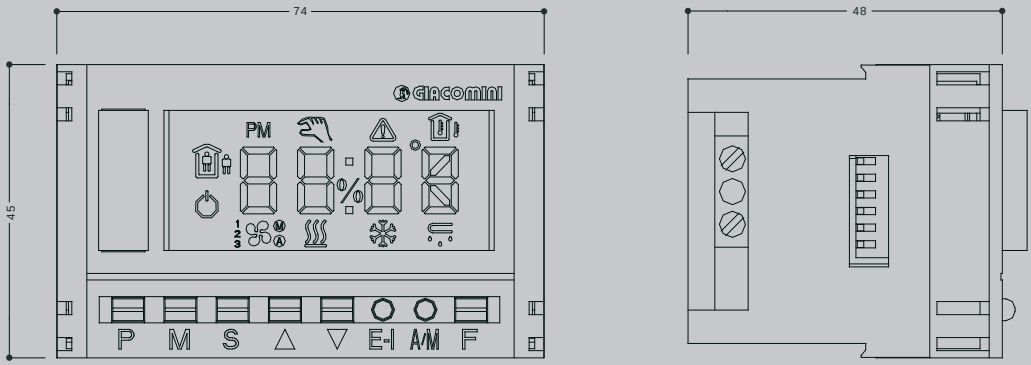
K481 Digital electronic thermostats

The K481 thermostat is a unit which has been realized for use on a Giacoklima bus system for the regulation of the Giacomini radiant underfloor or ceiling heating and/or cooling systems, combined with the KM203 controller, the KD200 display unit and the KPM20 I/O unit. The K481A version is equipped with a relay for directly controlling an electrical actuator and can therefore function in stand-alone configuration, combined with R478 (N.O.) or R473 (N.C.) 230V~ or 24V~ power supplied electrical actuators. The K481B version is not equipped with integrated relay and can only control electrical actuators indirectly, combined with the KPM20 I/O unit. The K481D version has an integrated moisture tester function for dehumidifying unit control. The K481 thermostat constantly compares the ambient temperature value metered by the integrated (Teff) sensor with the value of required temperature (Tset): in WINTER mode if Teff > Tset the flow request ceases and a corresponding message is sent by bus to the KPM20 I/O unit which proceeds with bringing the electrical heads to hydraulically closed position.

Characteristics:

- Power supply 8÷12VDC o 6÷8V~
- Operates in bus signal network with KPM20 (secondary bus) unit
- Operates in bus signal network with KM20x controller (primary bus)
- The K481A has an integrated relay which consents stand-alone operation
- LCD Display with temperature indication.

Overall size and Dimensions



TECH

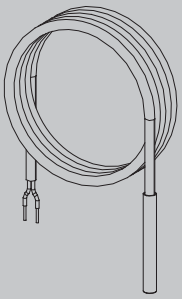
K483 Digital electronic thermostats

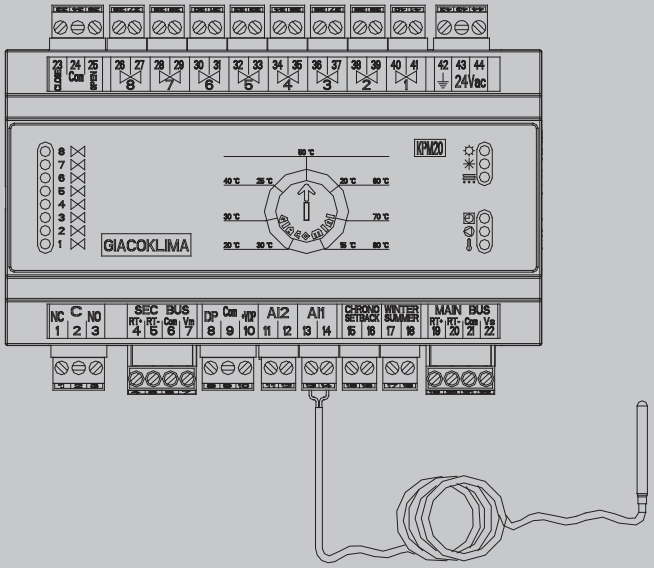
The K483 digital electronic thermostat family consists of devices realized to be used in Giacomini radiant underfloor or ceiling heating and/or cooling systems, combined with the KM20x controller, the KD200 display unit and the KPM20 I/O unit and other compatible communicating devices. The K483 thermostat family is directly powered by means of a bus communication network. The K483A version is equipped with a relay for directly controlling electrical or motorized actuators for circuit interception valves or zone valves.
The K483B version is not equipped with integrated relay and can control electrical actuators only indirectly or combined with the KPM20 I/O unit. The K483F version, combined with the command module to be installed onboard the KF200, is predisposed for controlling the dual-pipe ventilation convector terminal actuators; it can also control electrical actuators indirectly or combined with the KPM20. The K483D version is equipped with a relay for controlling the dehumidifying unit. The thermostat can also drive electrical zone actuators indirectly or combined with the KPM20 I/O unit.

Characteristics:

- Temperature regulation range 12÷28°C
- Minimum temperature regulation interval 0,1°C
- Ambient temperature visualization 0÷40°C with a resolution of 0.1°C
- LCD display
- Summer/winter (cooling/heating) switch
- Operates in bus signal network with KPM20 unit (secondary bus)
- Operates in bus signal network with KM20x controller (primary bus)
- The K483A has an integrated relay for driving electrical actuators or zone valves
- The K483D, with integrated moisture tester function, has a relay for controlling the dehumidifying unit
- The K483F has a module for the manual/automatic control of the dual-pipe ventilation convector terminal actuators
- The K483AY002, K483BY002, K483FY002, K483DY002 are equipped with a capacity-related type sensor for metering the relative integrated humidity, with ±3% precision.

Connection to the K363P
sensor of the KPM20 I/O unit





K363P flow temperature sensor

The K363P temperature sensor is a unit which is intended for use in Giacomini radiant underfloor or ceiling systems combined with the KPM20 I/O unit. The K363P sensor allows metering of supply temperature on relative collector; the KPM20 unit is predisposed to acquire the signal emitted by the K363P sensor which is elaborated for the control of the water temperature flowing to the single circuits. The K363P sensor can be applied to all Giacoklima installations, regardless of the chosen regulation mode: set point or with climatic compensation, with or without temperature jump monitoring. The K363P sensor must be connected to the A/1 inlet of the KPM20 unit.

Characteristics:

- Passive type sensor
- Type NTC 30 kΩ 25°C resistance

K365P external temperature sensor

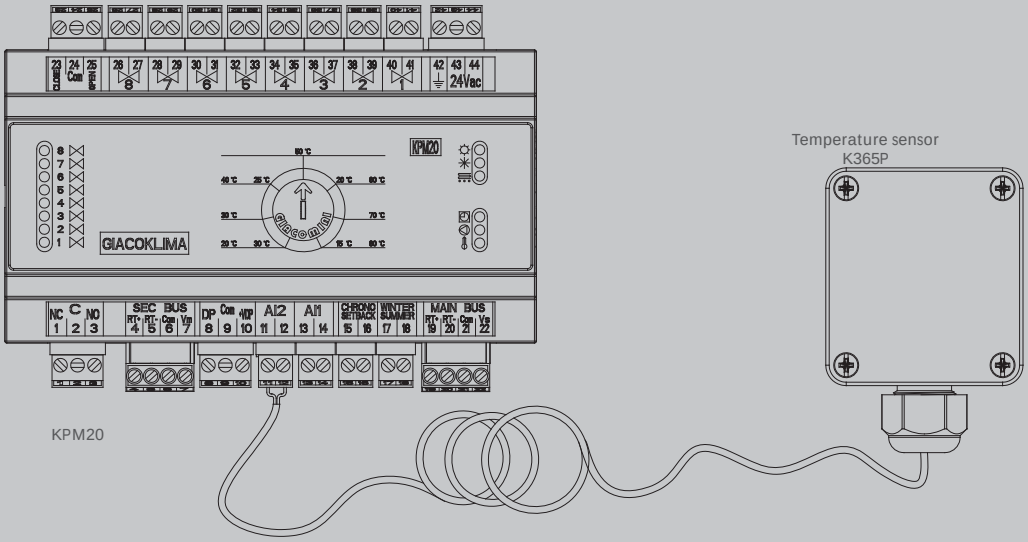
The K365P temperature sensor is a unit destined for use on Giacomini radiant underfloor or ceiling systems combined with the KPM20 unit or with the KM203 network controller. The K365P sensor allows external temperature metering; the KPM20 unit and the KM203 controller are predisposed for acquiring the signal emitted by the K365P sensor which they elaborate in order to effect the regulation of the climatic compensation installation. The K365P sensor is applied in Giacoklima installations where the chosen regulation mode is with climatic compensation, with or without monitoring of the temperature drop. In the simpler installations featuring only one KPM20 unit with a maximum of 8 K481/K483 thermostats connected on secondary bus, the K365P sensor must be connected to the dedicated A/2 inlet of the KPM20. Instead, in systems also featuring a KM203 controller connected on primary bus, the K365P sensor must be connected to the A/3 or A/4 inlets of the controller: in this case the A/2 inlet of the KPM20 unit is not predisposed for connection with the K365P sensor..

Characteristics:

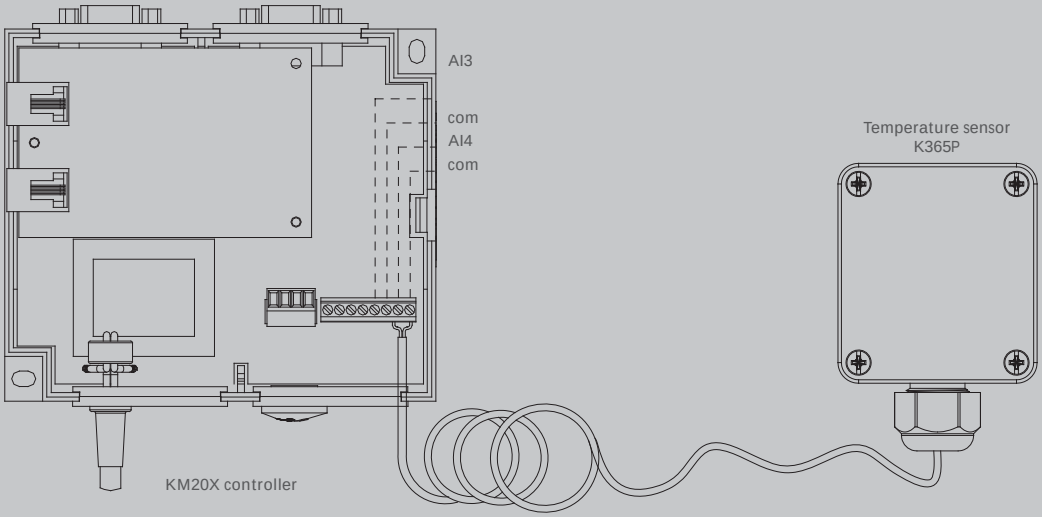
- Passive type sensor
- Type NTC 30 kΩ 25°C resistance

Overall size and Dimensions

Connection of K365P sensor
to KPM20 I/O unit



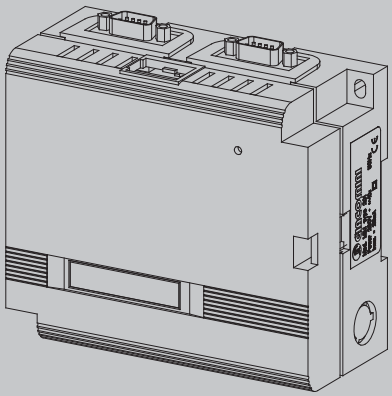
Connection of K365P sensor
to KM20X controller

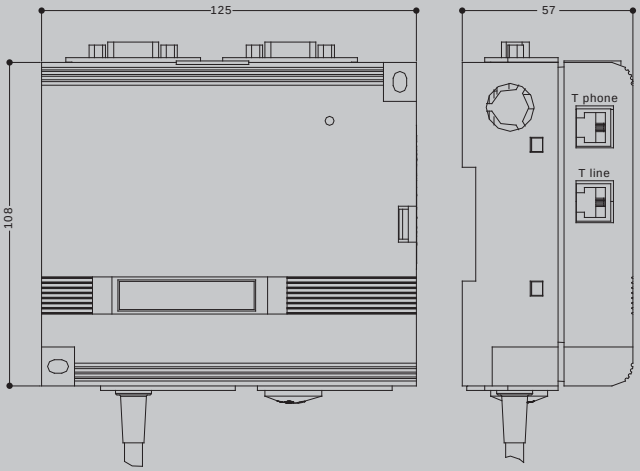


K360 transformer

220V –24Vac transformer to be combined with control actuators for power supply of 24V motors. Nominal power 12

Overall size and Dimensions





TECH

Network control

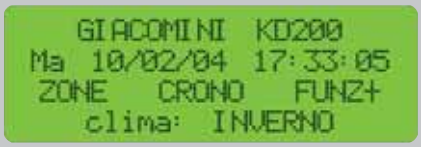
KM203 controller

This controller has been realized for use on Giacoklima “bus” systems destined for the regulation of radiant underfloor or ceilings combined with the K481 and K483 thermostats, the KPM20 I/O unit and the KD200 display unit.
The KM203 controller features a one door RS485 interface with integrated modem.
The KM203 controller provides two main functions:

- It manages and coordinates operations of all Giacoklima “bus” devices connected to the installation and extends their performance compared with the stand-alone function;
- it acts as interface for local supervision and remote control.

Characteristics:

- Power supply 230V~ 50÷60 Hz
- Enables to manage up to 32 Giacoklima “bus” devices connected on primary bus
- 2 analogue inlets for connection with active sensors
- 2 analogue inlets for connection with passive sensors
- It consents connection with one KD200 display unit.



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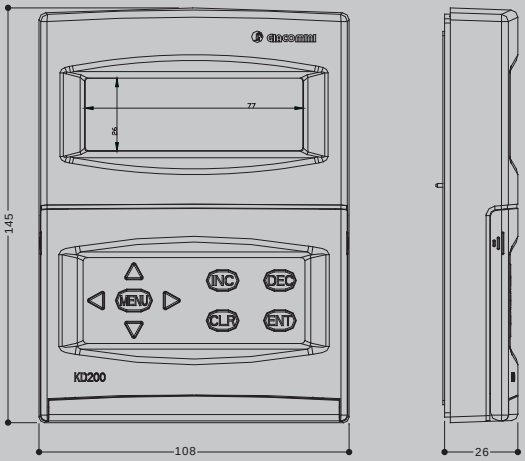
Overall size and Dimensions



1 ▸ Detail of KD 200 1 display unit

KD200 display unit

The KD200 display unit is a unit realized for use in a Giacoklima "bus" system destined for the regulation of radiant underfloor or ceiling systems combined with the K481 and K483 thermostats, the KPM20 I/O unit and the KM203 controller.

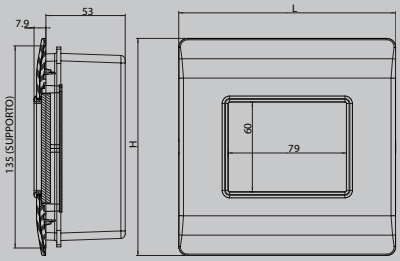
The KD200 display unit is a visualization and control terminal which operates exclusively combined with the Giacoklima KM203 controller, acting as its local interface. The KD200 is equipped with keyboard, display and communication interface. Data visualization and action triggered by pressing the keys of the K200 are managed by the KM203 controller.

KD200 display unit has a set of command and signalling elements:

- An LCD alphanumerical display with 4 lines x 20 columns
- A keyboard with 17 rubber keys (9 keys for the selection of principal commands and 8 auxiliary keys for additional functions)
- One RS485 interface for communication with the KM203 controller.

Characteristics

- Powered by KM203 by bus connection
- 1 RS485 inlet for connection to a KM203 controller
- 1 frontal RS485 inlet for connection to a PC
- Visualization and adjustment of significant parameters of a maximum of 16 K481 and K483 thermostats connected to the bus of the Giacoklima system
- Centralized commutation of the summer/winter conduction mode for up to 32 devices
- Loading and modification of 4 Chrono programs residing in the KM203 controller
- Setting of date and time displayed on the KM203 controller
- Visualization and modification of parameters to be configured according to installation function



KD300 touch screen unit

The KD300 touch-screen control and display unit is a device designed for use in Giacomini radiant heating and/or cooling systems (floor, wall and ceiling) associated with the components for giacoklima® heating/cooling control bus and other devices communicating with compatible protocol.
The KD300 touch-screen unit is a control and display unit that can work exclusively associated with KM203 network controller of which it represents the local user interface. Thanks to the 3,8" monochromatic touch screen surface, use is easy and intuitive both for daily operation of end user and for installer throughout all the phases of system commissioning or maintenance. The installation requires the built-in box Gewiss GW24237 model.

Main features

- monitoring and control of maximum 16 independent zones
- centralized commutation SUMMER/WINTER for the entire system
- possibility to set 4 time programs
- final user customization of zone name
- system diagnosis and fine-tuning of operating parameters
- Italian/English menu browsing

K485 Ambient sensor

The K485 temperature and relative humidity ambient sensor allows the control of radiant underfloor or ceiling heating and/or cooling systems, combined with the components for the Giacoklima bus heating regulation and other compatible communicating devices. The ambient sensor is equipped with a relay for directly controlling electrothermic actuators or motors for zone valves. Thanks to the temperature and relative humidity sensors integrated in the device, the ambient sensor can calculate the dew temperature of ambient air, important information for the control applications of cooling radiant systems. In addition the sensor can perform the function of blind ambient thermostat in the applications in which no control or display element is necessary for the user. In the operation as blind ambient thermostat, the display or setting of ambient temperature measured and required, just like the typical parameters of attenuation, can be made on the KD200 display unit combined with the KM20x net controller.
The sensor K485 was developed for wall-mounted installation and requires the arrangement with round built/in box (diameter: 60 mm)..

KSMS

Module for remote control of radiant panel systems with mobile phone (GSM network) sending and receiving text messages; in addition the system is remotely controlled by PC through a direct connection with GSM modem. The KSMS module should be used combined with GIACOKLIMA bus heating regulation products. All functions locally executed on the KD200 display panel (for example reading and setting ambient temperatures, reading or modification of adjustment parameters and management of the radiant system) can be performed remotely sending simple text messages. Two access profiles are available: user profile to monitor and control the temperatures in the house; the maintenance profile with which the installer can easily diagnose and fine-tune the parameters of the system.

Remote control

This handling consists in remote monitoring and control of the installation realized, in order to optimize maintenance and enhance comfort by means of well-timed system regulation.
Giacoklima remote control does not require dedicated software or hardware: it is possible to intervene in the remote management of a system through internet by means of an access key which guarantees data protection.

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KPM20 adjustment module

2

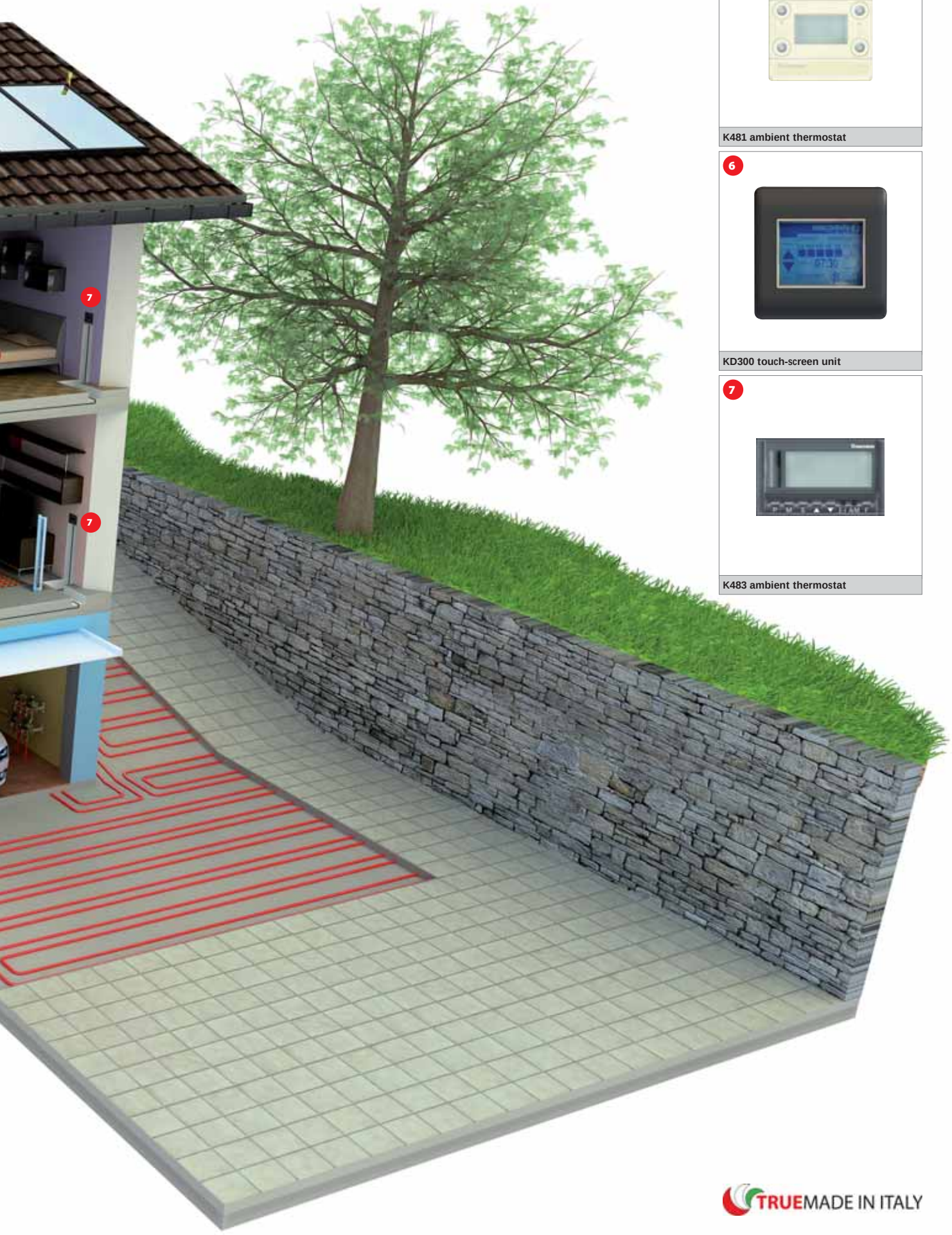
KM203 network controller

3

KSMS remote control module

4

K365P external temperature probe



5

K481 ambient thermostat

6

KD300 touch-screen unit

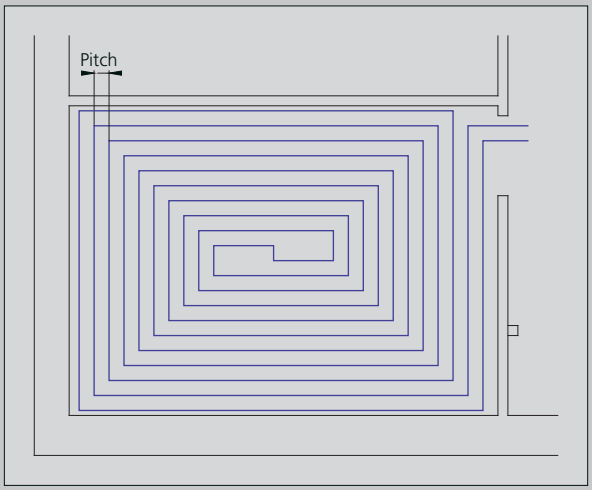
7

K483 ambient thermostat

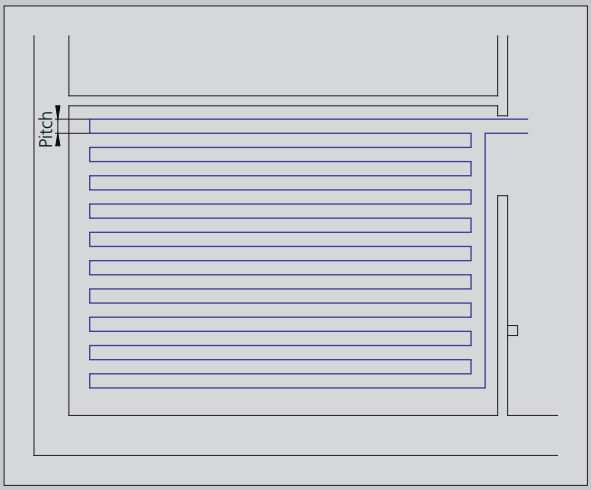
TRUEMADE IN ITALY

Design

Spiral-type distribution

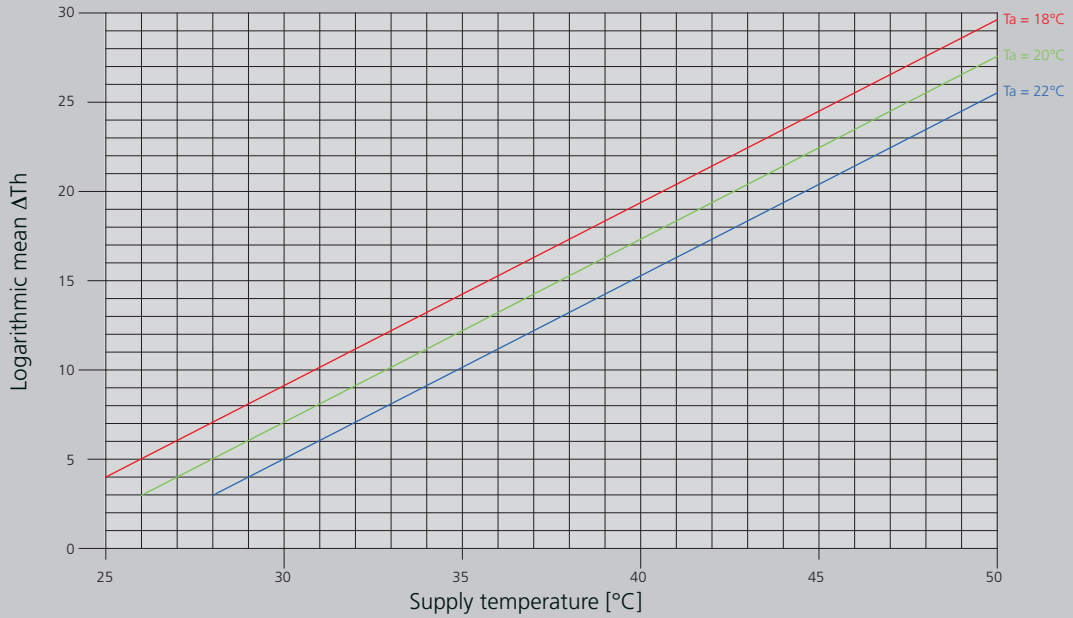


Coil-type distribution



Project parameters

To obtain maximum comfort from an underfloor radiant installation, this must be designed with great care.
First of all it is important to know the physical characteristics of the building in which the system is to be installed, in particular the way it is oriented in relation to cardinal points and its grade of insulation, so as to correctly estimate potential heat loss through the building itself and the glass surfaces.
The level of comfort required may vary from one room to another within the same building, depending on the purpose and conditions of the environment. In the case of living areas, approx 20°C are considered adequate for comfortable ambient temperature, also in consideration of the indications of the UNI EN 1264 norm in terms of maximum superficial temperature acceptable for the human body, which is reported to be equal to 35°C for peripheral zones and 33°C for living areas and bathrooms.
Another very important aspect to be considered is the superficial floor cover of the various rooms, both as regards the type of material used and the thickness of the same, since these factors are extremely influential in the desingning phase of a radiant system.
In the designing phase it is also useful to be aware of the position where the manifold will be placed within the ambient to be heated, in order to achieve best supply and return circuit distribution: for this reason it is advisable to position the manifold is a fairly central area in relation to the various rooms which will be served by the radiant system, and choosing a spot which will also allow easy inspection.
The layout of the circuits composing the installation can be of the “spiral”-type or of the “coil”-type: the spiral distribution guarantees a more uniform surface temperature distribution; on the other hand, the coil distribution causes a gradual drop in the superficial temperature from the manifold supply point to the return point: this makes the coil distribution more suitable in applications where the screed takes on vast proportions, such as industrial floors.



Installation dimensioning

When reaching the actual installation dimensioning phase, it will therefore be necessary to consider the various aspects evaluated in the preparatory phase (thermal insulation, floor cover, manifold position) in addition to the other distinctly "technical" factors, such as pressure loss and ΔT. temperature difference

For the practical calculation of the pitch and thermal output the following steps must be followed:

- First of all the maximum installation supply temperature and the required ambient comfort temperature must be established: with this data follow the diagram to obtain the value of the ΔThlogarithmic mean , analytically defined as

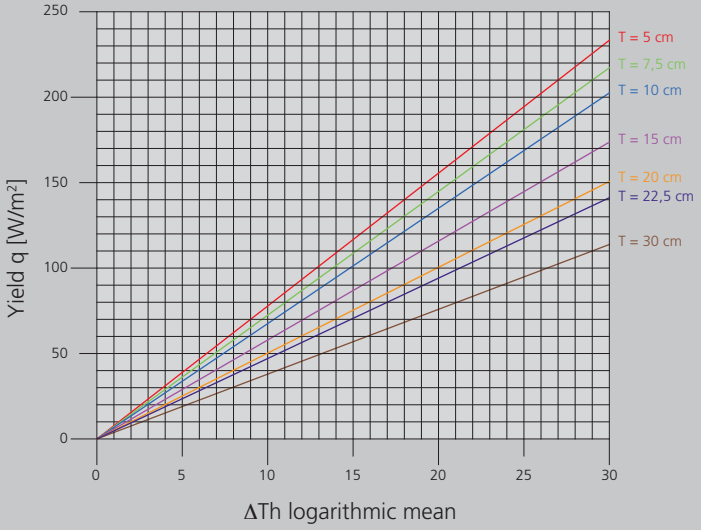
$$\Delta Th = \frac{T_v - T_R}{\ln\left[\frac{T_v - T_a}{T_R - T_a}\right]}$$

where: T_v = supply temperature [°C]
T_R = return temperature [°C]
T_a = ambient temperature [°C]
ln = natural logarithm

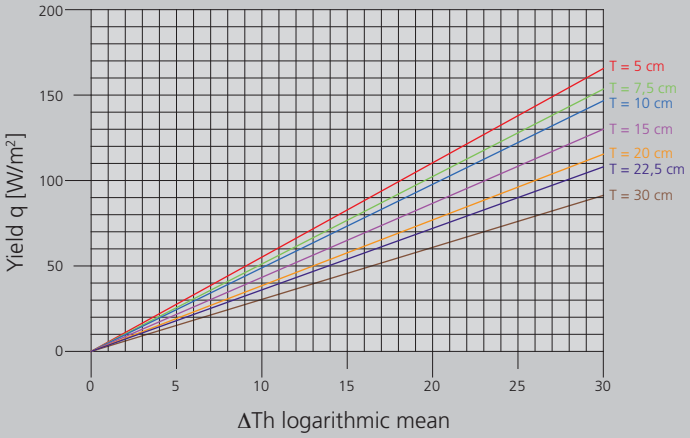
- Once the choice of floor cover is known, with the ΔTh value obtained from the diagram it is possible to find the pitch between the pipes corresponding to the thermal requirement q expressed in W/m2.

Giacomini has devised a calculation program (Giacoklima Tool) realized within the company to enable easier, more accurate calculation processes, which are often of an iterative nature, since the resulting values are obtained applying the UNI EN 1264 norm. Such program can be requested directly to Giacomini.

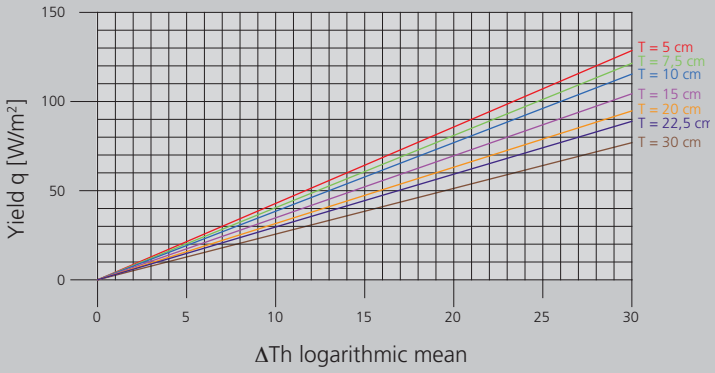
Surface finish: CERAMIC
Thermal output as a function of
ΔTh logarithmic mean and of T pitch between the tubes



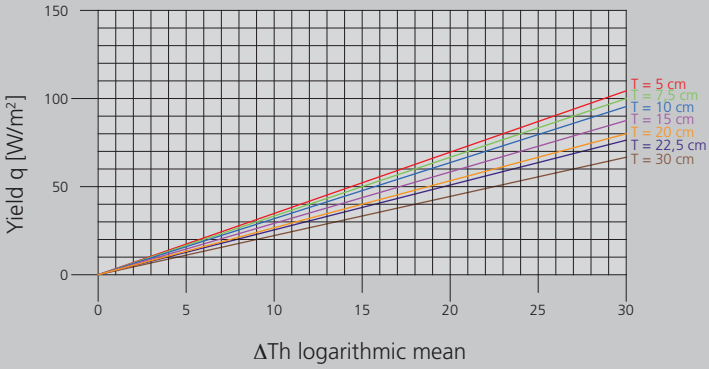
Surface finish: PARQUET
Thermal output as a function of
ΔTh logarithmic mean and of T pitch between the tubes

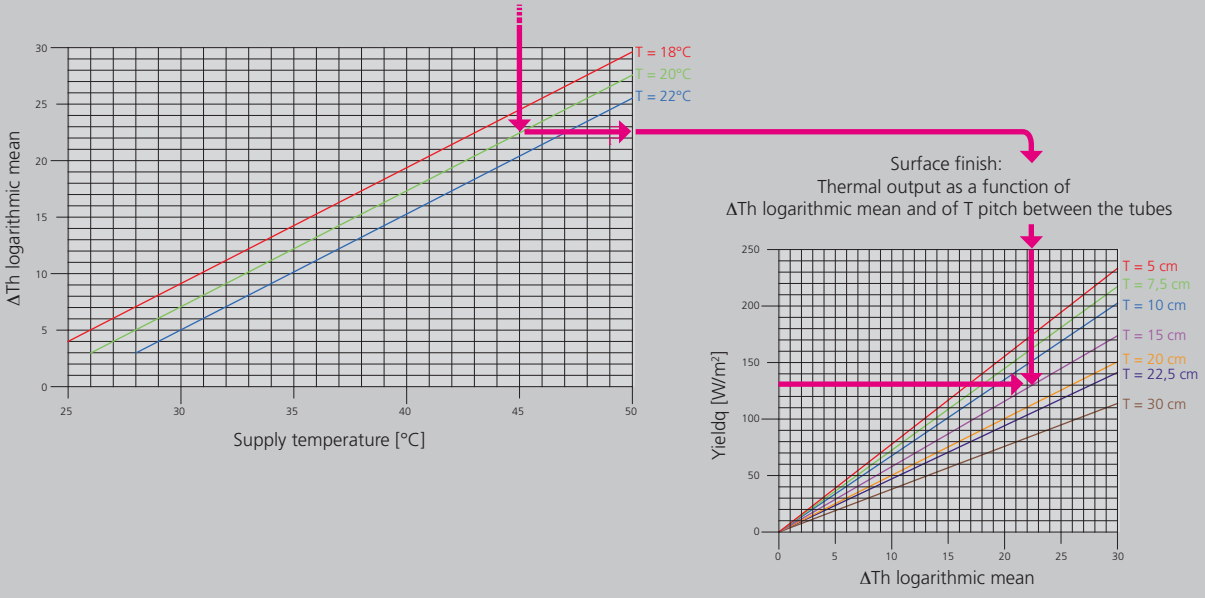


Surface finish: LIGHTWEIGHT CARPETING
Thermal output as a function of
ΔTh logarithmic mean and of T pitch between the tubes



Surface finish: THICK CARPETING
Thermal output as a function of
ΔTh logarithmic mean and of T pitch between the tubes



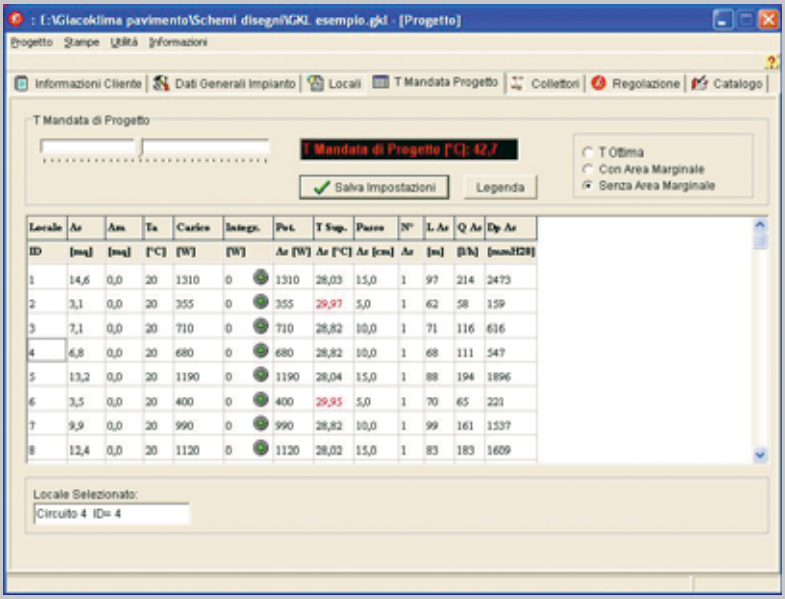


The designer is requested to insert certain data required by the program in subsequent windows, so as to arrive at a complete and precise description of the ambient which will be served by the radiant installation. First of all an indication of the type of installation to be designed must be provided: only heating, heating and cooling and type of regulation. Once the choice has been made the fields must be filled in with the requested data.

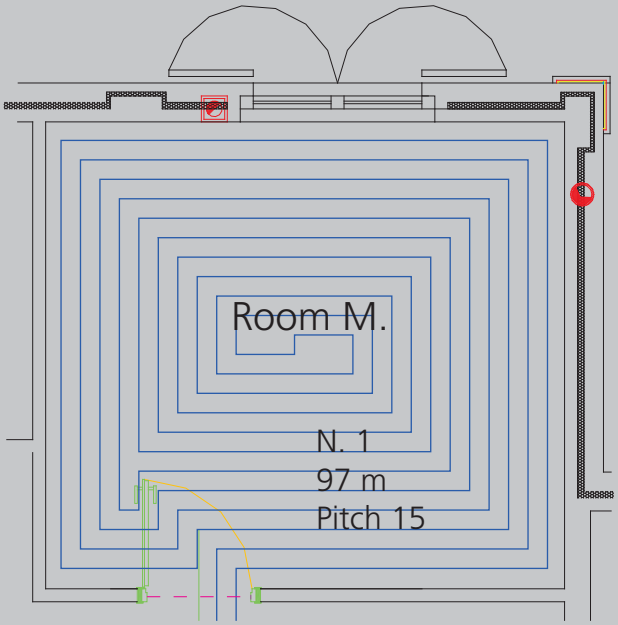
- Write the data identifying the client and the project.
- Fill in general preliminary fields with data regarding the screed, slab and floor cover, then add the Giacomini components which are going to make up the installation, i.e. insulation, tubing and manifold. Indications are also given on the maximum length allowed for the circuits and on maximum ΔT to be considered for water.
- Specify the characteristics of the rooms served by the installation, with area and required thermal supply.
- In the following window the program puts out the resulting pipe pitches to be adopted in the various rooms, the number and length of the circuits with the values related to flow and pressure drop of the single circuit, with the possibility of intervening, if necessary, on the temperature of supply water.
- Subsequently the various circuits are assigned to the manifolds, with a limit of max 12 circuits for each manifold.
- Once the manifolds are determined, the program puts out the values of flow and pressure drop which the manifolds will produce given the hypothesis formulated so far.
- The program can also be requested to optimize the use of pipe coils in order to provide the installer with useful indications on how best to distribute the hanks of pipe between the various circuits.
- In order to complete the project, primary and secondary system regulations are examined, the thermostats to be installed in the rooms, if any, are considered as well as the boiler manifold needed to cover the requirements of the installation.
- Should it be necessary to add any particular components from the catalogue, a selection is available straight from the catalogue for anything required to be directly included in the list of material.

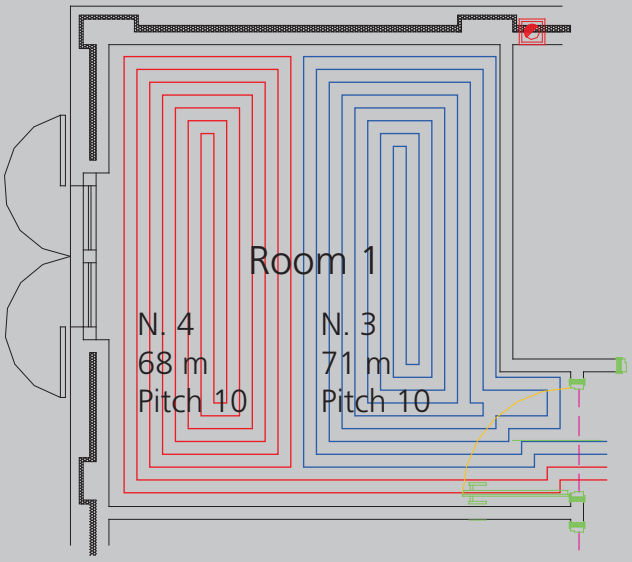
Inside the home, where possible, one or more circuits are assigned exclusively to each room, in order to enable easy control and regulation of the comfort situation of single rooms. Where the building features zones with large glass expanses or insufficient insulation, it is advisable to foresee marginal areas in which the pitch between the pipes is greater than in the rest of the room, in order to guarantee a higher heating output in compensation of the thermal drop caused by dispersion.

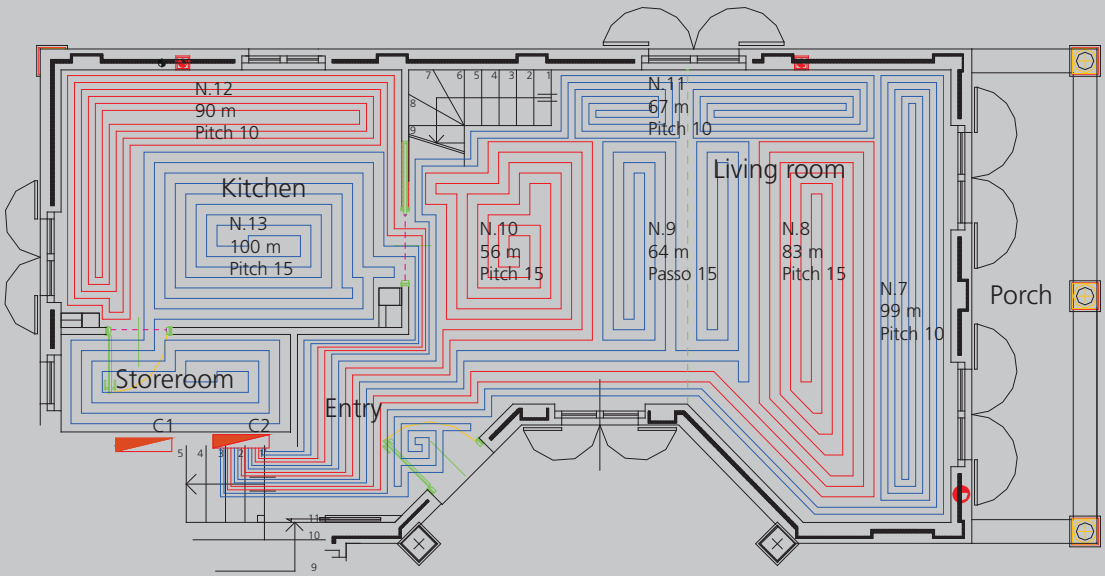
- **PROJECT PARAMETERS**
- DESIGNING FOR AMBIENTS WITH SIGNIFICANT HEIGHT (INDUSTRIAL FLOORS, CHURCHES, ETC.)
- INSTALLATION DIMENSIONING



Example of a video display of the Giacoklima calculation program







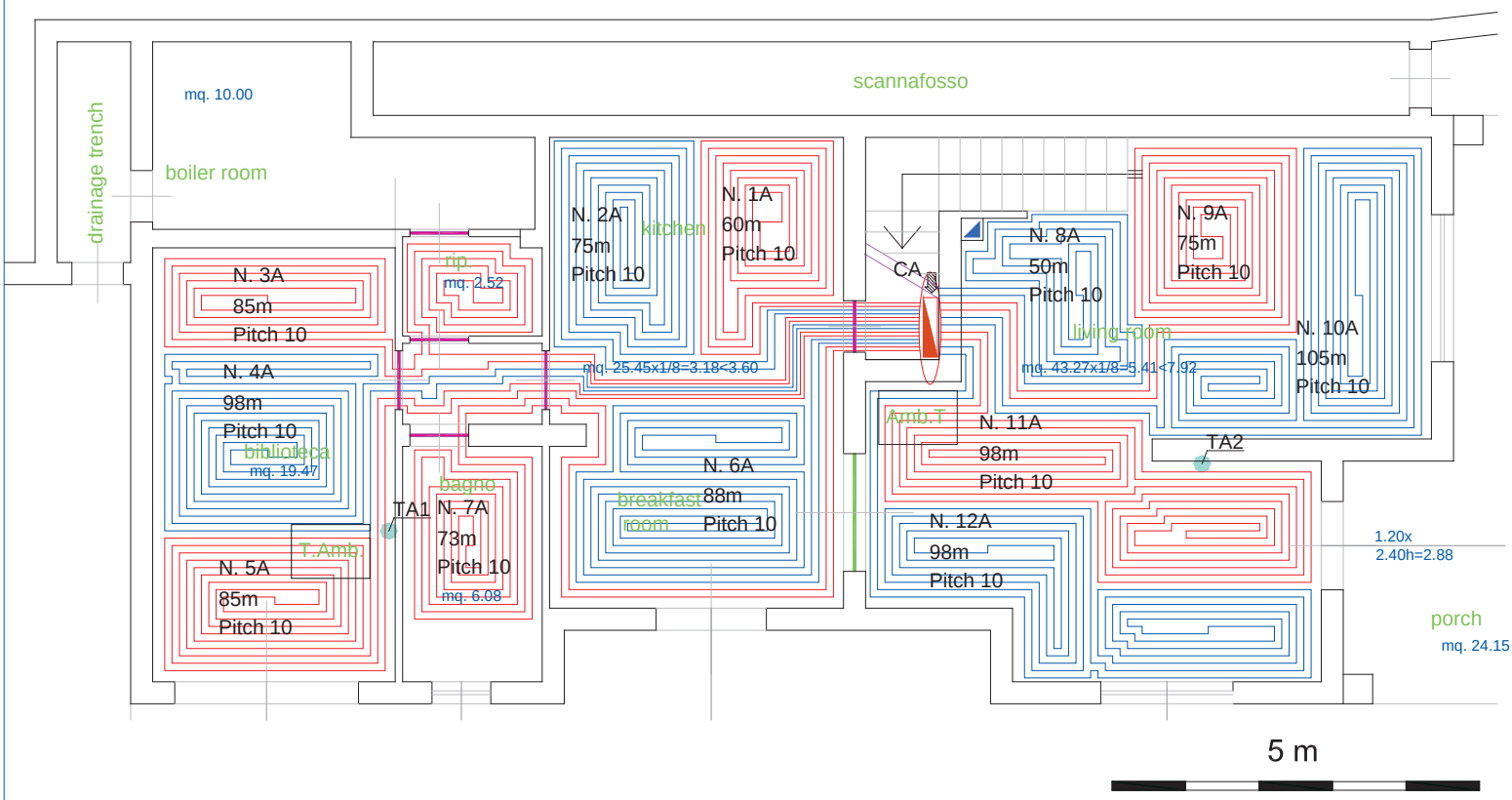
Designing of rooms with significant height (industrial floors, churches, ...)

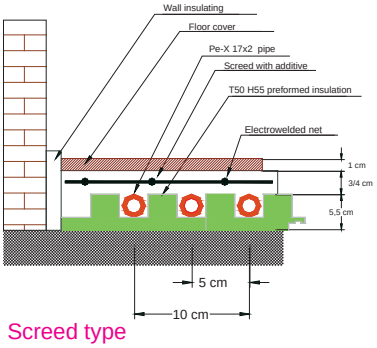
Thermal comfort is known to be influenced not only by air temperature, but also by the temperature of surfaces surrounding the person and by the presence of draughts.

An ambient heated with a low temperature radiant system, especially if the height is significant, houses some natural, very weak air circulation: this avoids air stratification (which occurs with traditional heating systems) and a notable upward dispersion of heat, as well as excessively dry ambient air.
In an industrial floor, for example, due consideration must be given to the fact that the floor installation is subject to continuous functioning: this allows for more constant thermal pressure and for the heat generators to operate with a seasonal average output out-performing that of traditional installation solutions.

In the realization of installations with vast surfaces, in order to speed up installation operations, the R981 flat panel is used coupled with the R984 polyethylene sheet with steam barrier function: above these the pipe-fixing tracks are placed for the coil-type distribution of tubing. In industrial floors it is always advisable to position a structural electrowelded net for load distribution.

Ground Floor Plan

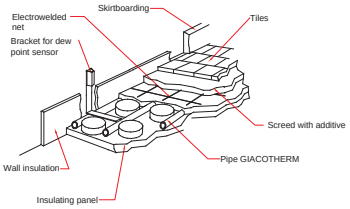




Screed type

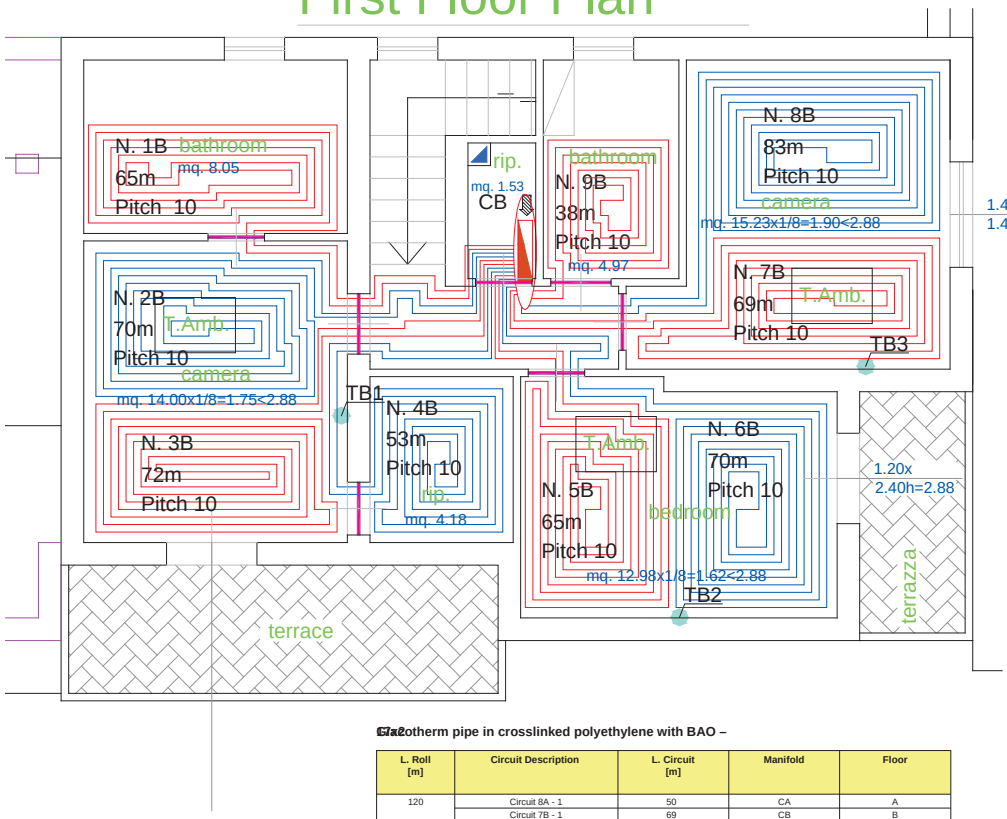
In cases where concentrated loads are expected (warehouses, garages, showrooms, etc.) it is advisable to position an electrowelded net, imbedded in the screed with additive, over the pipes.

NOTE: In zones where the tubing is expected to be rather crowded (doorways, manifold outlets, etc.), supply tubing must necessarily be insulated



Screed perspective

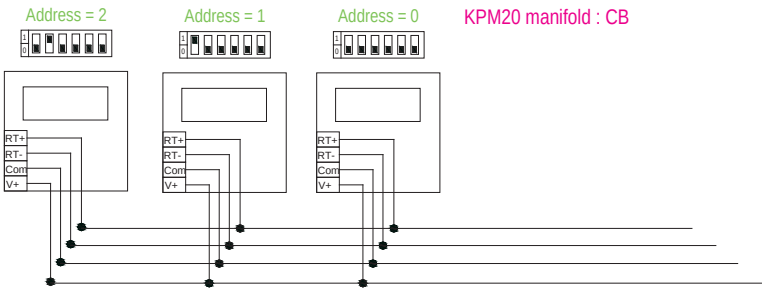
First Floor Plan

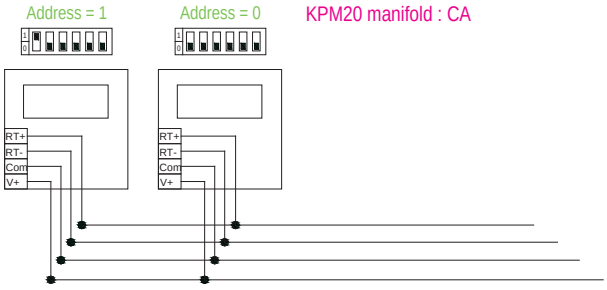


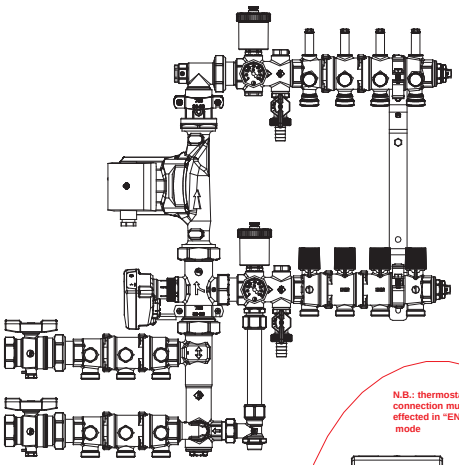
Giacotherm pipe in crosslinked polyethylene with BAO –

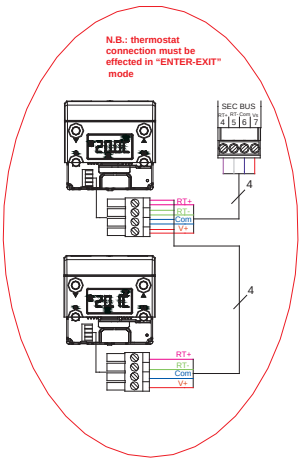
L. Roll [m]	Circuit Description	L. Circuit [m]	Manifold	Floor
120	Circuit 8A - 1	50	CA	A
	Circuit 7B - 1	69	CB	B
240	Circuit 4B - 1	53	CB	B
	Circuit 6A - 1	88	CA	A
	Circuit 4A - 1	98	CA	A
240	Circuit 1A - 1	60	CA	A
	Circuit 7A - 1	73	CA	A
	Circuit 10A - 1	105	CA	A
240	Circuit 1B - 1	65	CB	B
	Circuit 2A -1	75	CA	A
	Circuit 11A - 1	98	CA	A
240	Circuit 5B - 1	65	CB	B
	Circuit 9A - 1	75	CA	A
	Circuit 12A - 1	98	CA	A
240	Circuit 2B - 1	70	CB	B
	Circuit 8B - 1	83	CB	B
	Circuit 3A - 1	85	CA	A
240	Circuit 6B -1	70	CB	B
	Circuit 3B -1	72	CB	B
	Circuit 5A - 1	85	CA	A
100	Circuit 9B - 1	38	CB	B

manifold R559









Legenda

- GIACOTHERM pipe
- Settlement joint
- Expansion joint
- TA — Room thermostat
- Manifold R559

Circuit results

N°	Description	Floor	Amb. Temp [°C]	Usable area [mq]	Max Pow. [W]	Integr. Pow. [W]	Pitch [cm]	Nr. Circ. [nr.]	Length. [m]	Sup. Temp. [°C]	Circuit results [°C]	P [mm c.a.]
1	Circuit 1A	A	20	6	600	-	10	1	60	28,8	100	403
2	Circuit 2A	A	20	7,5	750	-	10	1	75	28,8	125	744
3	Circuit 3A	A	20	8,5	850	-	10	1	85	28,8	141	1049
4	Circuit 4A	A	20	9,8	980	-	10	1	98	28,8	163	1552
5	Circuit 5A	A	20	8,5	850	-	10	1	85	28,8	141	1049
6	Circuit 6A	A	20	8,8	880	-	10	1	88	28,8	146	1154
7	Circuit 7A	A	20	7,3	730	-	10	1	73	28,8	121	690
8	Circuit 8A	A	20	5	500	-	10	1	50	28,8	83	244
9	Circuit 9A	A	20	7,5	750	-	10	1	75	28,8	125	744
10	Circuit 10A	A	20	10,5	1050	-	10	1	105	28,8	175	1876
11	Circuit 11A	A	20	9,8	980	-	10	1	98	28,8	163	1552
12	Circuit 12A	A	20	9,8	980	-	10	1	98	28,8	163	1552
13	Circuit 1B	B	20	6,5	650	-	10	1	65	28,8	108	502
14	Circuit 2B	B	20	7	700	-	10	1	70	28,8	116	615
15	Circuit 3B	B	20	7,2	720	-	10	1	72	28,8	120	665
16	Circuit 4B	B	20	5,3	530	-	10	1	53	28,8	88	286
17	Circuit 5B	B	20	6,5	650	-	10	1	65	28,8	108	502
18	Circuit 6B	B	20	7	700	-	10	1	70	28,8	116	615
19	Circuit 7B	B	20	6,9	690	-	10	1	69	28,8	115	591
20	Circuit 8B	B	20	8,3	830	-	10	1	83	28,8	138	983
21	Circuit 9B	B	20	3,8	380	-	10	1	38	28,8	63	115

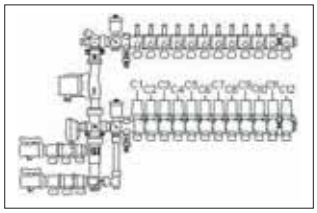
Manifold results

N°	Name	Manifold type	Number of rings	Flow Totale [l/h]	ΔPTotal [mm c.a.]
1	CA	PREASSEMBLED (SET POINT) R559	12	1648	2299
2	CB	PREASSEMBLED (SET POINT) R559	9	974	1247

Preassembled R559 CA cabinet configuration

ROOM	THERMOSTATS		CONTROL UNIT OUTPUTS KPM20	CIRCUIT NR.
	BUS ADDRESS	MICROSWITCHES		
THERMOSTAT-1	0		40 41 / 1	C3 + C4 in parallel
			38 39 / 2	C5
THERMOSTAT-2	1		36 37 / 3	C1 + C2 in parallel
			34 35 / 4	C6 + C7 in parallel
			32 33 / 5	C8 + C9 in parallel
			30 31 / 6	C10
			28 29 / 7	C11
			26 27 / 8	C12

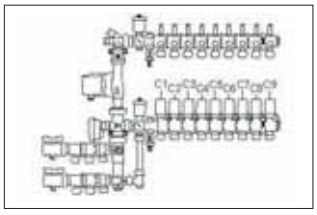
TYPE	HEATING AND COOLING
REGULATION:	PREASSEMBLED (SET POINT) R559
ACTUATORS:	



Preassembled R559 CB cabinet configuration

ROOM	THERMOSTATS		CONTROL UNIT OUTPUTS KPM20	CIRCUIT NR.
	BUS ADDRESS	MICROSWITCHES		
THERMOSTAT-1	0		40 41 / 1	C1 + C2 in parallel
			38 39 / 2	C3
			36 37 / 3	C4
TERMOSTAT-2	1		34 35 / 4	C5
			32 33 / 5	C6
TERMOSTAT-3	2		30 31 / 6	C7
			28 29 / 7	C8
			26 27 / 8	C9

TYPE:	HEATING AND COOLING
REGULATION:	PREASSEMBLED (SET POINT) R559
ACTUATORS:	



Peak operating values of GIACOKLIMA underfloor installation

Ambient temperature:	20 °C
Water supply temperature:	45 °C
ΔT:	6 °C

UNI EN 1264 NORM

Maximum surface temperature

Living areas:	29 °C
Living areas:	33 °C
Peripheral zones:	35 °C

Joints

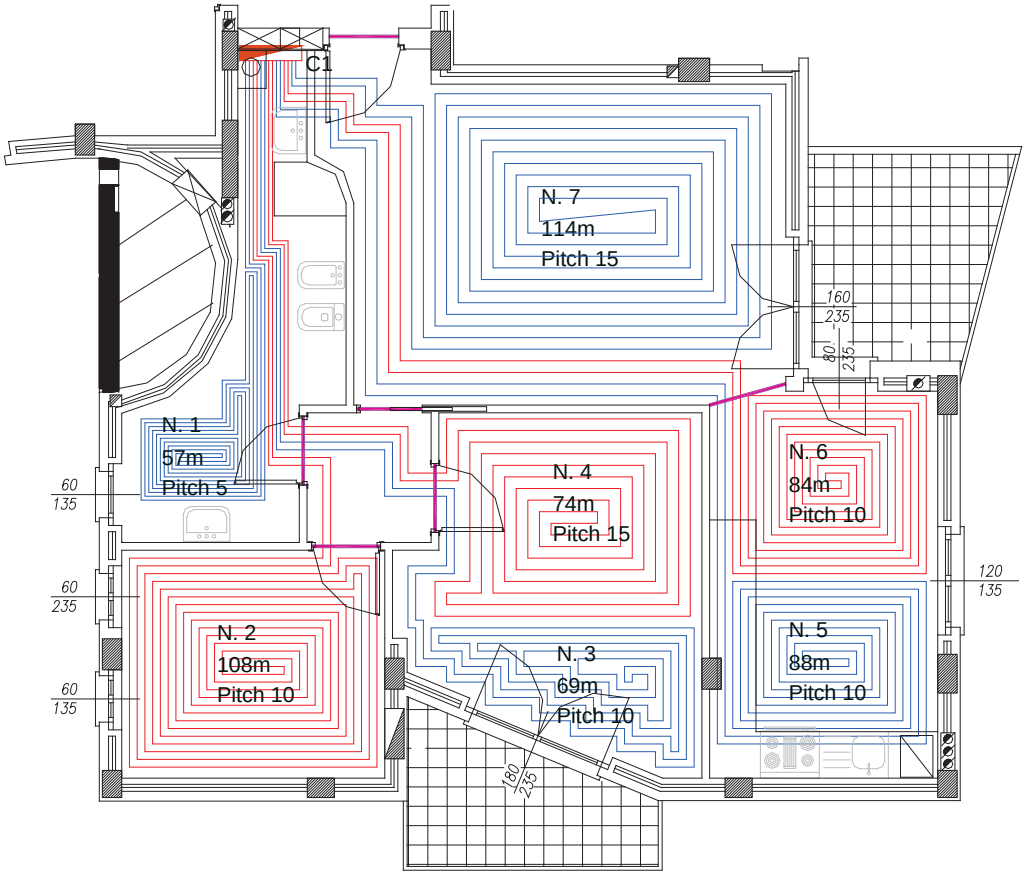
Expansion joint position must correspond with that of structural joints within the building.For floors which are expected to be finished in stone or tiles , the joints must be designed to include areas of approx. 40 m², with max length of 8 m.
In case of rectangular areas these measures may be exceeded, limiting the ratio between the sides to 2:1.

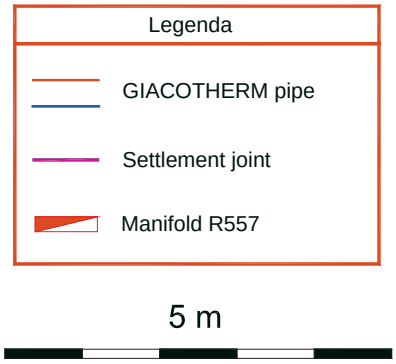
Expansion joint positioning should start, where possible, from jutting zones, such as pilasters or service areas, i.e. points where room surfaces are broader or narrower

In any case expansion or settlement joints must be provided in doorways and corridors

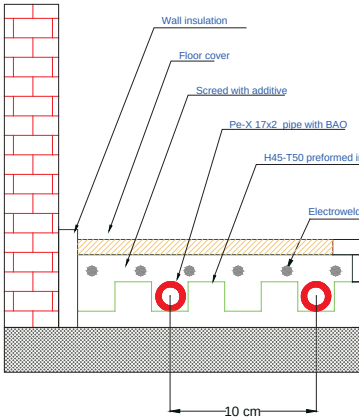
Pressure test and start up

Pressure test and start up must be carried out according to the provisions of the UNI EN 1264 Norm.





Screed section



In cases where concentrated loads are expected (ware
it is advisable to position an electrowelded net, imbedd
over the pipes.

NOTE: In zones where the tubing is expected to be ratl
(doorways, manifold outlets, etc.), supply tubing must
be insulated.

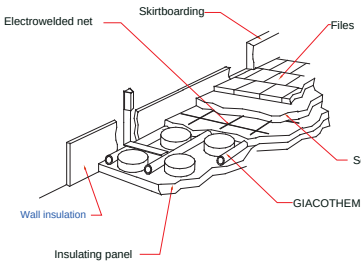
Circuits optimization- Coils

GIACOTHERM CROSSLINKED POLYETHYLENE PIPES WITH BAO - 17x2

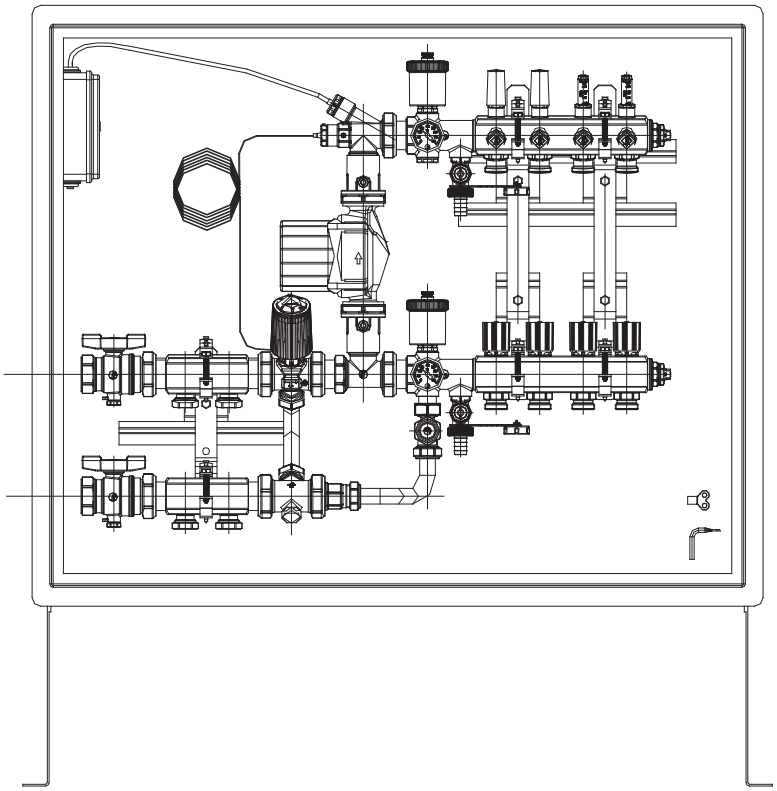
Roll L.[m]	Description Circuit	L. Circuit [m]	Manifold	Floor
600	Circuit 3 -1	69	C1	t
	Circuit 4 -1	74	C1	t
	Circuit 6 -1	84	C1	t
	Circuit 5 -1	88	C1	t
	Circuit 2 -1	108	C1	t
	Circuit 7 -1	114	C1	t
	Circuit 1 -1	57	C1	t

Circuit results

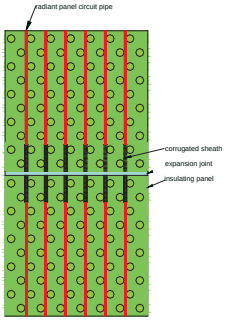
N°	Description	Floor	Amb. Temp. [°C]	Usable area [mq]	Usable area [W]	Max Pow. [W]	Integr. Pow [W]	Pitch [cm]	Circ. Nr. [nr.]	Lung. [m]	Sup. Temp. [°C]	circuit flow [l/h]	P [mm c.a.]
1	Circuit 1	t	20	2,85	325	325	-	5	1	57	29,9	45	96
2	Circuit 2	t	20	10,8	1080	1080	-	10	1	108	28,8	151	1491
3	Circuit 3	t	20	6,9	690	690	-	10	1	69	28,8	96	435
4	Circuit 4	t	20	11,1	1000	1000	-	15	1	74	28	140	898
5	Circuit 5	t	20	8,8	880	880	-	10	1	88	28,8	123	849
6	Circuit 6	t	20	8,4	840	840	-	10	1	84	28,8	117	747
7	Circuit 7	t	20	17,1	1540	1540	-	5	1	114	28	216	2946



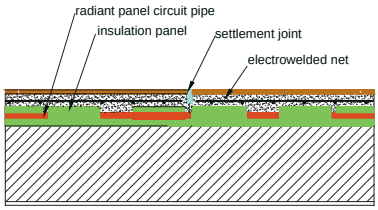
Screed perspective



Settlement Joint



Plan view

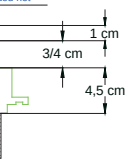


Section view

Settlement joints must be foreseen where doorways are located; they are realized at a depth of up to 3-4 cm. (UNI EN 1264)

nsulation

led net



ehouses, garages, showrooms, etc.)
led in the screed with additive,

ner crowded
necessarily

h additive

BALANCING LOCKSHIELD VALVE

* Opening turns are counted starting from Fully Closed position.
Before opening the manifold, unscrew the tightening ring (mechanical memory).
TA = fully open lockshield

N°	Manifold	Circuit	Lockshield Balancing
1	C1	Circuit 1 -1	0,5
2	C1	Circuit 2 -1	2,5
3	C1	Circuit 3 -1	1,5
4	C1	Circuit 4 -1	2,5
5	C1	Circuit 5 -1	2
6	C1	Circuit 6 -1	2
7	C1	Circuit 7 -1	TA

Manifold results

N°	Name	Manifold Type	Number of rings	Total Flow [l/h]	ΔP Total [mm c.a.]
1	C1	Preassembled R559 CB cabinet configuration	7	889	3202

Peak operating values of GIACOKLIMA underfloor installation

Ambient temperature:	20 °C
Water supply temperature :	45 °C
ΔT:	7 °C

UNI EN 1264 NORM

Maximum surface temperature

Living areas:	29 °C
Bathrooms or the like:	33 °C
Peripheral zones:	35 °C

Joints

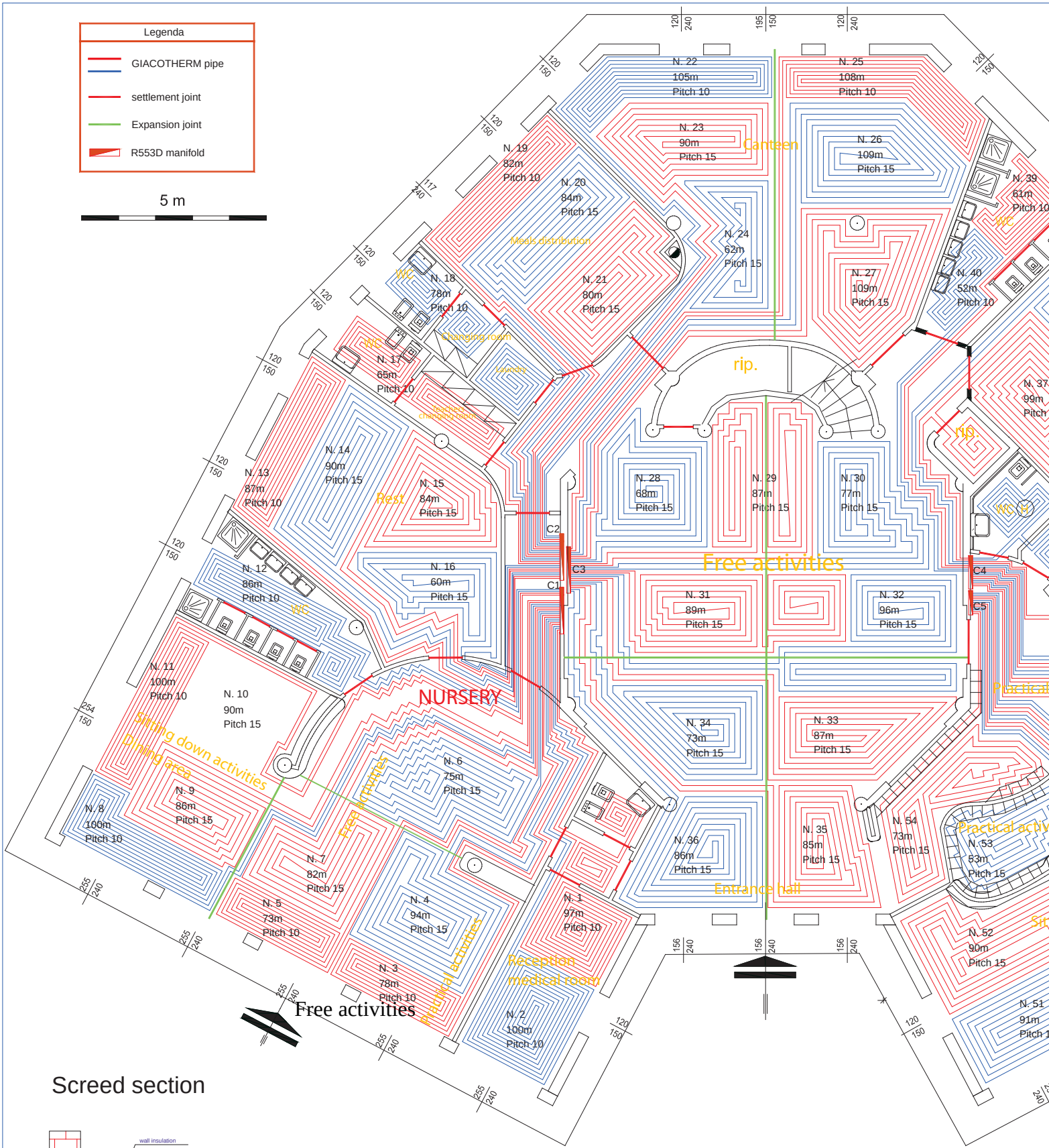
Expansion joint position must correspond with that of structural joints within the building.For floors which are expected to be finished in stone or tiles , the joints must be designed to include areas of approx. 40 m², with max length of 8 m.
In case of rectangular areas these measures may be exceeded, limiting the ratio between the sides to 2:1.

Expansion joint positioning should start, where possible, from jutting zones, such as pilasters or service areas, i.e. points where room surfaces are broader or narrower.

In any case expansion or settlement joints must be provided in doorways and corridors.

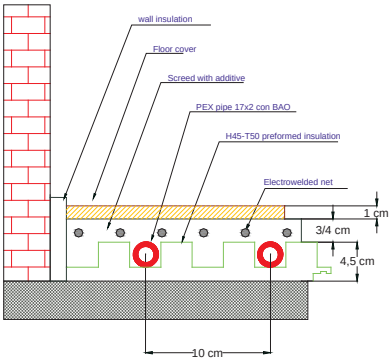
Pressure test and start up

Pressure test and start up must be carried out according to the provisions of the UNI EN 1264 Norm.



Free activities

Screed section



In cases where concentrated loads are expected (warehouses, garages, showrooms, etc.) it is advisable to position an electrowelded net, imbedded in the screed with additive, over the pipes.

NOTA: Nelle zone in cui sono previsti passaggi ravvicinati delle tubazioni (soglie, uscita dal Manifold, ecc.) è necessario prevedere l'isolamento delle tubazioni di mandata.

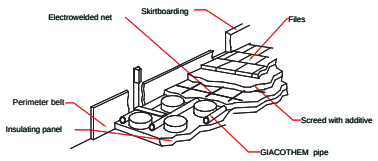
Circuits optimization - Coils

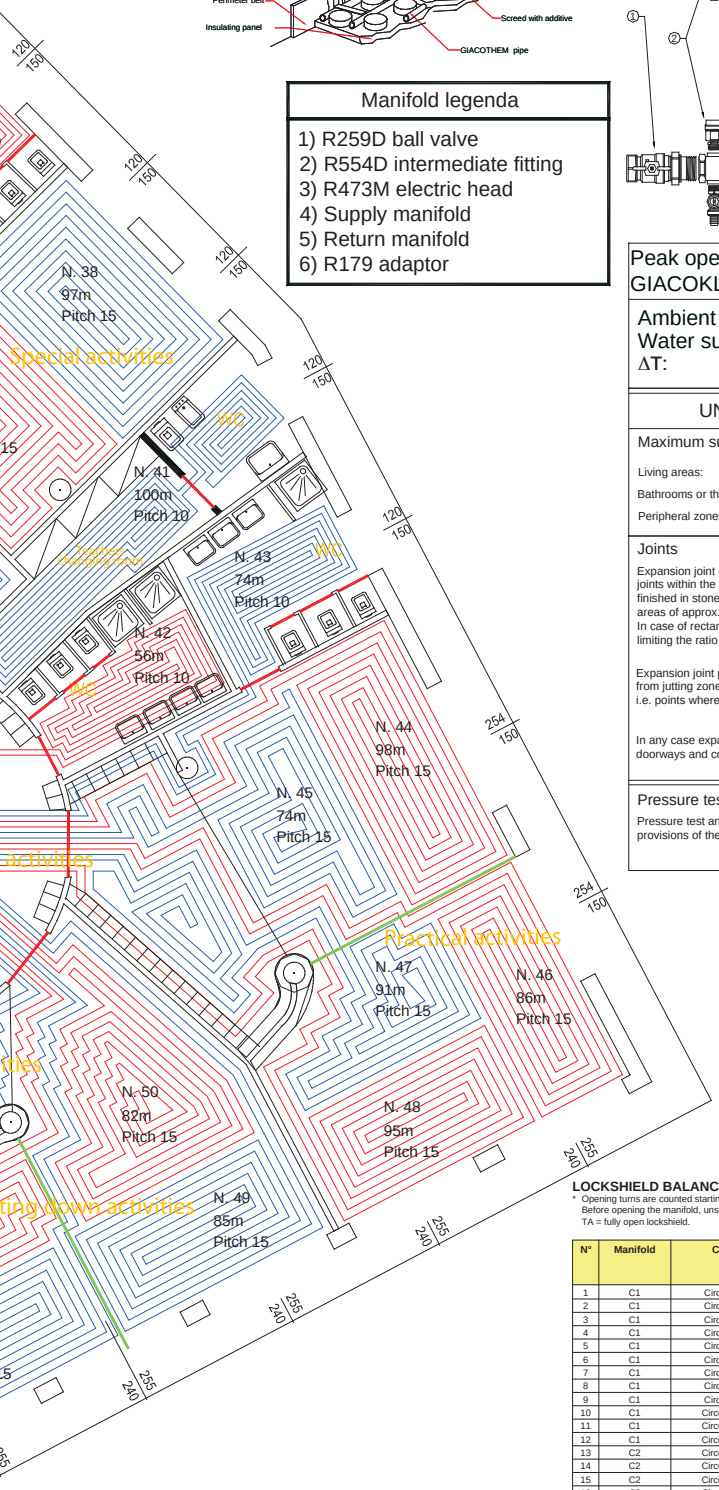
GIACOTHERM CROSSLINKED POLYETHYLENE PIPE WITH BAO – 17x2

L. Roll [m]	Circuit description	L. Circuit [m]	Manifold	Floor
240	Circuit 40 - 1	52	C4	C4
	Circuit 6 - 1	75	C1	C1
	Circuit 26 - 1	109	C3	C3
240	Circuit 53 - 1	53	C5	C5
	Circuit 43 - 1	74	C4	C4
	Circuit 27 - 1	109	C3	C3
240	Circuit 42 - 1	56	C4	C4
	Circuit 21 - 1	80	C2	C2
	Circuit 2 - 1	100	C1	C1
240	Circuit 16 - 1	60	C2	C2
	Circuit 28 - 1	68	C3	C3
	Circuit 25 - 1	108	C3	C3
240	Circuit 39 - 1	61	C4	C4
	Circuit 30 - 1	77	C3	C3
	Circuit 44 - 1	98	C4	C4
240	Circuit 24 - 1	62	C2	C2
	Circuit 45 - 1	74	C4	C4
	Circuit 8 - 1	100	C1	C1
240	Circuit 17 - 1	65	C2	C2
	Circuit 7 - 1	82	C1	C1
	Circuit 31 - 1	89	C3	C3
600	Circuit 48 - 1	95	C4	C4
	Circuit 1 - 1	97	C1	C1
	Circuit 37 - 1	99	C4	C4
	Circuit 11 - 1	100	C1	C1
	Circuit 41 - 1	100	C4	C4
	Circuit 22 - 1	105	C2	C2

L. Roll [m]	Circuit description	L. Circuit [m]	Manifold	Floor
600	Circuit 14 - 1	90	C2	C2
	Circuit 23 - 1	90	C2	C2
	Circuit 52 - 1	90	C5	C5
	Circuit 47 - 1	91	C4	C4
	Circuit 51 - 1	91	C5	C5
	Circuit 38 - 1	97	C4	C4
600	Circuit 13 - 1	87	C2	C2
	Circuit 29 - 1	87	C3	C3
	Circuit 33 - 1	87	C3	C3
	Circuit 9 - 1	86	C1	C1
	Circuit 12 - 1	86	C1	C1
	Circuit 34 - 1	73	C3	C3
	Circuit 46 - 1	86	C4	C4
600	Circuit 49 - 1	85	C5	C5
	Circuit 15 - 1	84	C2	C2
	Circuit 20 - 1	84	C2	C2
	Circuit 19 - 1	82	C2	C2
	Circuit 50 - 1	82	C5	C5
	Circuit 18 - 1	78	C2	C2
	Circuit 32 - 1	96	C3	C3
600	Circuit 5 - 1	73	C1	C1
	Circuit 10 - 1	90	C1	C1
	Circuit 54 - 1	73	C5	C5
	Circuit 3 - 1	78	C1	C1
	Circuit 35 - 1	85	C3	C3
	Circuit 4 - 1	94	C1	C1
	Circuit 36 - 1	86	C3	C3

Screed perspective

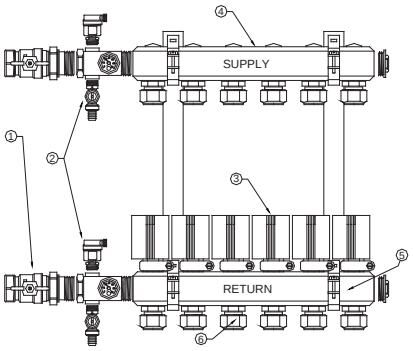




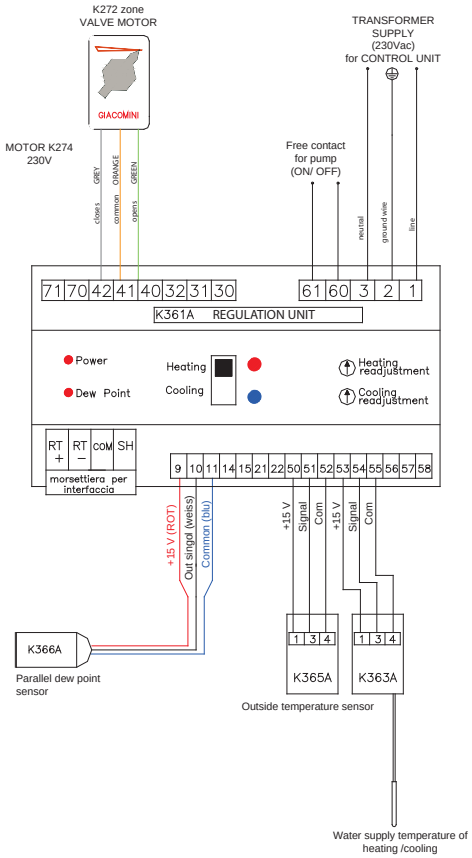
Manifold legenda

1) R259D ball valve
2) R554D intermediate fitting
3) R473M electric head
4) Supply manifold
5) Return manifold
6) R179 adaptor

R553D manifold + Electric heads



Electric connections



Peak operating values of GIACOKLIMA underfloor instalation

Ambient temperature:	20 °C
Water supply temperature:	45 °C
ΔT:	6 °C

UNI EN 1264 NORM

Maximum surface temperature

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Peripheral zones:	35 °C

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Expansion joint position must correspond with that of structural joints within the building.For floors which are expected to be finished in stone or tiles , the joints must be designed to include areas of approx. 40 m², with max length of 8 m.
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In any case expansion or settlement joints must be provided in doorways and corridors.

Pressure test and start up

Pressure test and start up must be carried out according to the provisions of the UNI EN 1264 Norm.

LOCKSHIELD BALANCING

* Opening turns are counted starting from Fully Closed position.
Before opening the manifold, unscrew the tightening ring (mechanical memory).
TA = fully open lockshield.

N°	Manifold	Circuit	Bilanciamento Detentore
1	C1	Circuit 1 - 1	3
2	C1	Circuit 2 - 1	3
3	C1	Circuit 3 - 1	2,5
4	C1	Circuit 4 - 1	TA
5	C1	Circuit 5 - 1	2
6	C1	Circuit 6 - 1	3
7	C1	Circuit 7 - 1	4
8	C1	Circuit 8 - 1	3
9	C1	Circuit 9 - 1	4
10	C1	Circuit 10 - 1	5
11	C1	Circuit 11 - 1	3
12	C1	Circuit 12 - 1	2,5
13	C2	Circuit 13 - 1	3
14	C2	Circuit 14 - 1	TA
15	C2	Circuit 15 - 1	4
16	C2	Circuit 16 - 1	2,5
17	C2	Circuit 17 - 1	2
18	C2	Circuit 18 - 1	2,5
19	C2	Circuit 19 - 1	2,5
20	C2	Circuit 20 - 1	4
21	C2	Circuit 21 - 1	4
22	C2	Circuit 22 - 1	4
23	C2	Circuit 23 - 1	TA
24	C2	Circuit 24 - 1	2,5
25	C3	Circuit 25 - 1	3
26	C3	Circuit 26 - 1	TA
27	C3	Circuit 27 - 1	TA
28	C3	Circuit 28 - 1	2
29	C3	Circuit 29 - 1	3
30	C3	Circuit 30 - 1	2,5
31	C3	Circuit 31 - 1	3
32	C3	Circuit 32 - 1	4
33	C3	Circuit 33 - 1	3
34	C3	Circuit 34 - 1	2,5
35	C3	Circuit 35 - 1	3
36	C3	Circuit 36 - 1	3
37	C4	Circuit 37 - 1	TA
38	C4	Circuit 38 - 1	5
39	C4	Circuit 39 - 1	1,5
40	C4	Circuit 40 - 1	1
41	C4	Circuit 41 - 1	3
42	C4	Circuit 42 - 1	1,5
43	C4	Circuit 43 - 1	2
44	C4	Circuit 44 - 1	5
45	C4	Circuit 45 - 1	3
46	C4	Circuit 46 - 1	4
47	C4	Circuit 47 - 1	4
48	C4	Circuit 48 - 1	5
49	C5	Circuit 49 - 1	4
50	C5	Circuit 50 - 1	4
51	C5	Circuit 51 - 1	TA
52	C5	Circuit 52 - 1	5
53	C5	Circuit 53 - 1	2
54	C5	Circuit 54 - 1	3

Circuit results

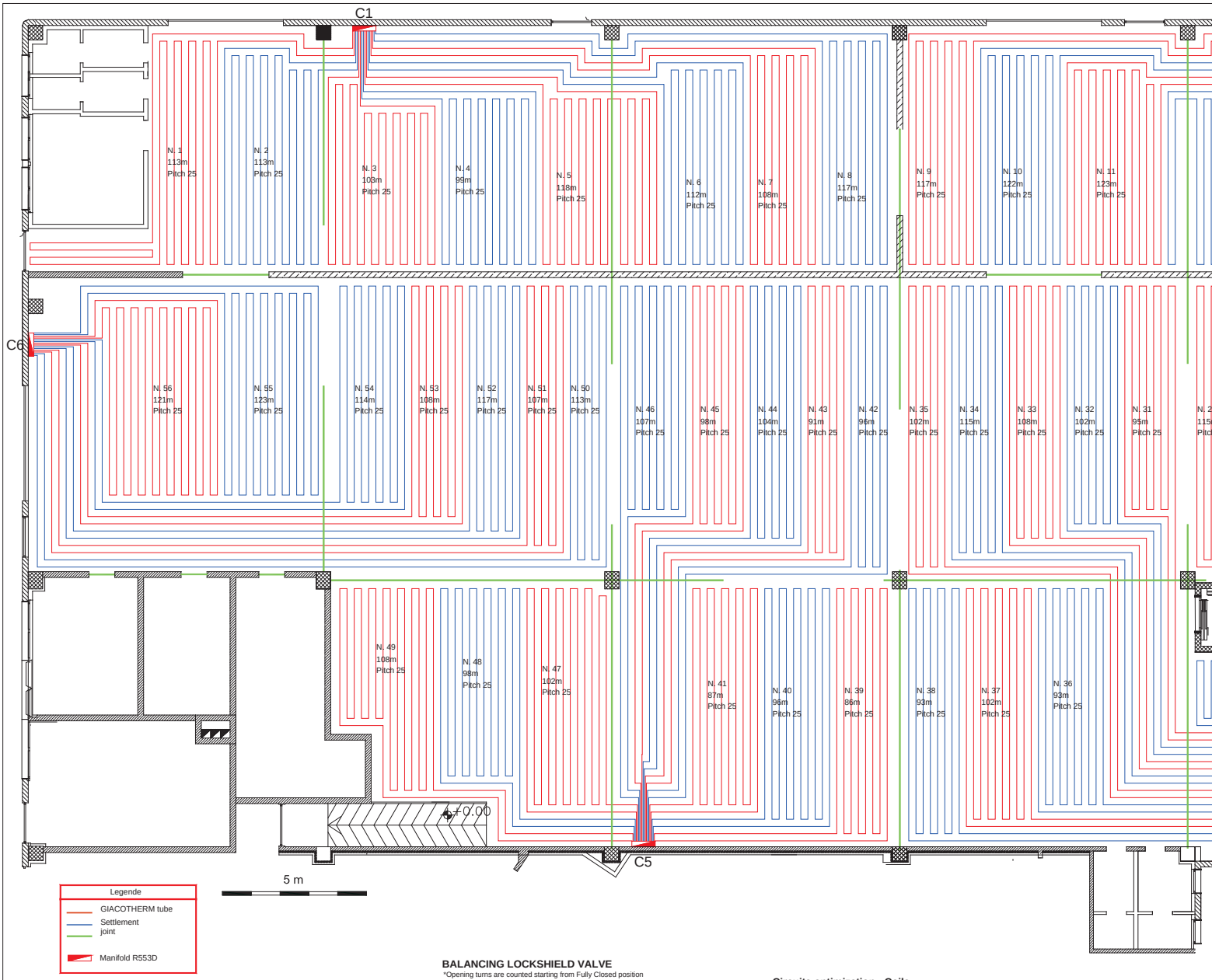
N°	Description	Floor	Amb. Temp. [°C]	Usable Area [mq]	Thermal Load [W]	Max Pow. [W]	Integr. Pow. [W]	Pitch [cm]	Circ. Nr. [nr.]	Length [m]	Sup. Temp. [°C]	Circuit Flow [l/h]	ΔP [mm c.a.]
1	Circuit 1	C1	20	9,7	970	970	-	10	1	97	28,8	135	1110
2	Circuit 2	C1	20	10	1000	1000	-	10	1	100	28,8	140	1207
3	Circuit 3	C1	20	7,8	780	780	-	10	1	78	28,8	109	609
4	Circuit 4	C1	20	14,1	1270	1270	-	15	1	94	28	178	1733
5	Circuit 5	C1	20	7,3	730	730	-	10	1	73	28,8	102	508
6	Circuit 6	C1	20	11,25	1010	1010	-	15	1	75	28	142	926
7	Circuit 7	C1	20	12,3	1105	1105	-	15	1	82	28	155	1185
8	Circuit 8	C1	20	10	1000	1000	-	10	1	100	28,8	140	1207
9	Circuit 9	C1	20	12,9	1160	1160	-	15	1	86	28	163	1353
10	Circuit 10	C1	20	13,5	1215	1215	-	15	1	90	28	170	1536
11	Circuit 11	C1	20	10	1000	1000	-	10	1	100	28,8	140	1207
12	Circuit 12	C1	20	8,6	860	860	-	10	1	86	28,8	120	797
13	Circuit 13	C2	20	8,7	870	870	-	10	1	87	28,8	121	823
14	Circuit 14	C2	20	13,5	1215	1215	-	15	1	90	28	170	1536
15	Circuit 15	C2	20	12,6	1135	1135	-	15	1	84	28	159	1272
16	Circuit 16	C2	20	9	810	810	-	15	1	60	28	113	504
17	Circuit 17	C2	20	6,5	650	650	-	10	1	65	28,8	91	369
18	Circuit 18	C2	20	7,8	780	780	-	10	1	78	28,8	109	609
19	Circuit 19	C2	20	8,2	820	820	-	10	1	82	28,8	114	699
20	Circuit 20	C2	20	12,6	1135	1135	-	15	1	84	28	159	1272
21	Circuit 21	C2	20	12	1080	1080	-	15	1	80	28	151	1111
22	Circuit 22	C2	20	10,5	1050	1050	-	10	1	105	28,8	147	1380
23	Circuit 23	C2	20	13,5	1215	1215	-	15	1	90	28	170	1536
24	Circuit 24	C2	20	9,3	835	835	-	15	1	62	28	117	549
25	Circuit 25	C3	20	10,8	1080	1080	-	10	1	108	28,8	151	1491
26	Circuit 26	C3	20	16,35	1470	1470	-	15	1	109	28	206	2596
27	Circuit 27	C3	20	16,35	1470	1470	-	15	1	109	28	206	2596
28	Circuit 28	C3	20	10,2	915	915	-	15	1	68	28	128	707
29	Circuit 29	C3	20	13,05	1175	1175	-	15	1	87	28	165	1400
30	Circuit 30	C3	20	11,55	1040	1040	-	15	1	77	28	146	1001
31	Circuit 31	C3	20	13,35	1200	1200	-	15	1	89	28	168	1486
32	Circuit 32	C3	20	14,4	1295	1295	-	15	1	96	28	181	1832
33	Circuit 33	C3	20	13,05	1175	1175	-	15	1	87	28	165	1400
34	Circuit 34	C3	20	10,95	985	985	-	15	1	73	28	138	863
35	Circuit 35	C3	20	12,75	1145	1145	-	15	1	85	28	160	1308
36	Circuit 36	C3	20	12,9	1160	1160	-	15	1	86	28	163	1353
37	Circuit 37	C4	20	14,85	1335	1335	-	15	1	99	28	187	1992
38	Circuit 38	C4	20	14,55	1310	1310	-	15	1	97	28	184	1888
39	Circuit 39	C4	20	6,1	610	610	-	10	1	61	28,8	85	310
40	Circuit 40	C4	20	5,2	520	520	-	10	1	52	28,8	73	200
41	Circuit 41	C4	20	10	1000	1000	-	10	1	100	28,8	140	1207
42	Circuit 42	C4	20	5,6	560	560	-	10	1	56	28,8	78	245
43	Circuit 43	C4	20	7,4	740	740	-	10	1	74	28,8	103	527
44	Circuit 44	C4	20	14,7	1325	1325	-	15	1	98	28	186	1946
45	Circuit 45	C4	20	11,1	1000	1000	-	15	1	74	28	140	898
46	Circuit 46	C4	20	12,9	1160	1160	-	15	1	86	28	163	1353
47	Circuit 47	C4	20	13,65	1230	1230	-	15	1	91	28	172	1587
48	Circuit 48	C4	20	14,25	1280	1280	-	15	1	95	28	179	1776
49	Circuit 49	C5	20	12,75	1145	1145	-	15	1	85	28	160	1308
50	Circuit 50	C5	20	12,3	1105	1105	-	15	1	82	28	155	1185
51	Circuit 51	C5	20	13,65	1230	1230	-	15	1	91	28	172	1587
52	Circuit 52	C5	20	13,5	1215	1215	-	15	1	90	28	170	1536
53	Circuit 53	C5	20	7,95	715	715	-	15	1	53	28	100	358
54	Circuit 54	C5	20	10,95	985	985	-	15	1	73	28	138	863

Manifold results

N°	Name	Type of manifold	Number of rings	total flow [l/h]	Total ΔP [mm c.a.]
1	C1	PREASSEMBLED R553D - 1"	12	1693	1913
2	C2	PREASSEMBLED R553D - 1"	12	1623	1700
3	C3	PREASSEMBLED R553D - 1"	12	1977	2837
4	C4	PREASSEMBLED R553D - 1"	12	1690	2191
5	C5	PREASSEMBLED R553D - 1"	6	896	1755

GIACOMINI Technology in Comfort
28017 S.Maurizio d'Opaglio (No) Italia
tel.(0322)923111 fax.923255 telex 200035

giacoklima
GIACOKLIMA underfloor



Circuit results

N°	Description	Amb. Temp. [°C]	Thermal Load [W]	Pitch [cm]	Circ. Nr. [nr.]	Length [m]	Sup. Temp. [°C]	Circuit Flow [l/h]	ΔP [mm c.a.]
1	CIRCUIT 1	18	1980	25	1	113	24,4	285	1777
2	CIRCUIT 2	18	1980	25	1	113	24,4	285	1777
3	CIRCUIT 3	18	1805	25	1	103	24,4	260	1378
4	CIRCUIT 4	18	1735	25	1	99	24,4	250	1236
5	CIRCUIT 5	18	2065	25	1	118	24,4	298	1998
6	CIRCUIT 6	18	1960	25	1	112	24,4	283	1731
7	CIRCUIT 7	18	1890	25	1	108	24,4	272	1566
8	CIRCUIT 8	18	2050	25	1	117	24,4	296	1956
9	CIRCUIT 9	18	2050	25	1	117	24,4	296	1956
10	CIRCUIT 10	18	2135	25	1	122	24,4	308	2190
11	CIRCUIT 11	18	2150	25	1	123	24,4	310	2235
12	CIRCUIT 12	18	1630	25	1	93	24,4	235	1041
13	CIRCUIT 13	18	1715	25	1	98	24,4	247	1199
14	CIRCUIT 14	18	1575	25	1	90	24,4	227	949
15	CIRCUIT 15	18	1875	25	1	107	24,4	270	1530
16	CIRCUIT 16	18	2170	25	1	124	24,4	313	2290
17	CIRCUIT 17	18	2065	25	1	118	24,4	298	1998
18	CIRCUIT 18	18	2135	25	1	122	24,4	308	2190
19	CIRCUIT 19	18	2115	25	1	121	24,4	305	2136
20	CIRCUIT 20	18	1995	25	1	114	24,4	288	1817
21	CIRCUIT 21	18	2205	25	1	126	24,4	318	2393
22	CIRCUIT 22	18	2240	25	1	128	24,4	323	2499
23	CIRCUIT 23	18	2170	25	1	124	24,4	313	2290
24	CIRCUIT 24	18	2015	25	1	115	24,4	291	1865
25	CIRCUIT 25	18	2135	25	1	122	24,4	308	2190
26	CIRCUIT 26	18	1925	25	1	110	24,4	278	1647
27	CIRCUIT 27	18	2015	25	1	115	24,4	291	1865
28	CIRCUIT 28	18	1890	25	1	108	24,4	272	1566
29	CIRCUIT 29	18	1735	25	1	99	24,4	250	1236
30	CIRCUIT 30	18	1945	25	1	111	24,4	280	1692
31	CIRCUIT 31	18	1665	25	1	95	24,4	240	1103
32	CIRCUIT 32	18	1785	25	1	102	24,4	257	1338
33	CIRCUIT 33	18	1890	25	1	108	24,4	272	1566
34	CIRCUIT 34	18	2015	25	1	115	24,4	291	1865
35	CIRCUIT 35	18	1785	25	1	102	24,4	257	1338
36	CIRCUIT 36	18	1630	25	1	93	24,4	235	1041
37	CIRCUIT 37	18	1785	25	1	102	24,4	257	1338
38	CIRCUIT 38	18	1630	25	1	93	24,4	235	1041
39	CIRCUIT 39	18	1505	25	1	86	24,4	217	837
40	CIRCUIT 40	18	1680	25	1	96	24,4	242	1133
41	CIRCUIT 41	18	1525	25	1	87	24,4	220	867
42	CIRCUIT 42	18	1680	25	1	96	24,4	242	1133
43	CIRCUIT 43	18	1595	25	1	91	24,4	230	980
44	CIRCUIT 44	18	1820	25	1	104	24,4	262	1412
45	CIRCUIT 45	18	1715	25	1	98	24,4	247	1199
46	CIRCUIT 46	18	1875	25	1	107	24,4	270	1530
47	CIRCUIT 47	18	1785	25	1	102	24,4	257	1338
48	CIRCUIT 48	18	1715	25	1	98	24,4	247	1199
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50	CIRCUIT 50	18	1980	25	1	113	24,4	285	1777
51	CIRCUIT 51	18	1875	25	1	107	24,4	270	1530
52	CIRCUIT 52	18	2050	25	1	117	24,4	296	1956
53	CIRCUIT 53	18	1890	25	1	108	24,4	272	1566
54	CIRCUIT 54	18	19995	25	1	114	24,4	288	1817
55	CIRCUIT 55	18	2155	25	1	123	24,4	311	2244
56	CIRCUIT 56	18	2115	25	1	121	24,4	305	2136

BALANCING LOCKSHIELD VALVE

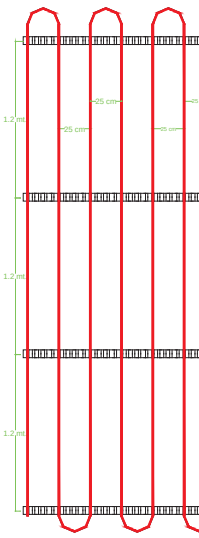
*Opening turns are counted starting from Fully Closed position
Before opening the manifold, unscrew the tightening ring (mechanical memory)
TA = fully open lockshield

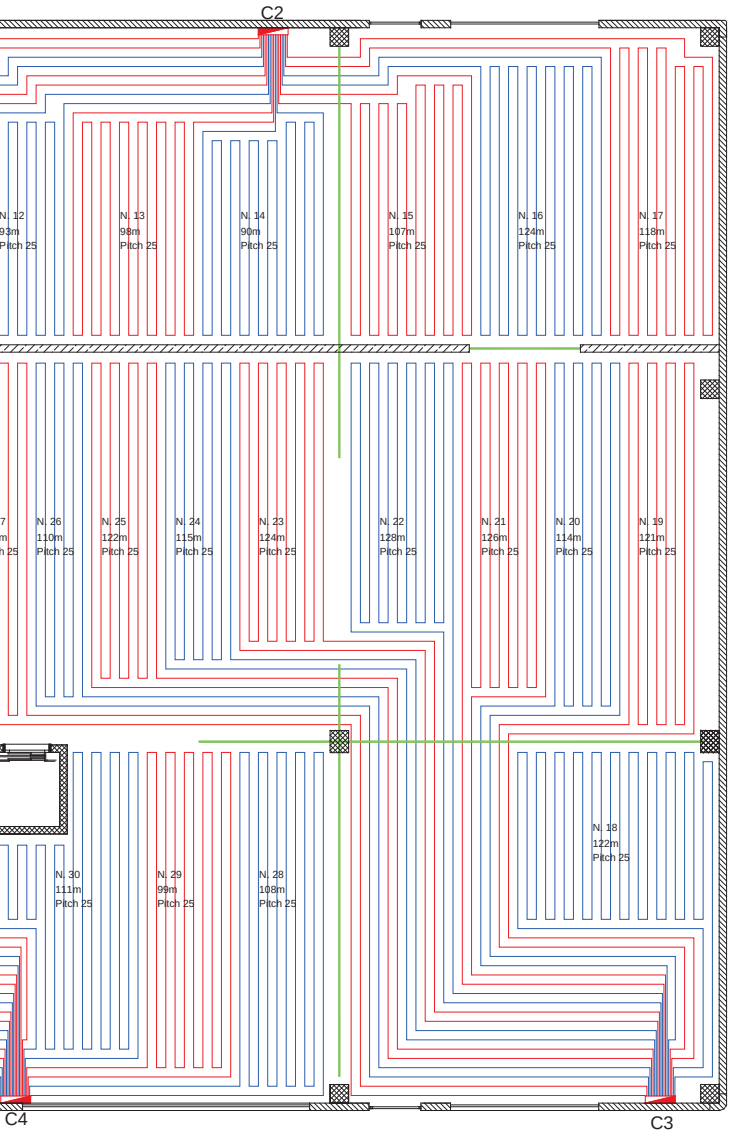
N°	Manifold	Circuit	Lockshield Balancing
1	C1	CIRCUIT 1 - 1	5
2	C1	CIRCUIT 2 - 1	5
3	C1	CIRCUIT 3 - 1	4
4	C1	CIRCUIT 4 - 1	4
5	C1	CIRCUIT 5 - 1	TA
6	C1	CIRCUIT 6 - 1	5
7	C1	CIRCUIT 7 - 1	5
8	C1	CIRCUIT 8 - 1	TA
9	C2	CIRCUIT 9 - 1	5
10	C2	CIRCUIT 10 - 1	TA
11	C2	CIRCUIT 11 - 1	TA
12	C2	CIRCUIT 12 - 1	4
13	C2	CIRCUIT 13 - 1	4
14	C2	CIRCUIT 14 - 1	3
15	C2	CIRCUIT 15 - 1	4
16	C2	CIRCUIT 16 - 1	TA
17	C2	CIRCUIT 17 - 1	5
18	C3	CIRCUIT 18 - 1	5
19	C3	CIRCUIT 19 - 1	5
20	C3	CIRCUIT 20 - 1	4
21	C3	CIRCUIT 21 - 1	TA
22	C3	CIRCUIT 22 - 1	TA
23	C3	CIRCUIT 23 - 1	TA
24	C3	CIRCUIT 24 - 1	5
25	C3	CIRCUIT 25 - 1	5
26	C3	CIRCUIT 26 - 1	4
27	C3	CIRCUIT 27 - 1	5
28	C4	CIRCUIT 28 - 1	5
29	C4	CIRCUIT 29 - 1	4
30	C4	CIRCUIT 30 - 1	TA
31	C4	CIRCUIT 31 - 1	4
32	C4	CIRCUIT 32 - 1	5
33	C4	CIRCUIT 33 - 1	5
34	C4	CIRCUIT 34 - 1	TA
35	C4	CIRCUIT 35 - 1	5
36	C4	CIRCUIT 36 - 1	4
37	C4	CIRCUIT 37 - 1	5
38	C4	CIRCUIT 38 - 1	4
39	C5	CIRCUIT 39 - 1	4
40	C5	CIRCUIT 40 - 1	5
41	C5	CIRCUIT 41 - 1	4
42	C5	CIRCUIT 42 - 1	5
43	C5	CIRCUIT 43 - 1	4
44	C5	CIRCUIT 44 - 1	TA
45	C5	CIRCUIT 45 - 1	5
46	C5	CIRCUIT 46 - 1	TA
47	C5	CIRCUIT 47 - 1	5
48	C5	CIRCUIT 48 - 1	5
49	C5	CIRCUIT 49 - 1	TA
50	C6	CIRCUIT 50 - 1	5
51	C6	CIRCUIT 51 - 1	4
52	C6	CIRCUIT 52 - 1	5
53	C6	CIRCUIT 53 - 1	4
54	C6	CIRCUIT 54 - 1	5
55	C6	CIRCUIT 55 - 1	TA
56	C6	CIRCUIT 56 - 1	TA

Circuits optimization - Coils

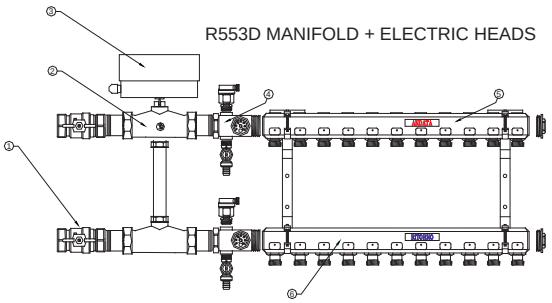
GIACOTHERM RETICULATED POLYETHYLENE TUBE WITH BAO – 20x2

Roll L. [m]	Circuit Description	Circuit L. [m]	Manifold	Floor
100	CIRCUIT 13 - 1	98	C2	T
100	CIRCUIT 45 - 1	98	C5	T
100	CIRCUIT 48 - 1	98	C5	T
240	CIRCUIT 26 - 1	110	C3	T
	CIRCUIT 22 - 1	128	C3	T
240	CIRCUIT 6 - 1	112	C1	T
	CIRCUIT 21 - 1	126	C3	T
240	CIRCUIT 20 - 1	114	C3	T
	CIRCUIT 16 - 1	124	C2	T
240	CIRCUIT 54 - 1	114	C6	T
	CIRCUIT 23 - 1	124	C3	T
240	CIRCUIT 24 - 1	115	C3	T
	CIRCUTIO 11 - 1	123	C2	T
240	CIRCUIT 27 - 1	115	C3	T
	CIRCUIT 55 - 1	123	C6	T
240	CIRCUIT 8 - 1	117	C1	T
	CIRCUIT 19 - 1	121	C3	T
240	CIRCUIT 9 - 1	117	C2	T
	CIRCUIT 56 - 1	121	C6	T
240	CIRCUIT 34 - 1	115	C4	T
	CIRCUIT 10 - 1	122	C2	T
240	CIRCUIT 5 - 1	118	C1	T
	CIRCUIT 17 - 1	118	C2	T
240	CIRCUIT 1 - 1	113	C1	T
	CIRCUIT 18 - 1	122	C3	T
240	CIRCUIT 2 - 1	113	C1	T
	CIRCUIT 25 - 1	122	C3	T
100	CIRCUIT 40 - 1	96	C5	T
100	CIRCUIT 42 - 1	96	C5	T
240	CIRCUIT 50 - 1	113	C6	T
	CIRCUIT 52 - 1	117	C6	T
100	CIRCUIT 31 - 1	95	C4	T
100	CIRCUIT 12 - 1	93	C2	T
100	CIRCUIT 36 - 1	93	C4	T
100	CIRCUIT 38 - 1	93	C4	T
240	CIRCUIT 7 - 1	108	C1	T
	CIRCUIT 30 - 1	111	C4	T
100	CIRCUIT 43 - 1	91	C5	T
100	CIRCUIT 14 - 1	90	C2	T
240	CIRCUIT 28 - 1	108	C4	T
	CIRCUIT 33 - 1	108	C4	T
240	CIRCUIT 49 - 1	108	C5	T
	CIRCUIT 53 - 1	108	C6	T
240	CIRCUIT 15 - 1	107	C2	T
	CIRCUIT 46 - 1	107	C5	T
240	CIRCUIT 44 - 1	104	C5	T
	CIRCUIT 51 - 1	107	C6	T
100	CIRCUIT 41 - 1	87	C5	T
100	CIRCUIT 39 - 1	86	C5	T
240	CIRCUIT 32 - 1	102	C4	T
	CIRCUIT 3 - 1	103	C1	T
240	CIRCUIT 35 - 1	102	C4	T
	CIRCUIT 37 - 1	102	C4	T
240	CIRCUIT 4 - 1	99	C1	T
	CIRCUIT 47 - 1	102	C5	T
100	CIRCUIT 29 - 1	99	C4	T



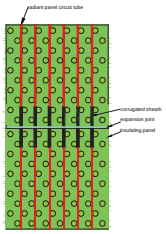


R553D MANIFOLD + ELECTRIC HEADS

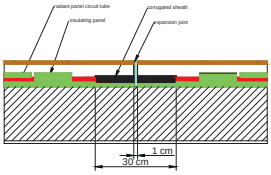


Manifold legenda
1) R251D ball valve
2) R278 zone valve
3) K272 zone valve motor
4) Intermediate fitting
5) R553S supply manifold
6) R551S return manifold

Expansion joint



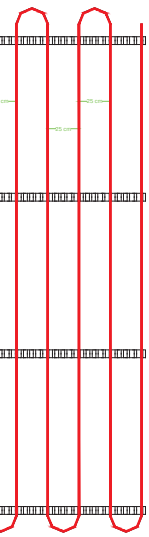
Plan view



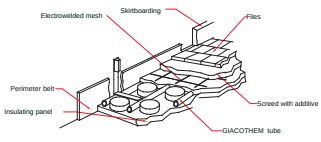
Section view

The expansion joints may be crossed only by connection pipes. In this case the pipes must be provided with a flexible protective sheath (see picture) for a length of approx 0.3 m. (UNI EN 1264)

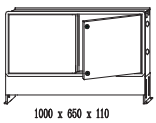
Expansion joints must be foreseen to include areas of approx. 40 m², with a maximum length equal to 8 m.
In case of rectangular areas these sizes may be exceeded, limiting the ratio between the two sides to 2:1. (UNI EN 1264).



Screed perspective

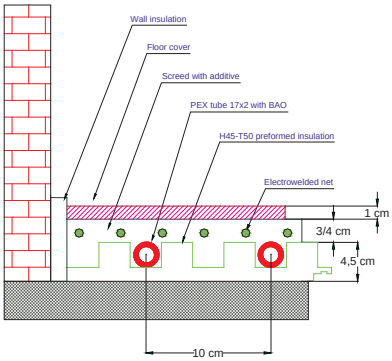


R500D cabinet



1000 x 650 x 110

Screed section



In cases where withcentrated loads are expected (warehouses, garages, showrooms, etc.) it is advisable to position an electrowelded mesh, imbedded in the screed with additive, over the tubes.

NOTE: In zones where the tubing is expected to be rather crowded (doorways, manifold outlets, etc.), supply tubing must necessarily be insulated.

Peak operating values of GIACOKLIMA underfloor installation	
Ambient temperature:	18 °C
Water supply temperature:	50 °C
ΔT:	7 °C

UNI EN 1264 NORM

Maximum surface temperature

Living areas:	29 °C
Bathrooms or the like:	33 °C
Peripheral zones:	35 °C

Joints

Expansion joint position must correspond with that of structural joints within the building.For floors which are expected to be finished in stone or tiles , the joints must be designed to include areas of approx. 40 m², with max length of 8 m.
In case of rectangular areas these measures may be exceeded, limiting the ratio between the sides to 2:1.

Expansion joint positioning should start, where possible, from jutting zones, such as pilasters or service areas, i.e. points where room surfaces are broader or narrower.

In any case expansion or settlement joints must be provided in doorways and corridors.

Manifold Results

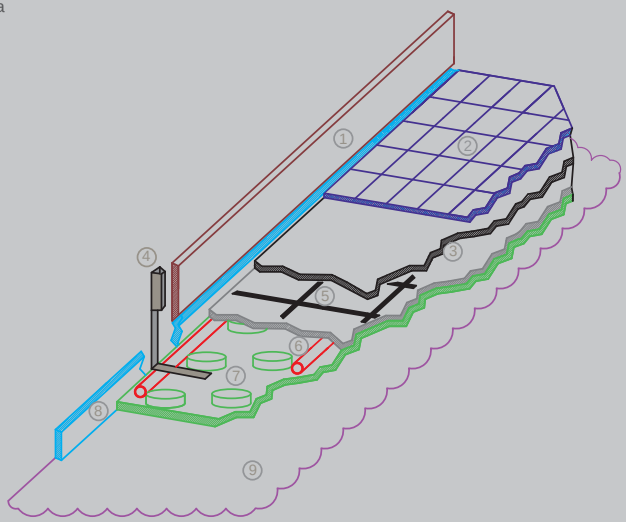
N°	name	Type of manifold	Nr. of rings	Total flow [l/h]	Total ΔP [mm c.a.]
1	C1	PREASSEMBLED R553S-R551S-1,1/4"	8	2230	2207
2	C2	(with Valv.Zona)	9	2504	2521
3	C3	PREASSEMBLED R553S-R551S-1,1/4"	10	3021	2745
4	C4	(with Valv.Zona)	11	2849	2065
5	C5	PREASSEMBLED R553S-R551S-1,1/4"	11	2709	1742
6	C6	(with Valv.Zona)	7	2028	2472

GIACOMINI Technology in Comfort
28017 S.Maurizio d'Opaglio (No) Italia
tel.(0322)923111 fax.923255 telex 200035

giacoklima
Giacoklima underfloor

System installation

Prospective view of a radiant floor section



	LEGENDA
①	skirting board
②	floor cover
③	screed with K366A additive
④	K367 bracket with K366A dew point sensor
⑤	K393 electrowelded net
⑥	R996 Giacotherm PE-X pipe with BAO
⑦	R982/R979 panel insulation
⑧	wall insulation
⑨	slab

Distribution pipe and cabinet connection is carried out at the moment of installing the risers, bearing in mind that the pipe will be positioned at insulation level.
Before laying a radiant installation, all outside door- and window-frames as well as the frames of the internal doors must be in place, wall plastering finished and electric installations completed.

For the installation of the electric and sanitary installations two methods can be followed:

- these installations are laid on the rough slab and then smoothed over with a lightweight mix: above this the insulation panel and the pipes are positioned, then the screed can be prepared and over this the chosen floor cover can finally be applied;
- in the case of rooms with limited height, it is possible to leave an edge along the internal walls along which the insulation panels will not be laid: in this strip the conduits with the electric cables and any sanitary distribution will be placed. These installations will then be covered with a polyethylene sheet before realizing the screed.

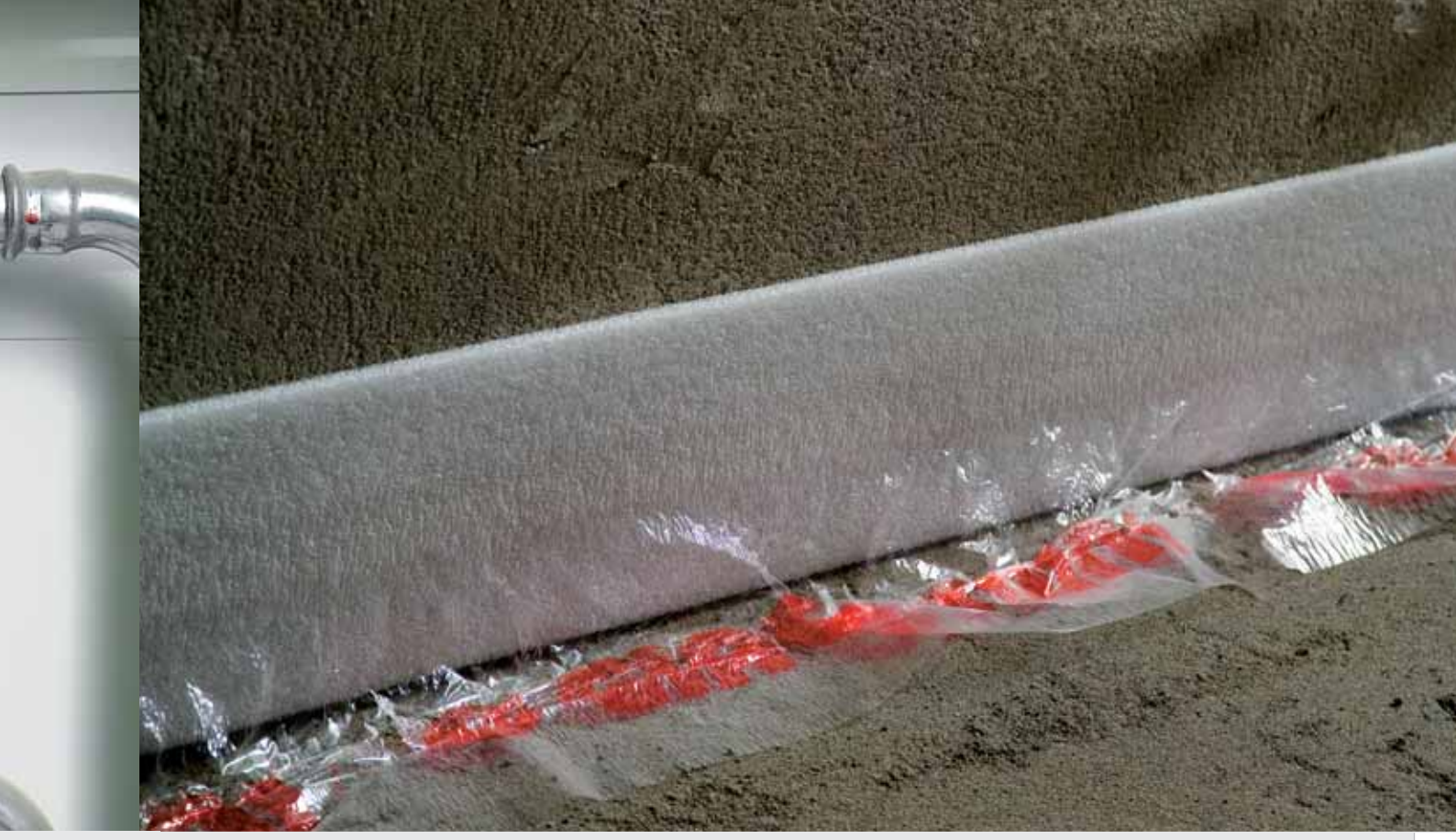


Manifold installation

The first component of the system to be installed must be the manifold: it must be recessed in an especially created niche in the wall and hydraulically connected to the boiler, following the instructions reported on the technical specifications of the product.

If the niche is not available it is possible to use the special installation cabinets.

The manifold must be installed at such a height as to consent easy connection of the pipes to the radiant panels as well as to the installation's air vent.

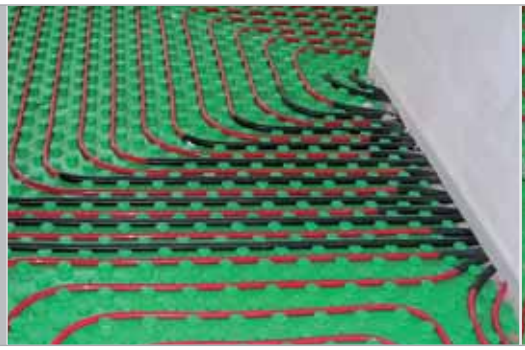


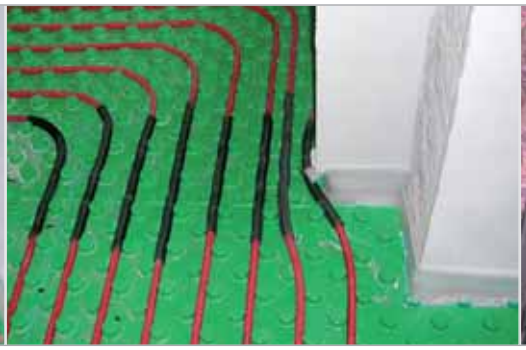
Wall insulation laying

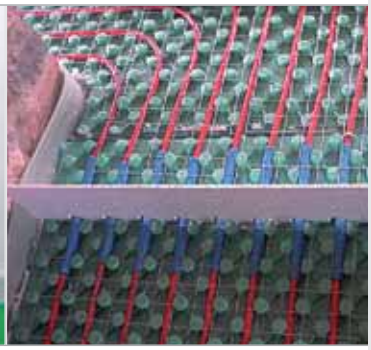
First of all the wall insulation must be applied along the walls and any other component which penetrates the substrate (for example columns): this insulation band must vertically connect the support base with the finished floor cover and consent a substrate movement of a few millimetres. The band must be placed on the ground so as to allow no movements during the pouring of the cement mix of the slab. The upper edge of the wall insulation which sticks out above the finished floor must be cut off only after the floor covering is completed.

Insulating panel laying

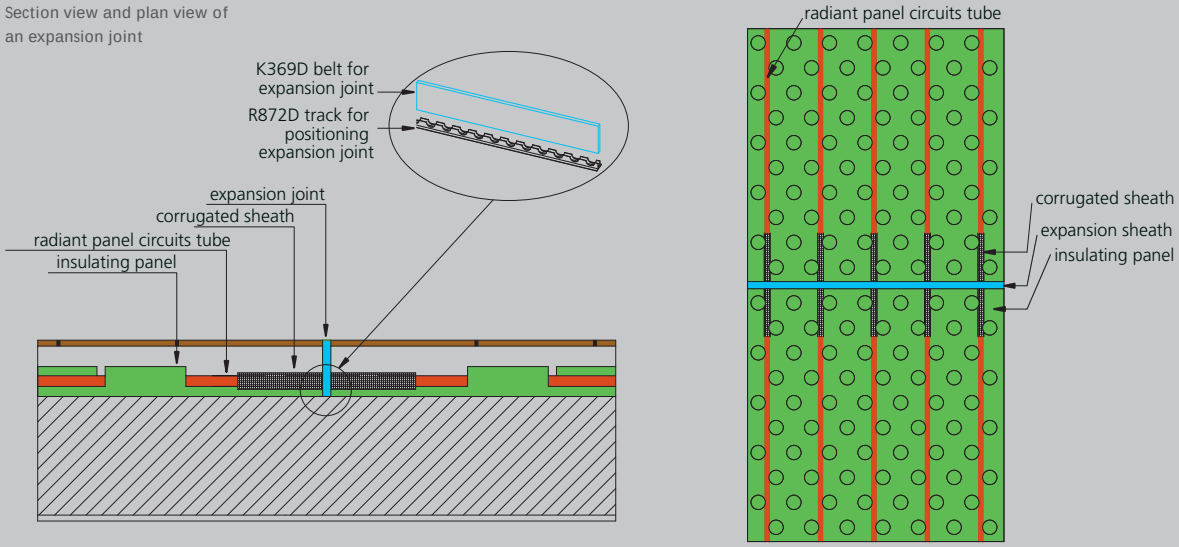
Once the wall insulation is laid, the insulation panels are positioned in such a way as to be in contact with the wall insulation, taking care to lift the transparent polyethylene sheet of the wall insulation above the panel in order to guarantee better insulation. Panels are laid and stuck into position so that subsequent rows are staggered.
To speed up the laying phase it is always advisable to start by positioning the corner of the panel without joint grooving against one corner of the room and proceed with joint accordingly.







Section view and plan view of an expansion joint



Realization of expansion joints

Temperature differentials induce imperceptible movements in the floor: in order to avoid their causing damage to the floor itself as time goes by (such as cracks in the floor cover), it may be necessary to lay expansion and settlement joints, as prescribed by the UNI EN 1264-4 norm.

Positioning of the expansion joints must be decided right from the designing phase, since the pipes composing the circuits must go through the joints only in supply and return and must therefore be designed accordingly. The UNI EN 1264-4 states that "…the surface of the joints must not exceed 40m2 with a maximum length of 8m. In case of rectangular environments, the surface of the joints may exceed these dimensions, with a maximum length ratio of 2 to 1" between the sides of the area involved.

When there are structural joints it is absolutely essential that they also be reflected in the expansion joints. Settlement joints are to be foreseen where the doors stand in order to separate the rooms where expansion can be expected to occur. Where they go through the joints, the pipes must be covered by a protective sleeve of at least 30cm in length.

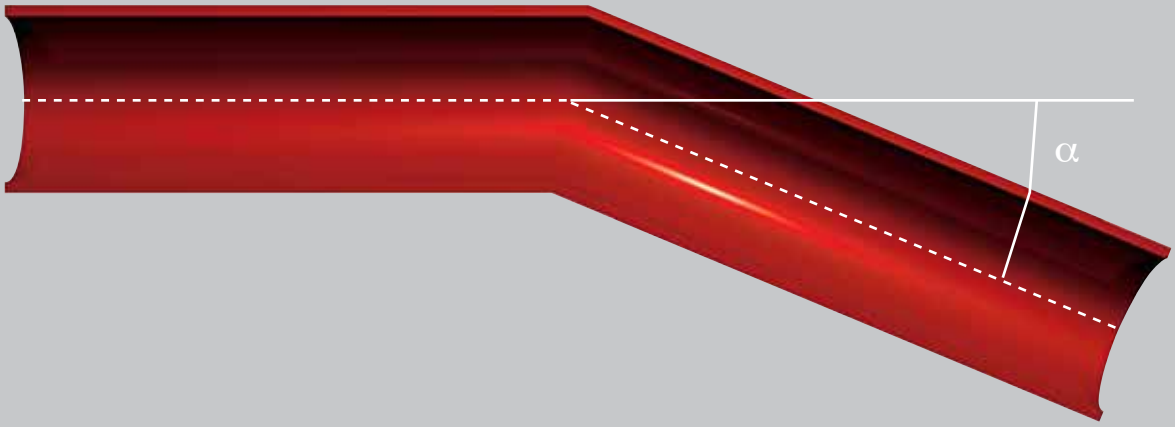
Tube laying

Pipe laying should take place according to indications given in the project, taking care to follow the recommended outlay in order to obtain the required output.
When laying the pipes it is necessary to effect curvatures with minimum radius conformant with the characteristics of the pipe. In order to effect curvatures with a smaller radius, strengthening curvatures must be used to avoid strangling of the pipe: the crushing of pipes owing to excessively tight curves causes a reduction of the flow section.
Where the pipe goes through the expansion joints, it is important to protect it with a sleeve, to avoid excessive mechanical stress.
Near the manifold the pipes are very crowded and consequently heat dispersion in this zone is very high: it is therefore recommended to insulate the flow pipes in the stretch that goes from the manifold to the floor, including the initial stretch of the floor (approx 1m) until the pipes run quite separate. It is also advisable to apply the special pipe-guiding curves to facilitate the positioning of the pipes going into and out of the manifold.

Electrowelded net laying

Once the pipe is laid the electrowelded net is placed over the entire surface covered by the insulation panels.
Its use is not foreseen by the norms; it is however recommended in cases where the screed has limited thickness and heavy loads are expected to weigh on the floor.

Installation filling



Installation filling

During installation filling the air must be eliminated manually, filling the pipes with the following procedure

- close all panel return circuits
- fill the supply manifold
- intervene on return manifold, opening one circuit at a time and following the steps described below:
  - open the manual handwheel of the valve incorporated in the return manifold, leaving all other valves closed;
  - discharge air from vent tap and continue discharging until air mixed with water escapes;
  - close the valve of the filled circuit and open the subsequent one, discharging air as described above;
  - carry out the same operations on all the circuits, in turn.

Installation filling must be performed bearing in mind the filling capacity of the pipes, removing the air contained by the same. Air dragging takes place when water reaches a critical speed which overpowers the upward drive of the air bubble: the critical speed needed for dragging air inside the tubing has been determined through experimental tests conducted by the Giacomini laboratories as well as by independent laboratories. The tests were conducted operating on a trial network shaped as in the picture, with corners α varying from 10° to 90°.

INTERNAL DIAMETER OF Pipe [mm]	90°	80°	70°	60°	50°	40°	30°	20°	10°
10 ÷ 15	0.5 m/s	0.5 m/s	0.5 m/s	0.5 m/s	0.45 m/s	0.4 m/s	0.35 m/s	0.3 m/s	0.25 m/s
15 ÷ 20	0.8 m/s	0.8 m/s	0.7 m/s	0.7 m/s	0.65 m/s	0.6 m/s	0.5 m/s	0.4 m/s	0.3 m/s

These results lead to some important conclusions: the air which accumulates inside the pipes during the course of the installation operation is dragged away at the moment the critical speed is exceeded, and such speed depends essentially on the internal diameter of the pipe.

Pressure test

Before covering them with cement, the installation circuits must be tested to ensure that they are leak-free.
According to the UNI EN 1264-4 norm "the pressure used in the test must be twice the operating pressure, with a minimum of 6 bar".

Concrete laying

Slab laying is carried out immediately after laying the installation and is effected with the installation under pressure. In order to safely effect the slab laying it is important to bear in mind the following points:

- during slab laying the ambient temperature must not be lower than 5°C and once the slab is spread the ambient temperature must be kept at no less than 5°C for at least 3 days (UNI EN 1264-4); in order for the screed to dry 21 days must pass from the slab pouring (UNI EN 1264-4);
- any hole in the floor must be drilled before applying the panel (UNI EN 1264-4);
- if a vertical pipe is to perforate the slab, the two must be separated by a conduit.

For screed composition it is advisable to follow the indications furnished with the K376 solution, which can be poured straight into the mixer during the formation of the cement mix in the quantity of 1 litre per 100kg of cement. Before pouring the screed lay the K393 galvanized electrowelded net in order to improve weight distribution once the installation is finished. The screed pouring must be effected so as to completely imbed the circuit pipes, starting from the edges of the room and working towards the centre. For civilian installations the sand granulometry must not exceed 8mm and must be bound with finer sand in order to avoid interstices; the cement tenure should range between 275 and 350 kg of cement for each m3 of mix.

Start-up

Based on the UNI EN 1264-4 norm, installation start-up must take place at least 21 days from the screed pouring: initially the supply temperature must be around 20÷25°C for at least 3 days, after which the project temperature must be introduced, and maintained for at least a further 4 days.

Laying of floor cover

Once the screed is dry it is possible to proceed with laying the floor cover (ceramic, wood or whatever).

Maintenance

The Giacoklima radiant floor system does not require constant maintenance since it has no mechanical parts subject to wear or filters which need periodic cleaning. According to the AICARR manual "Guidelines for climatization installation maintenance" Appendix C 7.5 Radiant Panels: " Periodically, manifold shut-off valves must be checked and relative filters (if any) cleaned, controlling pressure inlets to monitor the level of clogging. Verify the air vent valve and correct working of the thermometers (if any). Control, if any are foreseen, the flow meters of each single circuits, intervening to recreate the project values. [...] In case of automatic temperature control of the single rooms, it is necessary to verify the regular functioning of the ambient sensor and the water supply regulation servomotor."

R996T

- New GIACOTHERM PE-X pipe, only for radiant heating with anti-oxygen barrier. Extra Flex.

PART NUMBER	SIZE	■	⊞
R996TY047	16x1,5	100	-
R996TY048	16x1,5	240	-
R996TY019	16x2	240	-
R996TY027	16x2	100	-
R996TY064	16x2	600	-
R996TY033	17x2	240	-
R996TY052	17x2	600	-
R996TY054	17x2	100	-
R996TY020	18x2	240	-
R996TY049	18x2	100	-
R996TY050	18x2	500	-
R996TY021	20x2	100	-
R996TY022	20x2	240	-
R996TY053	20x2	400	-
R996TY068	25x2,3	320	-

R978

- PE-RT pipe with anti-oxygen barrier

PART NUMBER	SIZE	■	⊞
R978Y223	16x2	100	-
R978Y224	16x2	120	-
R978Y225	16x2	200	-
R978Y226	16x2	240	-
R978Y227	16x2	600	-
R978Y233	17x2	100	-
R978Y234	17x2	120	-
R978Y235	17x2	240	-
R978Y237	17x2	600	-
R978Y255	20x2	240	-
R978Y256	20x2	400	-

R986

- Polybutylene pipe without sleeve

PART NUMBER	SIZE	■	⊞
R986Y116	16x2	100	-
R986Y117	16x2	240	-
R986Y118	18x2	100	-
R986Y119	18x2	240	-

R999

▸ PE-X/AL/PE-X pipe welding by laser.

PART NUMBER	SIZE	■	⊞
R999Y122	16x2	100	-
R999Y123	16x2	200	-
R999Y124	16x2	500	-
R999Y232	18x2	100	-
R999Y233	18x2	200	-
R999Y142	20x2	100	-
R999Y143	20x2	200	-
R999Y272	26x3	4	-
R999Y273	26x3	50	-
R999Y282	32x3	4	-
R999Y283	32x3	50	-

R999G

▸ PE-X/AL/PE-X pipe welding by laser.

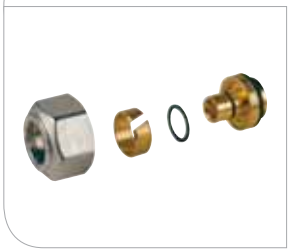
PART NUMBER	SIZE	■	⊞
R999GY040	40x3,5	5	-
R999GY050	50x4	5	-
R999GY063	63x4,5	5	-

K375

▸ Antiscale

PART NUMBER	SIZE	■	⊞
K375Y001	1 litro	1	8

R179AM



- Multilayer and synthetic pipe adaptor.

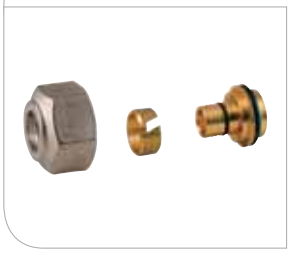
EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R179EX024	3/4"Ex(16x2)	25	250
R179EX025	3/4"x(17x2)	25	250
R179EX026	3/4"Ex(18x2)	25	250
R179EX027	3/4"Ex(20x2)	25	250

18 BASE

PART NUMBER	SIZE	■	⊞
R179MX024	18x(16x2)	25	250
R179MX034	18x(17x2)	25	250
R179MX025	18x(18x2)	25	250
R179MX026	18x(20x2)	25	250

R179



- Synthetic pipe adaptor

PART NUMBER	SIZE	■	⊞
R179X077	18x(16x1,5)	25	250
R179X105	22x(25x2,3)*	25	250

R979

- Insulation and pipe positioning panel thickness: h pitch: T.

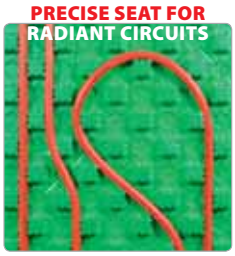
PART NUMBER	SIZE	■	⊞
R979Y003	T50-h32	13,44	-
R979Y005	T50-h55	6,72	-

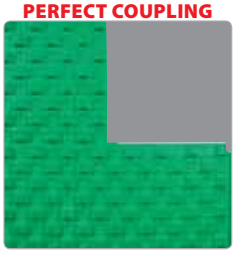
R982Q

- Pre-formed insulation panel for radiant floor installations, complying with EN 13163 standard

PART NUMBER	SIZE	■	⊞
R982QY003	T50-h39	7,5	-
R982QY005	T50-h52	6	-

R982Q
PRESHAPED INSULATING PANEL





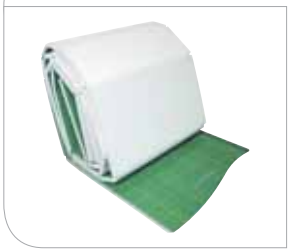
CHARACTERISTICS.

The R982Q preshaped insulating panel, realized in sinterized foam polystyrene (EPS) according to EN 13163 standard, features a coupling with a special 0,4 mm steam barrier in polystyrene (PS). The high thickness of the coating allows in fact obtaining an excellent mechanical resistance of mushroom-shaped elements, creating the most appropriate panel density for the characteristics of heat and sound insulation required.

The solutions adopted in the definition of profiles allow a solid and precise coupling between panels, the installation of radiant circuits without using tube-fastening clamps, in most of installations, and a good result in the screed with additive, avoiding the formation of air pockets that would inevitably reduce the underfloor system performance. The use of the R982Q preshaped panel allows significant labour saving when installing the piping and creating neat circuits characterized by 50 mm-multiple pitches (typical of underfloor heating and cooling systems) even in the most difficult plant engineering situations. In the model with total thickness equal to 52 mm, in addition to the function of heat insulation and support for radiant circuits, the improvement of acoustic insulation from walking noise equal to 26 dB is obtained thanks to the SD30 class dynamic stiffness.The model with total thickness equal to 39 mm, instead, grants the opportunity to realize underfloor systems even when there are problems of space, as in the case of renovation operations.

The layout and geometry of "mushroom-shaped elements" determines a lateral accommodating surface, during the installation of pipes that deforms creating a solid and precise seat for radiant circuits. This characteristic allows reducing significantly the use of tube-fastening clamps.

R882A



- Rolled insulation panel with barrier sheet for domestic and industrial radiant floor system. Roll dimension: 1 m x 10 m.

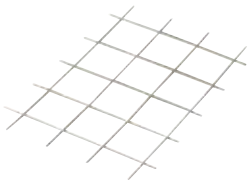
PART NUMBER	SIZE	■	⊞	
R882AY501	h25	10	-	DOMESTIC
R882AY502	h30	10	-	
R882AY002	h30	10	-	INDUSTRIAL
R882AY003	h40	10	-	

K376

- Fluid solution for rendering

PART NUMBER	SIZE	■	⊞
K376Y001	10 l.	1	-

K393



- Metallic electro-welded net, zinc plated

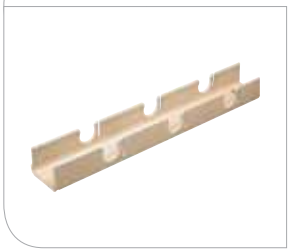
PART NUMBER	SIZE	■	⊞
K393Y001	50x50mm	2	40

K389W

- Pipe fixing track for pipes from 12 to 20 mm, in 1 meter bars.

PART NUMBER	SIZE	■	⊞
K389WY001	ø 12-22	1	100

K389



- Pipe fixing track in 2 m. bars, for use with floors

PART NUMBER	SIZE	■	⊞
K389Y002	ø 20 - pitch 5 cm	4	64
K389Y003	ø 25 - pitch 10 cm	4	64

K369A

- Wall insulation

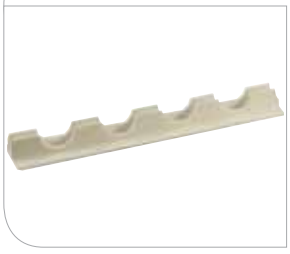
PART NUMBER	SIZE	■	⊞
K369AY021	15x0,8	50	100
K369AY022	25x0,8	50	100

K369D

- Expansion joint

PART NUMBER	SIZE	■	⊞
K369DY001	15x0,8	50	100

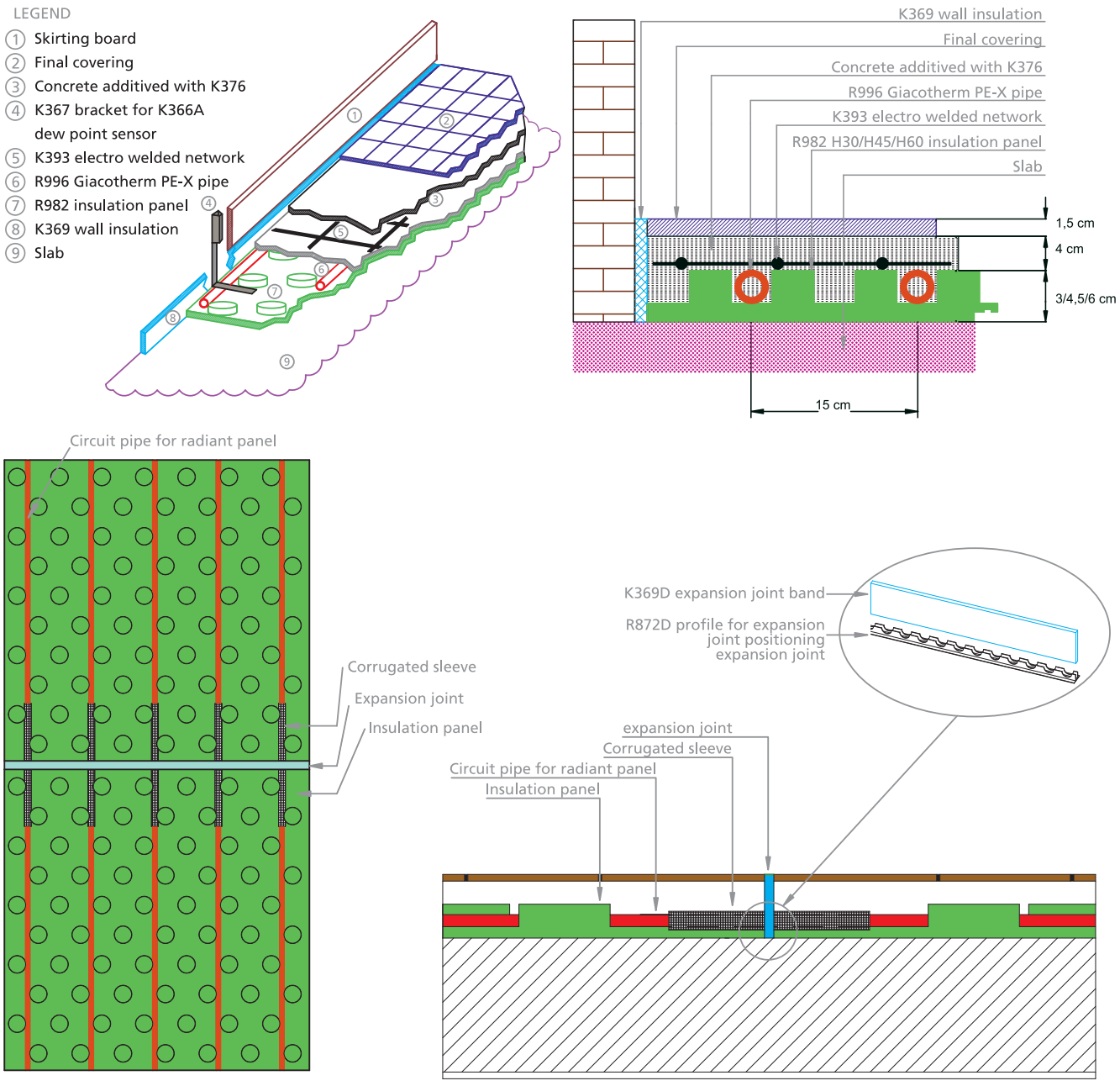
R872D



- Expansion joint profile.

PART NUMBER	SIZE	■	⊞
R872DY001	-	2	100

Radiant floor - constructive elements



EXPANSION JOINTS
Chap. 4.2.8.4 - UNI EN 1264-4
The expansion joints must be laid by the structural joints of the buildings. On stone or ceramics covering, you must provide for joints containing areas of around 40m^2,with a maximum length equal to 8 m. The positioning of the expansion joints must start, as far as possible, from the projections, for example pillars or light wells, that is from points where enlargements or shrinking of the room surfaces happen. In any case, expansion or fractionation joints must be provided for on threshold and in corridors.

TIGHTNESS TEST
Chap. 4.3 UNI EN 1264-4
Prior to the laying of the screed, the heating circuits shall be checked for leaks by means of a pressure test. The test pressure is to be twice the working pressure with a minimum of 6 bar. During the laying of the screed, this pressure shall be applied to the pipes.

INITIAL HEATING UP
Chap. 4.4 - UNI EN 1264-4
This operation shall be carried out at least 21 days after he laying of the screed, or in accordance with the manufacturer instructions. The initial heating up begins at a supply temperature between 20°C and 25°C, which shall be maintained for at least 3 days. Afterwards, the maximum design temperature shall be set and maintained for at least further 4 days.

R883

- nsulation panel for dry system dimension 1000x500 only for pipe ø16.

PART NUMBER	SIZE	■	⊞
R883Y002	h25	10	-

K802P

- Aluminium pipe support plate, combination with R883 panel.

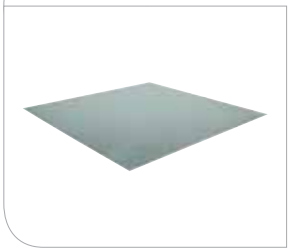
PART NUMBER	SIZE	■	⊞
K802PY002	-	1	40

R984

- Steam barrier sheet for radiant panels.

PART NUMBER	SIZE	■	⊞
R984Y005	50x50mm	135	-

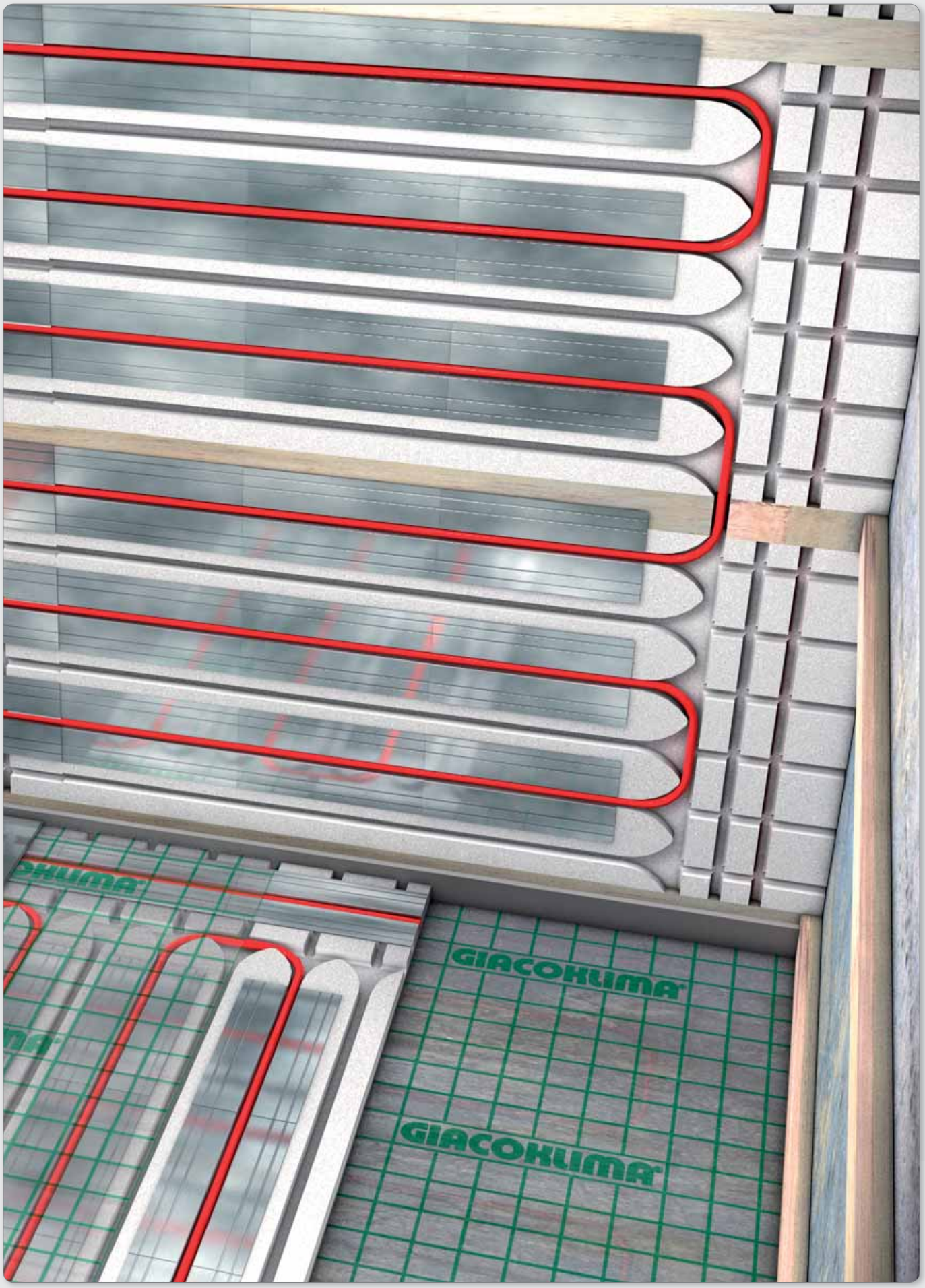
K805P

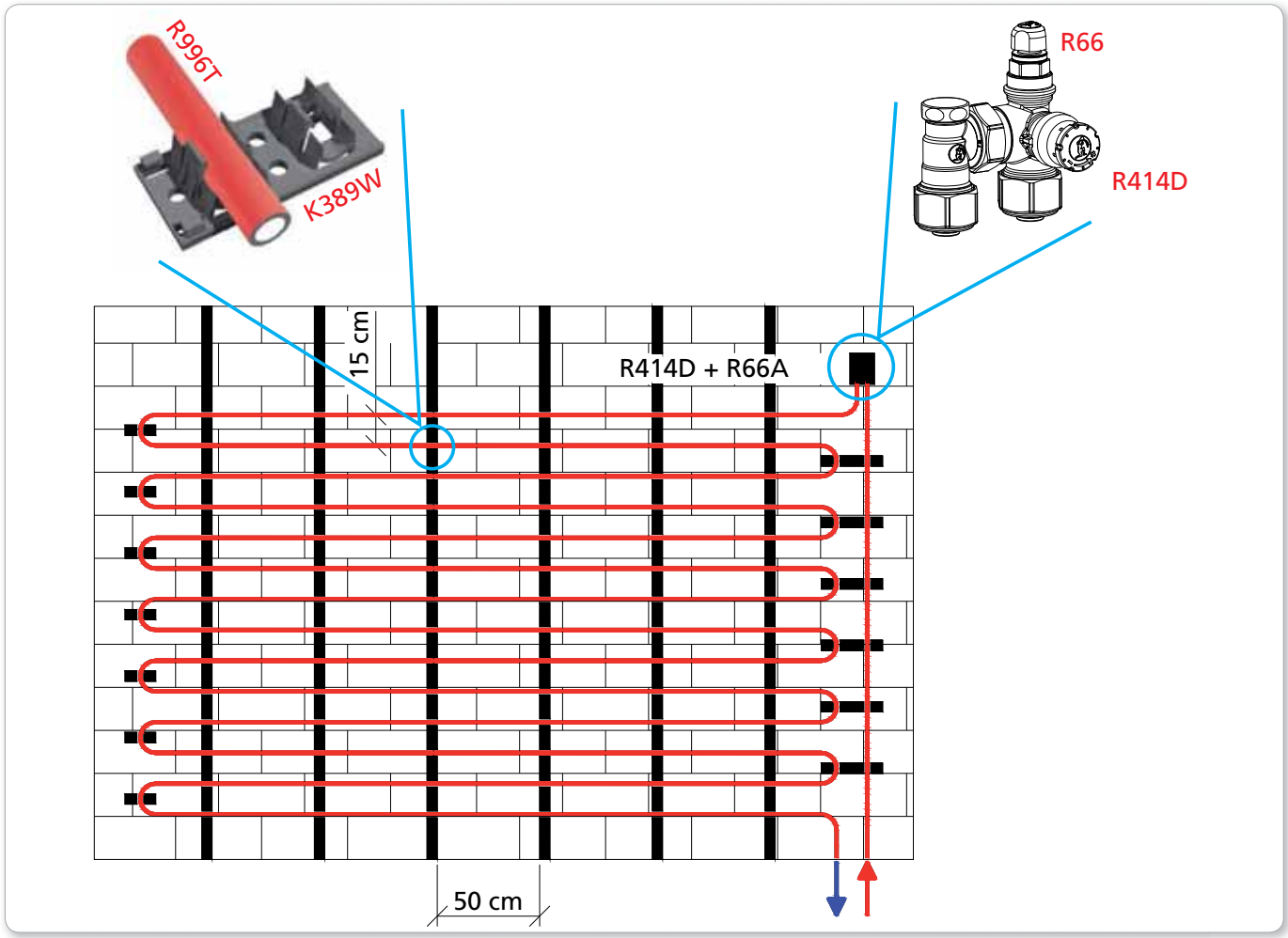


- Zinc coated steel lamel, to form a double layer for the partition of loads on dry systems.

PART NUMBER	SIZE	■	⊞
K805PY001	250x500x1mm	1	-
K805PY002	500x500x1mm	1	10

Dry floor system





R508M

- Thermostatic control cabinet for underfloor heating system.

PART NUMBER	SIZE	■	⊞
R508MY001	120x150x75mm	1	10

R414D

- Adjustable valve with thermostatic option, to set up cabinet R580M.

PART NUMBER	SIZE	■	⊞
R414DX003	18x18	5	50

R66A

- Radiator air vent complete with handwheel and washer, chrome plated, self-sealing.

PART NUMBER	SIZE	■	⊞
R66AX002	3/8"	50	500

R456

- Thermostatic head with liquid sensor.

CERTIFICATIONS

EN 215
EURO - NORM

PART NUMBER	SIZE	■	⊞
R456X101	-	1	50

R553FI

3/4"E

- Manifold for radiant floor systems, with R259D ball valves and R554D self-sealing connections, mounted in cabinet and insulated using modular elements made of expanded PE, suitable either for heating or for cooling systems

PART NUMBER	SIZE	■	⊞
R553IY044	1"1/4x3/4"E /4	1	-
R553IY045	1"1/4x3/4"E /5	1	-
R553IY046	1"1/4x3/4"E /6	1	-
R553IY047	1"1/4x3/4"E /7	1	-
R553IY048	1"1/4x3/4"E /8	1	-
R553IY049	1"1/4x3/4"E /9	1	-
R553IY050	1"1/4x3/4"E /10	1	-
R553IY051	1"1/4x3/4"E /11	1	-
R553IY052	1"1/4x3/4"E /12	1	-

R557R

- Pre-assembled and pre-wired manifold for mixed systems with fixed point regulation. Equipped with 2 or 3 connections for hot temperature circuits and from 3 to 12 connections for low temperature circuits for radiant panels.

INFO

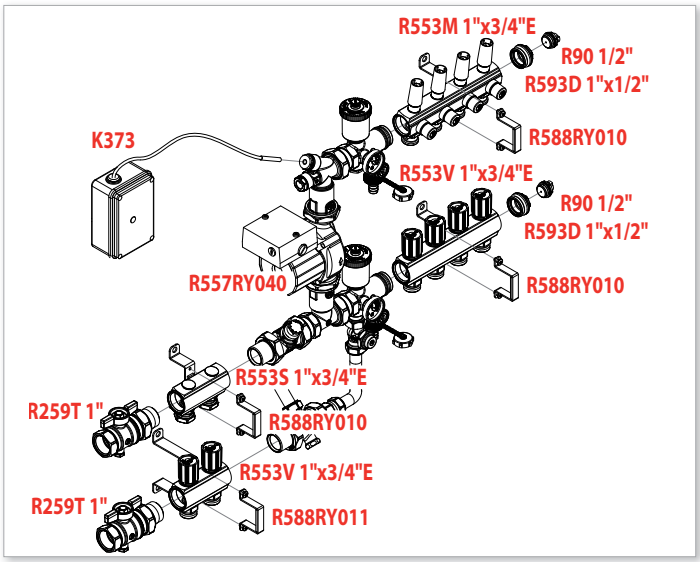
Connections for the joint of the high temperature circuits arranged for the connection to copper pipes or synthetic material pipes base 18 or 3/4"E. Connections for the joint of the low temperature circuits arranged for the connection to copper pipes or synthetic material pipes base 18 or 3/4"E. The electrical actuators with end-stroke micro switches normally closed (R473M) or normally open (R478M) shall be ordered separately. Possibility of circuits balancing with the (equipped) R558 key or with R558N key.

The kit includes:
- Electro zinc plated cabinet made of sheet to be embedded, with 170-200mm depth. Port and frame are in fire pre-painted sheet
- Delivery manifold for high temperature model R553S (1"x18 o 1"x3/4"E), with lockshield valves having mechanical memory for the circuit balancing.
- Return manifold for high temperature model R553V (1"x18 o 1"x3/4"E) with micrometric valve with thermostatic option.
- Delivery manifold for low temperature, model R553M (1"x18 or 1"x3/4"E) with flow meter and adjustment lockshield valve with mechanical memory.
- Return manifold for low temperature, model R553V (1"x18 or 1"x3/4"E), with micrometric valves with thermostatic option.
- Ball valves with tail piece and discharge, model R259T, with 1 connection.
- 3 ways valve driven by the thermostatic head model R462L.
- Electronic circulator with variable capacity
- K373 safety thermostat.

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R557RY103	1" x3/4"E/3	1	-
R557RY104	1" x3/4"E/4	1	-
R557RY105	1" x3/4"E/5	1	-
R557RY106	1" x3/4"E/6	1	-
R557RY107	1" x3/4"E/7	1	-
R557RY108	1" x3/4"E/8	1	-
R557RY109	1" x3/4"E/9	1	-
R557RY110	1" x3/4"E/10	1	-
R557RY111	1" x3/4"E/11	1	-
R557RY112	1" x3/4"E/12	1	-

PART NUMBER	SIZE	■	⊞
R557RY003	1"x18/3	1	-
R557RY004	1"x18/4	1	-
R557RY005	1"x18/5	1	-
R557RY006	1"x18/6	1	-
R557RY007	1"x18/7	1	-
R557RY008	1"x18/8	1	-
R557RY009	1"x18/9	1	-
R557RY010	1"x18/10	1	-
R557RY011	1"x18/11	1	-
R557RY012	1"x18/12	1	-



Number of circuits obtained by summing the circuits with high temperature with those with low temperature.	Manifold cabinet
till to 8	R557RY071
from 9 till 11	R557RY072
from 12 till 15	R557RY073

Number of circuits connected to the single manifold	Number of supports
from 8	1
from 9 till 12	2

REPLACEMENT CIRCULATOR	
076S00048	WILO E25/1-5-3-130-PL-12

R559

- Pre-assembled manifold equipped with 3 ways for circuits at high temperature and from 4 up to 12 circuits at low temperature, for radiant panel circuits.

INFO

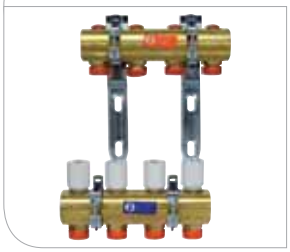
R559A: fixed point 4.
R559B: climatic compensation.
R559C: climatic compensation with monitoring of the thermal jump.

REPLACEMENT CIRCULATOR		
076S00018	WILO	RS25/6-3-180-PR-12 **(/4 ÷ /8)**
076S00028	WILO	RS25/7-3-180-PR-12 **(/9 ÷ /12)**

PART NUMBER	SIZE	■	⊞		PART NUMBER	SIZE	■	⊞
R559AY104	1"x3/4"E /4	1	-	R559A	R559AY004	1"1/4x18 /4	1	-
R559AY105	1"x3/4"E /5	1	-		R559AY005	1"1/4x18 /5	1	-
R559AY106	1"x3/4"E /6	1	-		R559AY006	1"1/4x18 /6	1	-
R559AY107	1"x3/4"E /7	1	-		R559AY007	1"1/4x18 /7	1	-
R559AY108	1"x3/4"E /8	1	-		R559AY008	1"1/4x18 /8	1	-
R559AY109	1"x3/4"E /9	1	-		R559AY009	1"1/4x18 /9	1	-
R559AY110	1"x3/4"E /10	1	-		R559AY010	1"1/4x18 /10	1	-
R559AY111	1"x3/4"E /11	1	-		R559AY011	1"1/4x18 /11	1	-
R559AY112	1"x3/4"E /12	1	-		R559AY012	1"1/4x18 /12	1	-
R559BY104	1"x3/4"E /4	1	-	R559B	R559BY004	1"1/4x18 /4	1	-
R559BY105	1"x3/4"E /5	1	-		R559BY005	1"1/4x18 /5	1	-
R559BY106	1"x3/4"E /6	1	-		R559BY006	1"1/4x18 /6	1	-
R559BY107	1"x3/4"E /7	1	-		R559BY007	1"1/4x18 /7	1	-
R559BY108	1"x3/4"E /8	1	-		R559BY008	1"1/4x18 /8	1	-
R559BY109	1"x3/4"E /9	1	-		R559BY009	1"1/4x18 /9	1	-
R559BY110	1"x3/4"E /10	1	-		R559BY010	1"1/4x18 /10	1	-
R559BY111	1"x3/4"E /11	1	-		R559BY011	1"1/4x18 /11	1	-
R559BY112	1"x3/4"E /12	1	-		R559BY012	1"1/4x18 /12	1	-

EUROCONE CONNECTION

R553D



- Pre-assembled manifolds for underfloor heating, and radiators connection.

INFO

Complete with: - 1 flow manifold with balancing lockshield valves assembled - 1 return manifold with valves assembled - 2 brackets R588 - 1 set of labels - R558.

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R553EY002	1"x3/4"E /2	1	-
R553EY003	1"x3/4"E /3	1	-
R553EY004	1"x3/4"E /4	1	-
R553EY005	1"x3/4"E /5	1	-
R553EY006	1"x3/4"E /6	1	-
R553EY007	1"x3/4"E /7	1	-
R553EY008	1"x3/4"E /8	1	-
R553EY009	1"x3/4"E /9	1	-
R553EY010	1"x3/4"E /10	1	-
R553EY011	1"x3/4"E /11	1	-
R553EY012	1"x3/4"E /12	1	-
R553EY022	1"1/4x3/4"E /2	1	-
R553EY023	1"1/4x3/4"E /3	1	-
R553EY024	1"1/4x3/4"E /4	1	-
R553EY025	1"1/4x3/4"E /5	1	-
R553EY026	1"1/4x3/4"E /6	1	-
R553EY027	1"1/4x3/4"E /7	1	-
R553EY028	1"1/4x3/4"E /8	1	-
R553EY029	1"1/4x3/4"E /9	1	-
R553EY030	1"1/4x3/4"E /10	1	-
R553EY031	1"1/4x3/4"E /11	1	-
R553EY032	1"1/4x3/4"E /12	1	-

18 BASE

PART NUMBER	SIZE	■	⊞
R553Y002	1"x18 /2	1	-
R553Y003	1"x18 /3	1	-
R553Y004	1"x18 /4	1	-
R553Y005	1"x18 /5	1	-
R553Y006	1"x18 /6	1	-
R553Y007	1"x18 /7	1	-
R553Y008	1"x18 /8	1	-
R553Y009	1"x18 /9	1	-
R553Y010	1"x18 /10	1	-
R553Y011	1"x18 /11	1	-
R553Y012	1"x18 /12	1	-
R553Y022	1"1/4x18 /2	1	-
R553Y023	1"1/4x18 /3	1	-
R553Y024	1"1/4x18 /4	1	-
R553Y025	1"1/4x18 /5	1	-
R553Y026	1"1/4x18 /6	1	-
R553Y027	1"1/4x18 /7	1	-
R553Y028	1"1/4x18 /8	1	-
R553Y029	1"1/4x18 /9	1	-
R553Y030	1"1/4x18 /10	1	-
R553Y031	1"1/4x18 /11	1	-
R553Y032	1"1/4x18 /12	1	-

R553F

- Pre-assembled distribution manifold for under floor heating system with built-in flow meter and possibility of circuit balancing.

INFO

Composed by: 1 flow manifold with built-in delivery meters and manifolds with mechanical memory, 1 return manifold with built-in valves with thermostatic option, 2 R588 metallic brackets set of labels for location of the circuits.

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R553FY042	1"x3/4"E /2	1	-
R553FY043	1"x3/4"E /3	1	-
R553FY044	1"x3/4"E /4	1	-
R553FY045	1"x3/4"E /5	1	-
R553FY046	1"x3/4"E /6	1	-
R553FY047	1"x3/4"E /7	1	-
R553FY048	1"x3/4"E /8	1	-
R553FY049	1"x3/4"E /9	1	-
R553FY050	1"x3/4"E /10	1	-
R553FY051	1"x3/4"E /11	1	-
R553FY052	1"x3/4"E /12	1	-

18 BASE

PART NUMBER	SIZE	■	⊞
R553FY002	1"x18 /2	1	-
R553FY003	1"x18 /3	1	-
R553FY004	1"x18 /4	1	-
R553FY005	1"x18 /5	1	-
R553FY006	1"x18 /6	1	-
R553FY007	1"x18 /7	1	-
R553FY008	1"x18 /8	1	-
R553FY009	1"x18 /9	1	-
R553FY010	1"x18 /10	1	-
R553FY011	1"x18 /11	1	-
R553FY012	1"x18 /12	1	-

R53SM

- Modular manifolds DN32, with bayonet connection, balancing lockshield valves with mechanical memory.

CERTIFICATIONS

*WRAS APPROVED PRODUCT

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R53SMY106	DN32x3/4"E	1	20

18 BASE

PART NUMBER	SIZE	■	⊞
R53SMY006	DN32x18*	1	20

R53ST

- Pair of end manifolds DN32, with bayonet connection, female thread, balancing lockshield valves with mechanical memory.

CERTIFICATIONS

*WRAS APPROVED PRODUCT

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R53STY106	1"x3/4"ExDN32	1	20
R53STY107	1"1/4x3/4"ExDN32	1	20

18 BASE

PART NUMBER	SIZE	■	⊞
R53STY006	1"x18xDN32*	1	20
R53STY007	1"1/4x18xDN32*	1	20

R53MM

- Modular manifolds DN32 for use on flow, with bayonet connection, fl ow meter, balancing lockshield valve with mechanical memory.

CERTIFICATIONS

*WRAS APPROVED PRODUCT

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R53MMY106	DN32x3/4"E	1	20

18 BASE

PART NUMBER	SIZE	■	⊞
R53MMY006	DN32x18*	1	20

R53MT

- Pair of end manifolds DN32, with bayonet connection, female thread, flow meter, balancing lockshield valve with mechanical memory.

CERTIFICATIONS

WRAS APPROVED PRODUCT

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R53MTY106	1"x3/4"ExDN32	1	20
R53MTY107	1"1/4x3/4"ExDN32	1	20

18 BASE

PART NUMBER	SIZE	■	⊞
R53MTY006	1"x18xDN32	1	20
R53MTY007	1"1/4x18xDN32	1	20

R53VM

- Modular manifold DN32, for use on return, with bayonet connection, built-in valve with actuator.

CERTIFICATIONS

*WRAS APPROVED PRODUCT

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R53VMY106	DN32x3/4"E*	1	20

18 BASE

PART NUMBER	SIZE	■	⊞
R53VMY006	DN32x18	1	20

R53VT

- Pair of end manifold DN32, for use on return, with bayonet connection, built-in valve with actuator.

CERTIFICATIONS

WRAS APPROVED PRODUCT

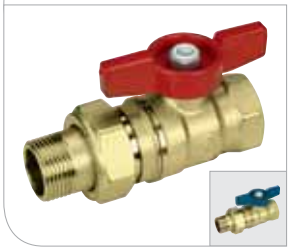
EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R53VTY106	1"x3/4"ExDN32	1	20
R53VTY107	1"1/4x3/4"ExDN32	1	20

18 BASE

PART NUMBER	SIZE	■	⊞
R53VTY006	1"x18xDN32	1	20
R53VTY007	1"1/4x18xDN32	1	20

R259D



- Standard port ball valve with tail piece, red T handle, brass finished.

PART NUMBER	SIZE	■	⊞	
R259Y007	1"x1"	2	20	RED T
R259Y009	1"1/4x1"1/4	2	20	
R259Y027	1"x1"	1	20	BLUE T
R259Y029	1"1/4x1"1/4	1	20	

R554D

- Self-sealing connection complete with: R88I 1/2" - R608 1/2" - R540 3/8" - R92 1/2" - R592D 1" or 1"1/4"

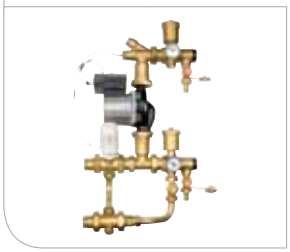
PART NUMBER	SIZE	■	⊞
R554DY005	1"	1	20
R554DY006	1"1/4	1	20

R592D

▸ Plug for manifolds, self-sealing.

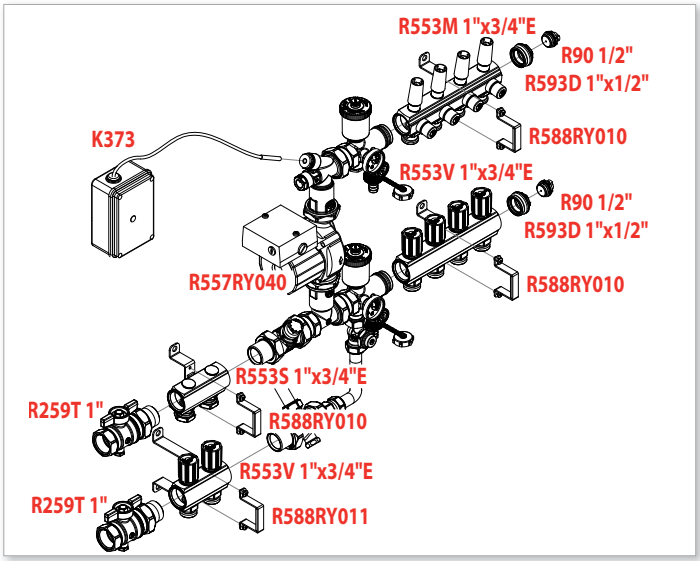
PART NUMBER	SIZE	■	⊞
R592DY005	1"	50	500
R592DY006	1"1/4	25	250

R557R-1



▸ Fixed point mixing group, for under floor heating and radiators connection.

PART NUMBER	SIZE	■	⊞
R557RY040	-	1	-



Number of circuits obtained by summing the circuits with high temperature with those with low temperature.	Manifold cabinet
till to 8	R557RY071
from 9 till 11	R557RY072
from 12 till 15	R557RY073

Number of circuits connected to the single manifold	Number of supports
from 8	1
from 9 till 12	2

REPLACEMENT CIRCULATOR	
076S00048	WILO E25/1-5-3-130-PL-12

R251T

▸ Standard port ball valve, with sensor connection M10 female connection.

PART NUMBER	SIZE	■	⊞	
R251TY005	1" - red T handle	5	50	RED
R251TY025	1" - blue T handle	5	50	BLUE

R553V

▸ Manifold with valve assembling.

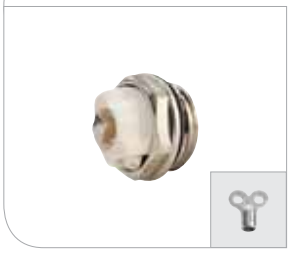
EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R553VY042	1"x3/4"E /2	1	15
R553VY043	1"x3/4"E /3	1	10
R553VY044	1"x3/4"E /4	1	10
R553VY045	1"x3/4"E /5	1	10
R553VY046	1"x3/4"E /6	1	10
R553VY047	1"x3/4"E /7	1	5
R553VY048	1"x3/4"E /8	1	5
R553VY049	1"x3/4"E /9	1	5
R553VY050	1"x3/4"E /10	1	5

18 BASE

PART NUMBER	SIZE	■	⊞
R553VY002	1"x18 /2	1	15
R553VY003	1"x18 /3	1	10
R553VY004	1"x18 /4	1	10
R553VY005	1"x18 /5	1	10
R553VY006	1"x18 /6	1	10
R553VY007	1"x18 /7	1	5
R553VY008	1"x18 /8	1	5
R553VY009	1"x18 /9	1	5
R553VY010	1"x18 /10	1	5
R553VY011	1"x18 /11	1	5
R553VY012	1"x18 /12	1	5
R553VY022	1"1/4x18 /2	1	10
R553VY023	1"1/4x18 /3	1	10
R553VY024	1"1/4x18 /4	1	10
R553VY025	1"1/4x18 /5	1	10
R553VY026	1"1/4x18 /6	1	5
R553VY027	1"1/4x18 /7	1	5
R553VY028	1"1/4x18 /8	1	5
R553VY029	1"1/4x18 /9	1	5
R553VY030	1"1/4x18 /10	1	5
R553VY031	1"1/4x18 /11	1	5
R553VY032	1"1/4x18 /12	1	5

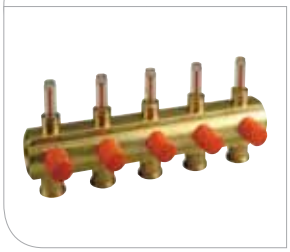
R90



▸ Draining plug self-sealing, for steel panels

PART NUMBER	SIZE	■	⊞
R90X003	1/2"	200	400
R74Y001	-	1	-

R553M



- Distribution manifold with lockshield valves for the circuit balancing, fl ow meter and connections for adapter.

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R553MY042	1"x3/4"E /2	1	10
R553MY043	1"x3/4"E /3	1	10
R553MY044	1"x3/4"E /4	1	10
R553MY045	1"x3/4"E /5	1	-
R553MY046	1"x3/4"E /6	1	-
R553MY047	1"x3/4"E /7	1	-
R553MY048	1"x3/4"E /8	1	-
R553MY049	1"x3/4"E /9	1	-
R553MY050	1"x3/4"E /10	1	-
R553MY051	1"x3/4"E /11	1	-
R553MY052	1"x3/4"E /12	1	-

18 BASE

PART NUMBER	SIZE	■	⊞
R553MY002	1"x18 /2	1	10
R553MY003	1"x18 /3	1	10
R553MY004	1"x18 /4	1	10
R553MY005	1"x18 /5	1	-
R553MY006	1"x18 /6	1	-
R553MY007	1"x18 /7	1	-
R553MY008	1"x18 /8	1	-
R553MY009	1"x18 /9	1	-
R553MY010	1"x18 /10	1	-
R553MY011	1"x18 /11	1	-
R553MY012	1"x18 /12	1	-

R588R

- Support for the mounting of the group R557R in the box R557I-2

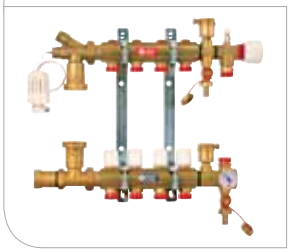
PART NUMBER	SIZE	■	⊞
R588RY010	35mm	1	-
R588RY011	77mm	1	-

R593D

- Reducer self-sealing.

PART NUMBER	SIZE	■	⊞
R593DY004	1"Mx1/2"F	25	250

R557



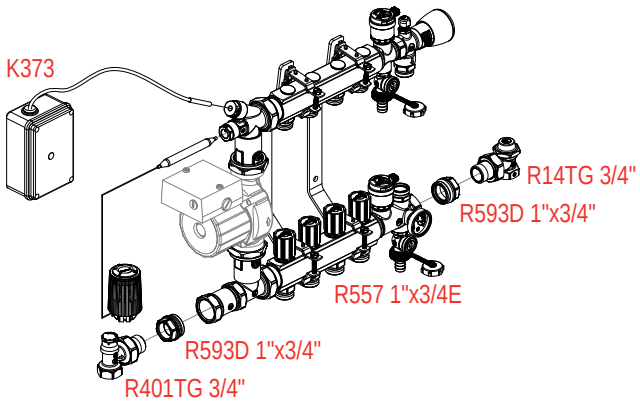
- Pre-assembled manifold complete with:
  1 pair of manifolds R553S-R553V,
  2 brackets R588L,
  1 T-fitting R557A,
  1 T-fitting 1. for thermostatic valve,
  1 thermostat R462L,
  1 endpiece R557N with R608
  and R88I (R554A),
  1 R554D 1.,
  1 differential valve R147,
  2 pump isolating valves R252,
  1 tail piece R557P.

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R557Y102	1"x3/4"E /2	1	-
R557Y103	1"x3/4"E /3	1	-
R557Y104	1"x3/4"E /4	1	-
R557Y105	1"x3/4"E /5	1	-
R557Y106	1"x3/4"E /6	1	-
R557Y107	1"x3/4"E /7	1	-
R557Y108	1"x3/4"E /8	1	-
R557Y109	1"x3/4"E /9	1	-
R557Y110	1"x3/4"E /10	1	-
R557Y111	1"x3/4"E /11	1	-
R557Y112	1"x3/4"E /12	1	-

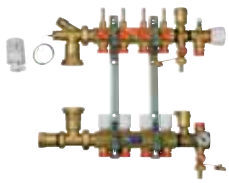
18 BASE

PART NUMBER	SIZE	■	⊞
R557Y002	1"x18 /2	1	-
R557Y003	1"x18 /3	1	-
R557Y004	1"x18 /4	1	-
R557Y005	1"x18 /5	1	-
R557Y006	1"x18 /6	1	-
R557Y007	1"x18 /7	1	-
R557Y008	1"x18 /8	1	-
R557Y009	1"x18 /9	1	-
R557Y010	1"x18 /10	1	-
R557Y011	1"x18 /11	1	-
R557Y012	1"x18 /12	1	-



Number of circuits obtained by summing the circuits with high temperature with those with low temperature.	Manifold
till 7	R557Y051
from 8 till to 12	R557Y052

R557F



- Pre-assembled manifold complete with:
  1 pair of manifolds R553M-R553V,
  2 brackets R588L,
  1 T-fitting R557A,
  1 T-fitting 1. for thermostatic valve,
  1 thermostat R462L,
  1 endpiece R557N with R608
  and R88I (R554A),
  1 R554D 1.,
  1 differential valve R147,
  2 pump isolating valves R252,
  1 tail piece R557P.

EUROCONE CONNECTION

PART NUMBER	SIZE	■	⊞
R557FY103	1"x3/4"E /3	1	-
R557FY104	1"x3/4"E /4	1	-
R557FY105	1"x3/4"E /5	1	-
R557FY106	1"x3/4"E /6	1	-
R557FY107	1"x3/4"E /7	1	-
R557FY108	1"x3/4"E /8	1	-
R557FY109	1"x3/4"E /9	1	-
R557FY110	1"x3/4"E /10	1	-
R557FY111	1"x3/4"E /11	1	-
R557FY112	1"x3/4"E /12	1	-

18 BASE

PART NUMBER	SIZE	■	⊞
R557FY003	1"x18/3	1	-
R557FY004	1"x18/4	1	-
R557FY005	1"x18/5	1	-
R557FY006	1"x18/6	1	-
R557FY007	1"x18/7	1	-
R557FY008	1"x18/8	1	-
R557FY009	1"x18/9	1	-
R557FY010	1"x18/10	1	-
R557FY011	1"x18/11	1	-
R557FY012	1"x18/12	1	-

R593D

- Reducer self-sealing.

PART NUMBER	SIZE	■	⊞
R593DY005	1"Mx3/4"F	25	250

R401TG

- Angle valve with thermostatic option, chrome plated, with iron pipe connection, self-sealing tail piece, with cover to protect body before assembling.

PART NUMBER	SIZE	■	⊞
R401X034	3/4″	5	50
R401X035	1″	2	20

R14TG

- Angle lockshield valve chrome plated, screwed ends and selfsealing tail pieces.

PART NUMBER	SIZE	■	⊞
R14X034	3/4″	5	50
R14X035	1″	2	20

R402TG

- Straight valve with thermostatic option, chrome plated, with iron pipe connection, self-sealing tail piece, with cover to protect body before assembling.

PART NUMBER	SIZE	■	⊞
R402X034	3/4″	5	50
R402X035	1″	2	20

R15TG

- Straight lockshield valve chrome plated, screwed ends and selfsealing tail pieces.

PART NUMBER	SIZE	■	⊞
R15X034	3/4″	5	50
R15X035	1″	2	20

R462L

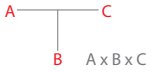
- Thermostatic head for water temperature control and underfl oor heating system.

PART NUMBER	SIZE	■	⊞
R462LX001	2 m	1	25

R557D

- T for R557 with nut and tail piece

INFO



PART NUMBER	SIZE	■	⊞
R557DY005	1"x1"x1"	5	50

R557P

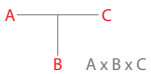
- Tail piece for R557

PART NUMBER	SIZE	■	⊞
R557PY005	1"x1"	10	100

R557B

- T with nut and tail piece for R557 with 1/2" plug

INFO



PART NUMBER	SIZE	■	⊞
R557BY005	1/2"x1"x1"	5	50

K373

- Thermostat with immersion temperature sensor.

PART NUMBER	SIZE	■	⊞
K373Y012	230 V~	1	10

R227-1

- Temperature gauge housing

PART NUMBER	SIZE	■	⊞
R227Y003	1/2"x6	25	250

R554A

- Self-sealing connection for R557, complete with:1 R88I 1/2. - 1 R608 1/2.

PART NUMBER	SIZE	■	⊞
R554AY001	1"x3/4"	1	20

R147N

- Pressure differential valve to be installed on heating system with thermostatic valves.

PART NUMBER	SIZE	■	⊞
R147NY004	3/4"x3/4"	1	25

R66A

- Radiator air vent complete with handwheel and washer, chrome plated, self-sealing.

PART NUMBER	SIZE	■	⊞
R66AX001	1/4"	50	1.000

R180M

- Male fitting with mono-cone and double OR for copper pipe.

BRASS FINISH

PART NUMBER	SIZE	■	⊞
R180MY121	3/4"x18	25	250

R554D

- Self-sealing connection complete with: R88I 1/2" - R608 1/2" - R540 3/8" - R92 1/2" - R592D 1" or 1"1/4"

PART NUMBER	SIZE	■	⊞
R554DY005	1"	1	20

R500

- Manifold cabinet, stove enamelled.

PART NUMBER	SIZE	■	⊞
R500Y101	400x450x110mm	1	-
R500Y102	600x450x110mm	1	-
R500Y103	800x450x110mm	1	-
R500Y104	1000x450x110mm	1	-

R510

- Wall bearing for cabinet R500.

PART NUMBER	SIZE	■	⊞
R510Y001	200mm	1	-
R510Y002	200mm	1	-
R510Y003	200mm	1	-
R510Y004	200mm	1	-

R509

- Frame cover for cabinet R500.

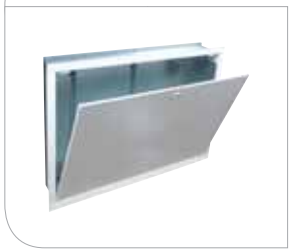
PART NUMBER	SIZE	■	⊞
R509Y001	400x450mm	1	-
R509Y002	600x450mm	1	-
R509Y003	800x450mm	1	-
R509Y004	1000x450mm	1	-

R502

- Manifold cabinet with adjustable wall bearing.

PART NUMBER	SIZE	■	⊞
R502Y001	400x650:720x110mm	1	-
R502Y002	600x650:720x110mm	1	-
R502Y003	800x650:720x110mm	1	-
R502Y004	1000x650:720x110mm	1	-

R557I



- Manifold cabinet, stove enamelled

PART NUMBER	SIZE	■	⊞
R557Y051	850X605x150-180mm	1	-
R557Y052	1000X605x150-180mm	1	-
R557RY071	850x930x150-180mm	1	-
R557RY072	1000x930x150-180mm	1	-
R557RY073	1200x930x150-180mm	1	-

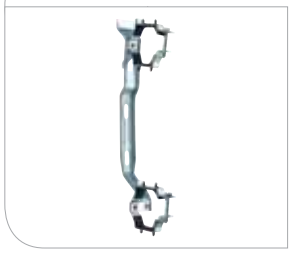
R559I

- Manifold cabinet, stove enamelled

PART NUMBER	SIZE	■	⊞
R559Y001	910x800x150-180mm	1	-
R559Y002	1210x800x150-180mm	1	-

MANIFOLD	R557Y051	R557Y052	R557RY071	R557RY072	R557RY073	R559Y001	R559Y002
FRAME COVER	R557Y061	R557Y062	R557RY081	R557RY082	R557RY083	R559Y011	R559Y012

R588



- Bracket for manifold R551 (3/4.- 1.-1.1/4) and R553.

PART NUMBER	SIZE	■	⊞
R588Y001	-	2	50

R588L

- Adjustable bracket for manifold R551 (3/4.- 1.- 1.1/4), R553.

PART NUMBER	SIZE	■	⊞
R588LY001	-	1	25

R588S

- Collar for bracket R588L.

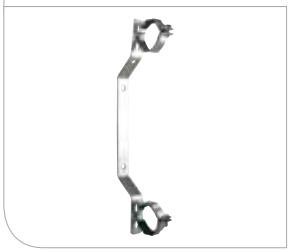
PART NUMBER	SIZE	■	⊞
R588SY001	-	1	200

R588D

- Bracket for modular manifolds DN32.

PART NUMBER	SIZE	■	⊞
R588DY001	per DN32	1	50

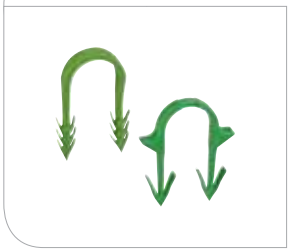
R588F



- Adjustable metallic support for DN32 modular manifold.

PART NUMBER	SIZE	■	⊞
R588FY001	-	1	25

R983



- Fixing clip for GIACOTHERM pipe.

PART NUMBER	SIZE	■	⊞
R983Y001	-	100	1.000
R983Y500	-	300	-

K809

- Fixing clip for dry floor system.

PART NUMBER	SIZE	■	⊞
K809Y001	50x26mm	1	100

R863

- Fixing clip gun for R983Y500

PART NUMBER	SIZE	■	⊞
R863Y500	-	1	-

R865

▸ Pipe unroller.

PART NUMBER	SIZE	■	⊞
R865Y001	-	1	-

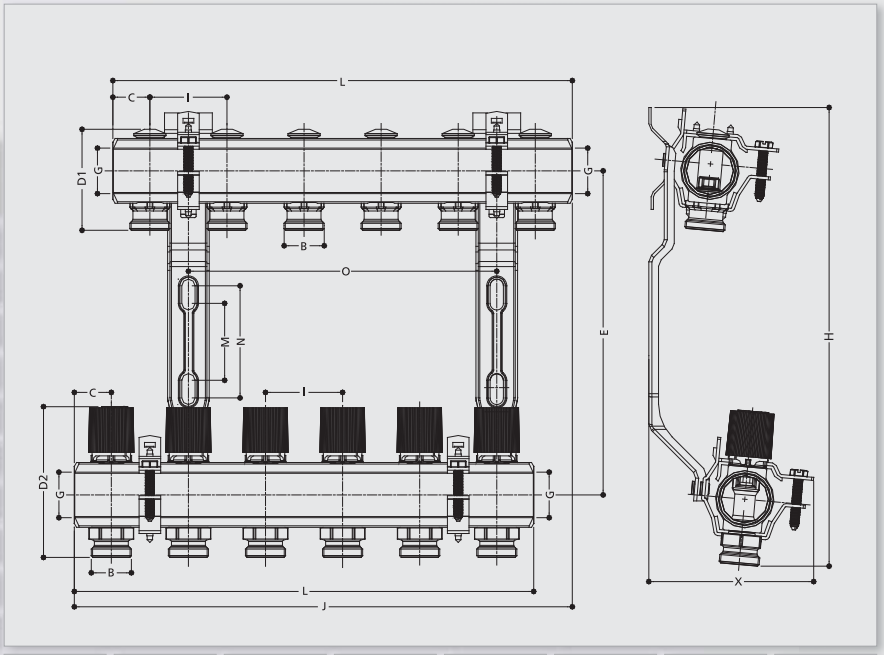
R549P

▸ Bend support

PART NUMBER	SIZE	■	⊞
R549PY003	ø 16-18	1	50
R549PY004	ø 20	1	50
R549PY007	ø 25	1	50

Installation dimensions

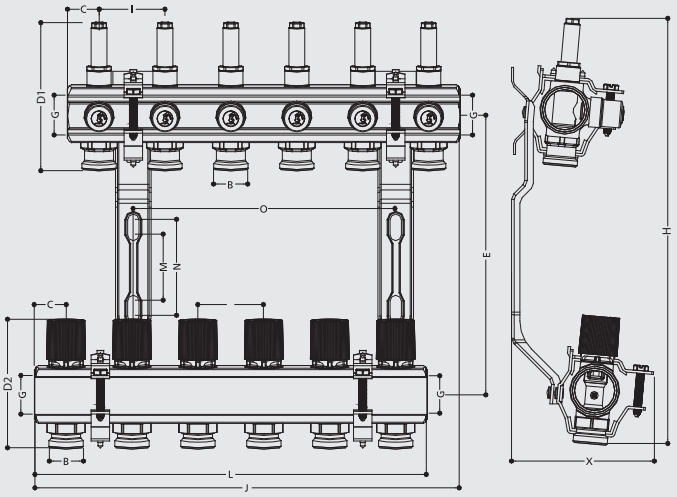
R553D	1"x18 - 1"x3/4"E	1"1/4 x18 1"1/4 x3/4"E
G	1"F	1"1/4F
B	18 or 3/4"E	18 or 3/4"E
I	50	50
C	24	24
D1	66	75
D2	96 ÷ 101	110 ÷ 115
E	213	213
M	50	50
N	73	73
X	108	108
H	249	249



Outlets	2	3	4	5	6	7	8	9	10	11	12
L	98	148	198	248	298	348	398	448	498	548	598
O	/	/	100	150	200	250	300	350	400	450	500
J	123	173	223	273	323	373	423	473	523	573	623
suggested (*) cabinet R500, R501, R502,R509	type A	type A	type B	type B	type B	type B	type C	type C	type C	type D	type D

* considering the overall dimensions due to a R554D intermediate fitting and R259D ball valve

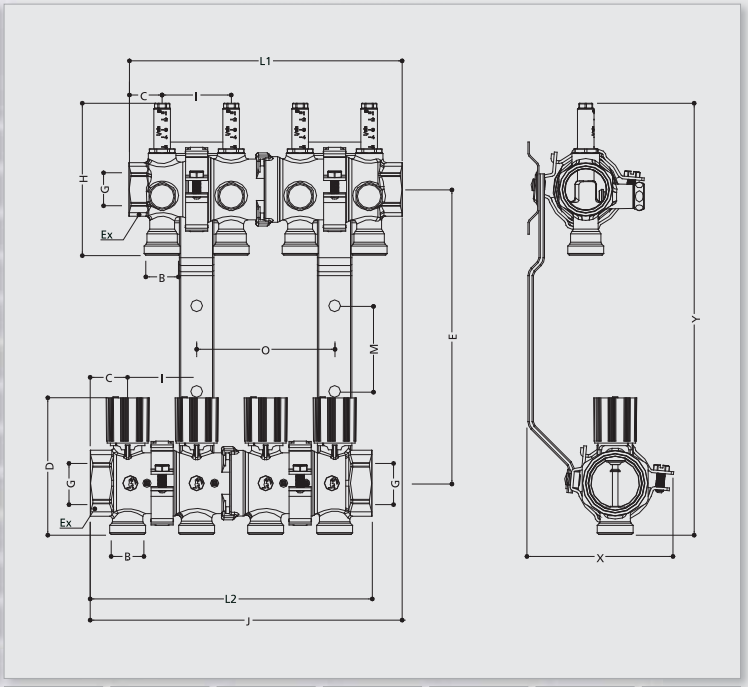
R553F	1"x18 - 1"x3/4"E
G	1"F
B	18 or 3/4"E
I	50
C	24
D1	112
D2	96 ÷ 101
E	213
M	50
N	73
X	108
H	323



Outlets	2	3	4	5	6	7	8	9	10	11	12
L	98	148	198	248	298	348	398	448	498	548	598
O	/	/	100	150	200	250	300	350	400	450	500
J	123	173	223	273	323	373	423	473	523	573	623
suggested (*) cabinet R500, R501, R502,R509	type A	type A	type B	type B	type B	type B	type C	type C	type C	type D	type D

* considering the overall dimensions due to a R554D intermediate fitting and R259D ball valve

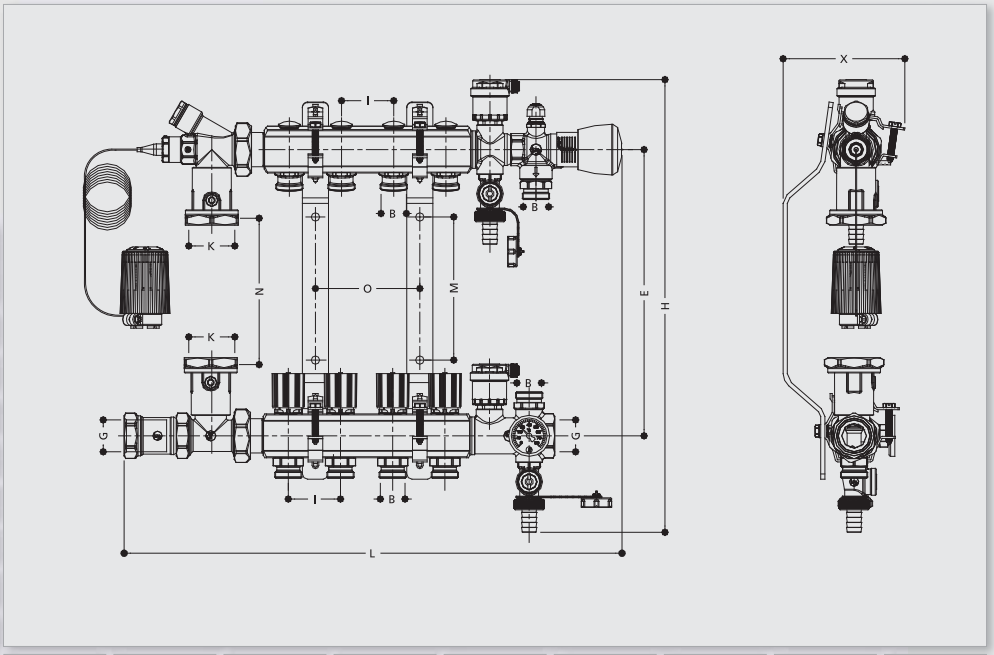
R53MT R53MM + R53VT R53VM	1"xDN32 x18 1"xDN32 x3/4"E	1"1/4xDN32 x18 1"1/4xDN32 x3/4"E
G	1"	1"1/4
B	18 or 3/4"E	18 or 3/4"E
I	50	50
C	24	27
D	100	100
H	108	108
L1	98	104
L2	95	104
J	123	129
Ex	39	48
E	213	213
M	62	62
X	106	106
Y	312	312



Outlets	2	3	4	5	6	7	8	9	10	11	12
R53MT+R53VT	1	1	1	1	1	1	1	1	1	1	1
R53MM+R53MT	0	1	2	3	4	5	6	7	8	9	10
O* 1"xDN32x18	/	50	100	150	200	250	300	350	400	450	500
O* 1"1/4xDN32x18	/	50	100	150	200	250	300	350	400	450	500

* the O distance refers to the installation of the two brackets after the first module, and before the last one respectively

R557-R557F	1"x18 - 1"x3/4"E
G	1"F
B	18 or 3/4"E
I	50
K	1"1/2
H	433-473
E	274-314
M	137
N	130-180
X	116,6

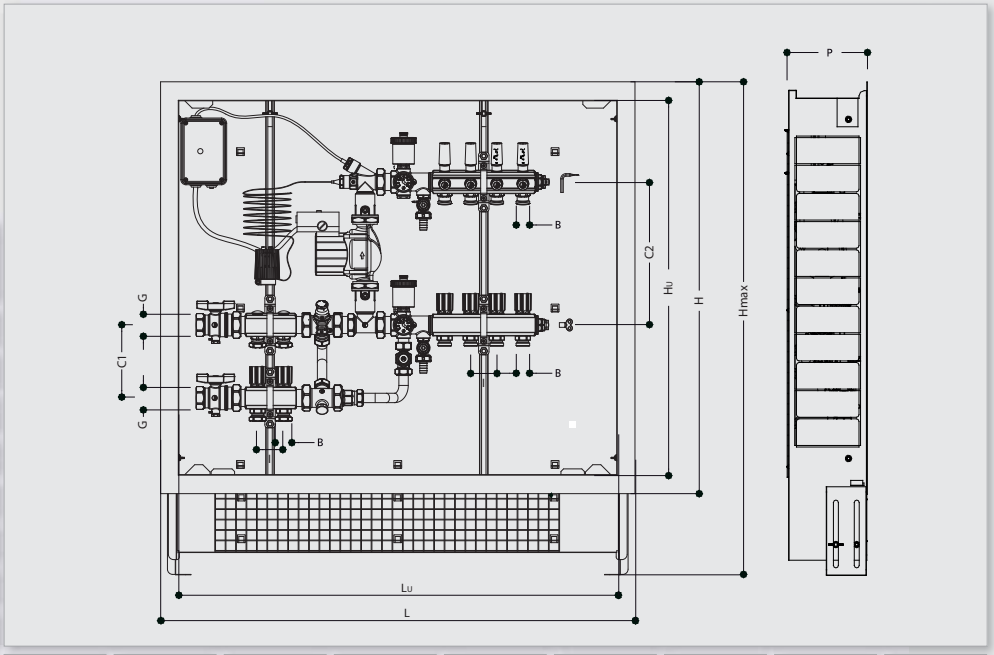


Outlets	2	3	4	5	6	7	8	9	10	11	12
O	/	/	100	150	200	250	300	350	400	450	500
L	377	427	477	527	577	627	677	727	777	827	877
suggested (*) cabinet R500, R501, R502,R509	type B	type C	type C	type C	type C	type D	type D	type D	type D	type D	type D

* considering the overall dimensions due to the valve with thermostatic option and the lockshield valve

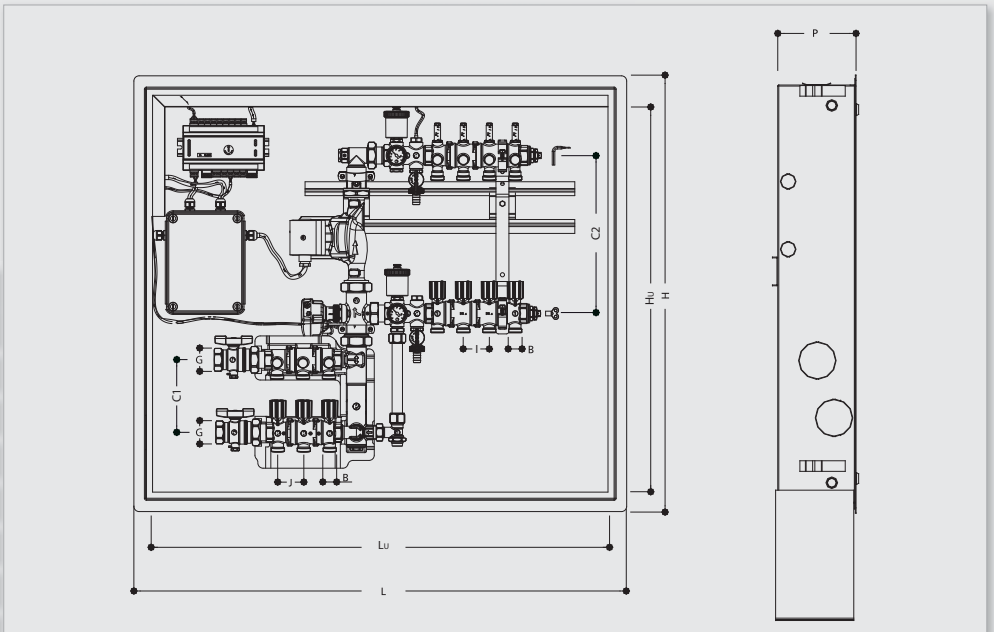
Installation dimensions

R557R	1"x18 - 1"x3/4"E
G	1"
B	18 or 3/4"E
C1	140
I	50
C2	275
Hu	720
H	790
Hmax	930-1030
P	150-180



Outlets	3	4	5	6	7	8	9	10	11	12
Radiator outlets	2			3						
Lu	850			1000			1200			
L	920			1070			1270			

R559	1"x18 - 1"x3/4"E
G	1"
B	18 or 3/4"E
C1	140
I	50
C2	305
Hu	800
H	840
P	150-180



Outlets	4	5	6	7	8	9	10	11	12
Radiator outlets	3								
Lu	910					1210			
L	950					1250			

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ACCADEMIA

General Sales conditions

ORDERS
All orders are to be considered for booking purposes only and shall in no way commit our Company to the delivery, whole or partial, or the goods ordered.

PRICES
Prices are those in force at the time of delivery and are in no case binding.

SHIPMENTS
Shipments are always carriage on delivery, save for special agreements to the contrary. Risks and liabilities relating to goods in transit are to be charged entirely to the purchaser even if sold free on delivery and the Company is relieved of any responsibility for missing or damaged goods. Shipments will be effected with the means available at the time and customers' indications shall be considered purely as recommendations.

PACKAGING
Packaging is invoiced at cost price and no return is accepted

RETURNED PIECES
Returned goods are not accepted without our prior authorization and in any case only on free house terms.

COMPLAINTS
Valid only if filed within 8 days from receipt of goods.

PAYMENTS
The terms are indicated in our offers and commission copies and are to be considered binding. Once the agreed deadline has expired, interest on arrears will be calculated based on the average bank rate existing at the date agreed for payment. In case of delayed payment we shall be entitled to discontinue running supplies without notice.

BILL STAMPS
Bill stamps are to be charged to customer.

GUARANTEE
1. GIACOMINI products are covered by guarantee for any faults which become apparent within the term of 24 months from the date of delivery, provided the relative claim is filed by the Customer within 60 days from noting the non-conformance.
2. Any fault deriving from the imperfect installation of the product or in any case from installation procedures not conforming with the correct professional practice will not be covered by guarantee.
3. In order to access the guarantee service the Customer will have to supply proof of the purchase by exhibiting the fiscal receipt released by the final vendor.
4. The guarantee only covers the repair and/or replacement without cost of the faulty product: the aforementioned remedies are exclusive and substitute any other guarantee, explicit or implied, including the guarantee of correct functioning, which is hereby expressly excluded.
5. GIACOMINI also declines any responsibility of a contractual, extra-contractual nature, or issuing from other sources, in case of indirect liabilities and/or economic losses deriving from the use of its products.
6. The guarantee herewith does not cover: (1) material damage to products; (2) damage caused by crashes or falls, improper use, negligence, failed or incorrect maintenance, unauthorized attempts to repair or modify the product or any other cause outside its intended use; (3) damage caused by fire, power variations, unusual conditions of water and air in the ambient, sudden voltage changes in the supply network or other "force majeure" causes.
7. The guarantee does not cover any travel, food and accommodation costs sustained by GIACOMINI technicians.
8. The GUARANTEE herewith concerns relations with final users only, while relations with all other parties of the contractual distribution network are disciplined by the laws in force.
9. The Guarantee is supported by an adequate insurance policy for "Product Civil Responsibility"

MODIFICATIONS
Our Company reserves the right to carry out any modification which should be deemed necessary for technical reasons, without prior notice.

COMPETENT COURT
In case of controversy the Court of Novara is recognized as having exclusive competence.