

# SOLUTIONS FOR DHW AND HEATING

**Q-TON | HYDROLUTION**



 **MITSUBISHI  
HEAVY INDUSTRIES**

[www.mitsubishi-termal.it](http://www.mitsubishi-termal.it)







# HEATING AND DHW SOLUTIONS

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Q-ton and HYDROLUTION are advanced low temperature heating and hot water systems from Mitsubishi Heavy Industries.

They offer a variety of comprehensive and efficient solutions that can contribute to reducing global warming, from the perspective of a low-carbon society future.



# LOW ENVIRONMENTAL IMPACT GWP AND REFRIGERANTS

Getting serious about low environmental impact means promoting refrigerant gases on the basis of their GWP. The GWP value indicates the potential for global warming and carbon dioxide accumulation. Reducing greenhouse gas emission is essential: the higher the GWP value of refrigerant gases entering the atmosphere, the faster and more dramatically the average global temperatures rise and the climate changes. Appliances with GWP = 1 refrigerants are MHI's technological breakthrough in low temperature heating.

**GWP  
1**


R744  
REFRIGERANT

Gas R744 (CO<sub>2</sub>) has a GWP of 1 and is a natural substance that can be used as a fluid in different heating or cooling applications thanks to its high heat transfer properties.

It has special environmentally-friendly characteristics, such as being non-flammable and not damaging to the ozone layer.

Using CO<sub>2</sub> as a refrigerant significantly reduces the amount of greenhouse gas emissions into the atmosphere, which are the cause of climate change.

## ADVANTAGES OF GAS R744

- Environmentally friendly.
- **Non-flammable.** 
- Non-toxic.
- Not harmful and does not pose risks to the ozone.
- Very efficient.
- No restrictions on use worldwide.


**GWP  
2088**

R410A  
REFRIGERANT

R410A gas is a refrigerant fluid that is mainly used for air conditioners and which is composed of a mixture of two fluorinated hydrocarbons: R32 and R125 in equal parts. It does not contain chlorine atoms and therefore cannot damage the earth's ozone layer, thus it has a reduced impact on the environment of our planet (ODP=0).

R410A is therefore a refrigerant gas that guarantees excellent performance and high efficiency, but also a low environmental impact at the same time.

## ADVANTAGES OF R410A GAS

- Environmentally friendly.
- **Non-flammable.** 
- Not harmful and does not present risks to the ozone.
- Very efficient.

# RENEWABLE ENERGY CLASS A QUALITY

There is a growing need for a single generator that fulfils household energy needs and also has the least possible impact on the environment. Q-ton and HYDROLUTION are MHI heat pumps developed for professionals who want to create systems with strong renewable energy use, high comfort and reduced operating costs. The wide power range allows the utmost application flexibility in both residential and commercial settings.

## Legal Decree on renewable energy for new buildings

According to the Renewable Energies Decree (Legislative Decree 28/2011) and subsequent extensions, thermal energy production systems in new buildings or buildings restructured on the basis of planning permission submitted from **1 January 2018** must be designed and built so as to ensure simultaneous compliance with coverage, through the use of energy produced by plants powered by renewable sources, of 50% of the consumption forecast for hot water and 50% of the sum of the consumption forecast for heating, cooling and domestic hot water.

Q-ton and HYDROLUTION make it possible to achieve these goals using renewable energy.

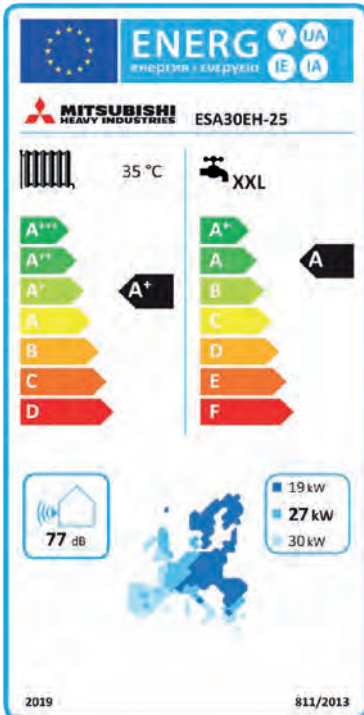
## Class A systems

- Starting from 2015, heating and DHW systems must display a label that clearly indicates the energy efficiency class. The aim of the European Directive is to remove inefficient products from the market.
- MHI is active in improving the energy requirements of its products through technological development, to ensure customers at "A" grade energy efficiency or higher.
- Q-ton and HYDROLUTION are innovative systems that make use of renewable aerothermal energy for significant energy and consumption savings. They have an efficiency of up to **class A++ for heating** and **class A for DHW production**.

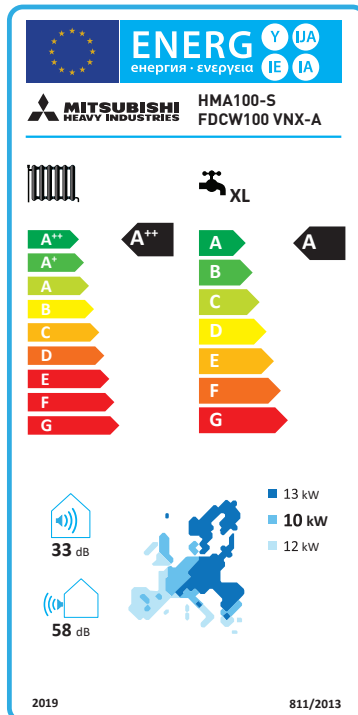
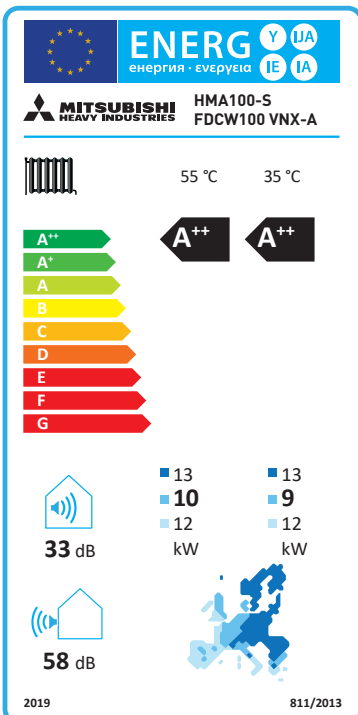


# ENERGY LABEL Q-TON - HYDROLUTION

ESA30EH2-25



HMA 100-S





# Q-TON DHW AND HEATING

## Production of high temperature DHW and low temperature heating

Q-ton is a heat pump system with natural refrigerant R744 (CO2) for heating and high temperature domestic hot water production. This system can be applied in residential, commercial and industrial environments.

**Q-ton is optimised for low temperature heating systems. It can produce domestic hot water up to 90° C at outdoor temperatures as low as -25° C.**

**Can produce up to 17,000 litres/day of mixed DHW at 45° C or at 90° C without mixing. Keeps nominal output down to -7° C.**

Q-ton boasts performance values among the best on the market, obtained thanks to the use of the two-stage compressor produced and patented by Mitsubishi Heavy Industries.



ESA30EH2-25



FEATURES	APPLICATIONS	BENEFITS FOR PROFESSIONALS	BENEFITS FOR CUSTOMERS
<ul style="list-style-type: none"> <li>• DHW and heating</li> <li>• underfloor heating</li> <li>• heating via high efficiency radiators</li> </ul>	<ul style="list-style-type: none"> <li>• large apartment buildings</li> <li>• small apartment buildings</li> <li>• spa resorts</li> <li>• big hotels</li> <li>• offices</li> <li>• gyms</li> </ul>	<ul style="list-style-type: none"> <li>• operation even at very low outside temperatures</li> <li>• installation flexibility</li> <li>• low environmental impact</li> </ul>	<ul style="list-style-type: none"> <li>• high performance</li> <li>• long-term reliability</li> <li>• low operating costs</li> <li>• a single centralised system for both heating and DHW</li> </ul>

# HYDROOLUTION ALL IN ONE

## Heating, cooling and DHW in a single solution

The All in One combination provides a comprehensive solution for all heating, cooling and DHW needs.

All in One includes an outdoor unit and an HMA system with an integrated DHW tank, heating element and circulation pump.

### All in One outdoor units



10 kW ■



### Indoor units



■ HMA 100-S  
10 kW O.U.

FEATURES	APPLICATIONS	BENEFITS FOR PROFESSIONALS	BENEFITS FOR CUSTOMERS
<ul style="list-style-type: none"> <li>• underfloor heating</li> <li>• heating via high efficiency radiators</li> <li>• DHW and heating</li> <li>• cooling</li> </ul>	<ul style="list-style-type: none"> <li>• independent homes</li> </ul>	<ul style="list-style-type: none"> <li>• can also be installed in tight spaces</li> <li>• installation flexibility</li> <li>• low environmental impact</li> </ul>	<ul style="list-style-type: none"> <li>• easy to use</li> <li>• very quiet</li> <li>• high performance</li> <li>• long-term reliability</li> <li>• low management costs</li> </ul>

# HYDROLUTION FLEXIBLE

## Heating and cooling with optional DHW

The Flexible combination offers space heating and cooling with the option of adding domestic hot water production.

HYDROLUTION Flexible consists of an outdoor unit and an HSB (split box) system.

**GWP 2088** **R410A**

### Flexible outdoor units



10 kW ■



16 kW ■

### Split box



Exchangers for units up to 16 kW

### Tank



Storage volume 300 L



Storage volume 500 L

FEATURES	APPLICATIONS	BENEFITS FOR PROFESSIONALS	BENEFITS FOR CUSTOMERS
<ul style="list-style-type: none"> <li>• underfloor heating</li> <li>• heating via high efficiency radiators</li> <li>• DHW and heating</li> <li>• cooling</li> </ul>	<ul style="list-style-type: none"> <li>• apartment buildings</li> <li>• small apartment buildings</li> <li>• offices</li> </ul>	<ul style="list-style-type: none"> <li>• integrates with conventional heating systems</li> <li>• modular solution up to 128 kW</li> <li>• installation flexibility</li> <li>• low environmental impact</li> </ul>	<ul style="list-style-type: none"> <li>• heating, DHW and cooling in a single system</li> <li>• high performance</li> <li>• long-term reliability</li> <li>• low management costs</li> </ul>

# Q-TON HIGH PERFORMANCE

Q-ton is a system that uses renewable aerothermal energy to significantly save energy and consumption.

## HIGH PERFORMANCE

- Especially suitable for DHW and heating production in cold outdoor temperatures, down to  $-25^{\circ}\text{C}$ .
- Can produce up to 17,000 litres/day of mixed DHW at  $45^{\circ}\text{C}$  or at  $90^{\circ}\text{C}$  without mixing.
- Keeps nominal output down to  $-7^{\circ}\text{C}$ .



Operating limit



Litres of DHW per day



100% nominal output down to  $-7^{\circ}\text{C}$



DHW temperature without mixing

## ENVIRONMENTALLY RESPONSIBLE

- Minimises the environmental impact thanks to the low GWP value = 1 with CO2 refrigerant.
- ODP (ozone depletion coefficient) equal to zero.



Minimum Global Warming Potential



Zero Ozone Depletion Potential

## EFFICIENCY AT THE TOP

- The industry's highest energy efficiency coefficient in DHW production mode [COP 4.3].
- Maximum operating cost reduction.



High efficiency



Maximum energy efficiency coefficient in DHW

## FLEXIBILITY AND RELIABILITY

- Modular up to 16 units.
- Durable, high-quality internal components.
- Boasts extreme versatility of use and easy operation and maintenance management.



Connectable Q-ton outdoor units

## OPERATION AT THE CLICK OF A BUTTON

- Touch screen control panel with user-friendly graphics.
- Possibility of sending notifications via MODBUS communication with the RCI-MDQE2 interface.



# EXAMPLES OF APPLICATION



## Q-ton for DHW only

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### Commercial

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## Q-ton for DHW and heating

### Residential

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### Commercial

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## APARTMENT BUILDINGS

# Q-ton for centralized DHW production

### SYSTEM DESCRIPTION

The example describes the system of a large condominium in which the production of domestic hot water is entrusted to the Q-ton system, a CO2 heat pump: the system is combined with 3 stratified tanks whose volume can vary from 500 up to 1500 litres.

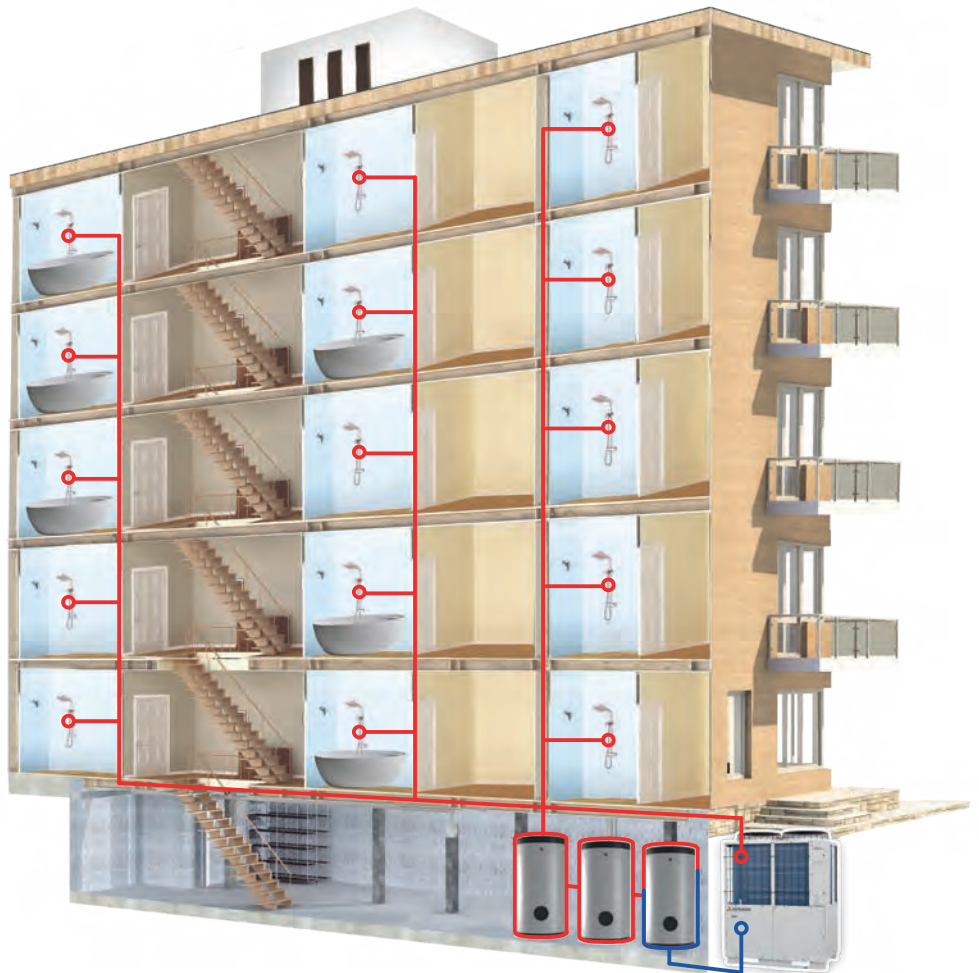
Q-ton produces 750 litres per hour of post-mixed hot water at 45 °C, except for the energy input necessary for recirculation.

The Q-ton system can also be installed in series with tanks already present in a pre-existing system.

### FEATURES OF THE SYSTEM



Litres of DHW per day



## SPA RESORTS/BIG HOTELS

# Q-ton for centralized DHW production

### SYSTEM DESCRIPTION

The example describes the system of a hotel with a SPA in which the production of domestic hot water is entrusted to the Q-ton system, a CO2 heat pump: the system consists of 2 Q-ton units, connected in series, combined with 5 stratified tanks whose volume can vary from 500 up to 1500 litres, except for the energy input necessary for recirculation.

To meet the need to produce large quantities of DHW, the Q-ton system can be installed in a modular combination: it is possible to connect up to 16 units of 30 kW each, controlled by a single remote control.

Consider that a 30-kW unit can produce up to 17,000 litres of DHW per day.

### FEATURES OF THE SYSTEM

16

Connectable outdoor units

1500

Litres of DHW per day

30 kW

Modular combination



## LARGE APARTMENT BUILDINGS

# Q-ton in heating and DHW production mode

### SYSTEM DESCRIPTION

Large, newly built apartment buildings increasingly utilise radiant underfloor heating systems and require a DHW production system.

Up to 16 Q-ton units can be hydraulically connected and controlled from a single control, depending on the actual needs of the building. This flexibility makes it possible to fulfil the multiple requirements of both residential and commercial applications.

### FEATURES OF THE SYSTEM



54  
kWt in heating



2000  
Litres of DHW per day



20+  
Flats



Radiant flooring

Components to be accessed on site

- Ⓢ Temperature sensor
- Ⓢ Circulation pump
- Ⓢ Mixing valve
- Ⓢ Flow meter
- Ⓢ Constant flow control valve
- Ⓢ Heat exchanger
- Ⓢ Control unit



### Q-TON FOR HEATING

Supposing we have a newly built condominium consisting of 20 flats (70 m<sup>2</sup> each), the estimated heating demand is about 54 kWt.

This demand is met by two Q-ton units feeding a radiant flooring system.

### Q-TON FOR DHW

Q-ton is also able to meet the demand for DHW, which for an apartment building of this size is around 2000 litres/day.

Q-ton will work on a (third party) exchanger connected to an 800-litre ESA tank and a 1500-litre ESA tank.

Calculation according to UNI TS 11300-2



## NEWLY BUILT APARTMENT BUILDINGS

# Q-ton in heating

### SYSTEM DESCRIPTION

Newly built apartment buildings must fulfil the parameters of current energy classification regulations. Compliance with the parameters is achieved by intervening both on the building structure and on the systems, using radiant flooring heating systems.

**Q-Ton fulfils the requirements in terms of plant engineering.**






### FEATURES OF THE SYSTEM

  
27  
kWt in heating

10  
Flats

  
Radiant flooring

Components to be accessed on site

-  Temperature sensor
-  Circulation pump
-  Flow meter
-  Constant flow control valve
-  Control unit



### Q-TON FOR HEATING

Supposing we have a newly built condominium consisting of 10 flats (70 m<sup>2</sup> each), the estimated heating demand is about 27 kWt.

This demand is met by a Q-ton unit feeding a radiant flooring system.

Calculation according to UNI TS 11300-2

## NEWLY BUILT APARTMENT BUILDINGS

# Q-ton in heating and DHW production mode

### SYSTEM DESCRIPTION

Q-ton in heating and DHW production mode allows for the installation of a single system that meets winter heating needs and produces DHW all year round for the entire building.

### FEATURES OF THE SYSTEM



kWt in heating



Litres of DHW per day



Flats



Radiant flooring

Components to be accessed on site

- Temperature sensor
- Circulation pump
- Mixing valve
- Flow meter
- Constant flow control valve
- Heat exchanger
- Control unit



### Q-TON FOR HEATING

Supposing we have a newly built apartment building composed of 10 flats (70 m<sup>2</sup> each), the estimated heating demand is about 27 kW<sub>t</sub>.

This demand is met by a Q-ton unit feeding a radiant flooring system.

### Q-TON FOR DHW

Q-ton is also able to meet the demand for DHW, which for an apartment building of this size is around 1000 litres/day.

Q-ton will work on a (third party) exchanger connected to a 800-litre ESA tank.

Calculation according to UNI TS 11300-2

## EXISTING APARTMENT BUILDINGS

# Q-ton in heating

### SYSTEM DESCRIPTION

The type of application illustrated in the figure below describes an existing apartment building with an existing radiant system.

**Q-ton connects to the existing radiant system, thus reducing installation costs and, given the high performance values, also utility consumption.**

### FEATURES OF THE SYSTEM



kWt in heating



Flats



Radiant flooring

Components to be accessed on site

- Ⓢ Temperature sensor
- Ⓢ Circulation pump
- FM Flow meter
- PCX Constant flow control valve
- PLC Control unit



### Q-TON FOR HEATING

Supposing we have a newly built condominium consisting of 10 flats (70 m<sup>2</sup> each), the estimated heating demand is about 27 kWt.

This demand is met by a Q-ton unit feeding a radiant flooring system.

Calculation according to UNI TS 11300-2

## SMALL APARTMENT BUILDINGS

# Q-ton in heating and DHW production mode

### SYSTEM DESCRIPTION

Small, newly built apartment buildings, generally composed of 5 flats, require a heating and DHW production system.

Thanks to the Inverter system, Q-ton is able to modulate according to the actual energy needs of the building, effectively improving its energy performance.

### FEATURES OF THE SYSTEM



14 kWt in heating



500 Litres of DHW per day



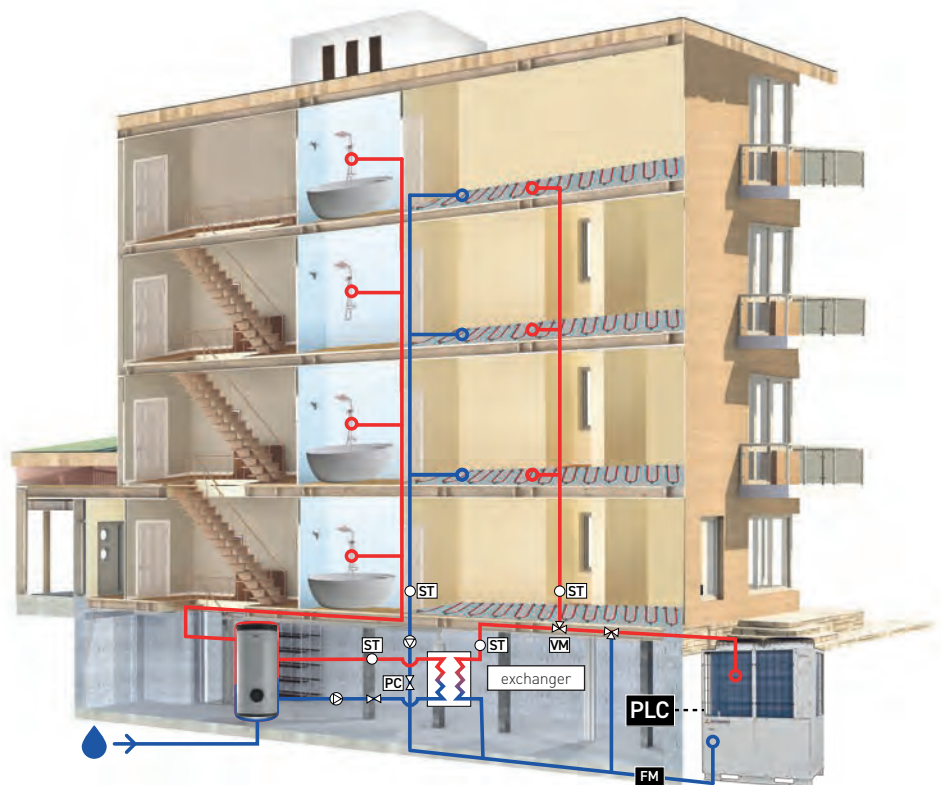
5 Flats



Radiant flooring

Components to be accessed on site

- Ⓢ Temperature sensor
- Ⓢ Circulation pump
- Ⓢ Mixing valve
- Ⓢ Flow meter
- Ⓢ Constant flow control valve
- Ⓢ Heat exchanger
- Ⓢ Control unit



### Q-TON FOR HEATING

Supposing we have a newly built condominium consisting of 5 flats (70 m<sup>2</sup> each), the estimated heating demand is about 14 kWt.

This demand is met by a Q-ton unit feeding a radiant flooring system.

Calculation according to UNI TS 11300-2

### Q-TON FOR DHW

Q-ton is also able to meet the demand for DHW, which for an apartment building of this size is around 500 litres/day.

Q-ton will work on a (third party) exchanger connected to a 500-litre ESA tank.

## PUBLIC AND PRIVATE OFFICES

# Q-ton in heating and DHW production mode

### SYSTEM DESCRIPTION

Working inside buildings requires a careful study of the environmental conditions in which occupants can carry out their tasks in optimal climatic conditions. More and more companies pay attention to the well-being of their workers, creating, for example, a fitness area and heated changing rooms where there is hot water for showers.

**Q-ton fulfils the dual demand for primary heating and DHW production with a single system.**

### FEATURES OF THE SYSTEM



kWt in heating



Litres of DHW per day



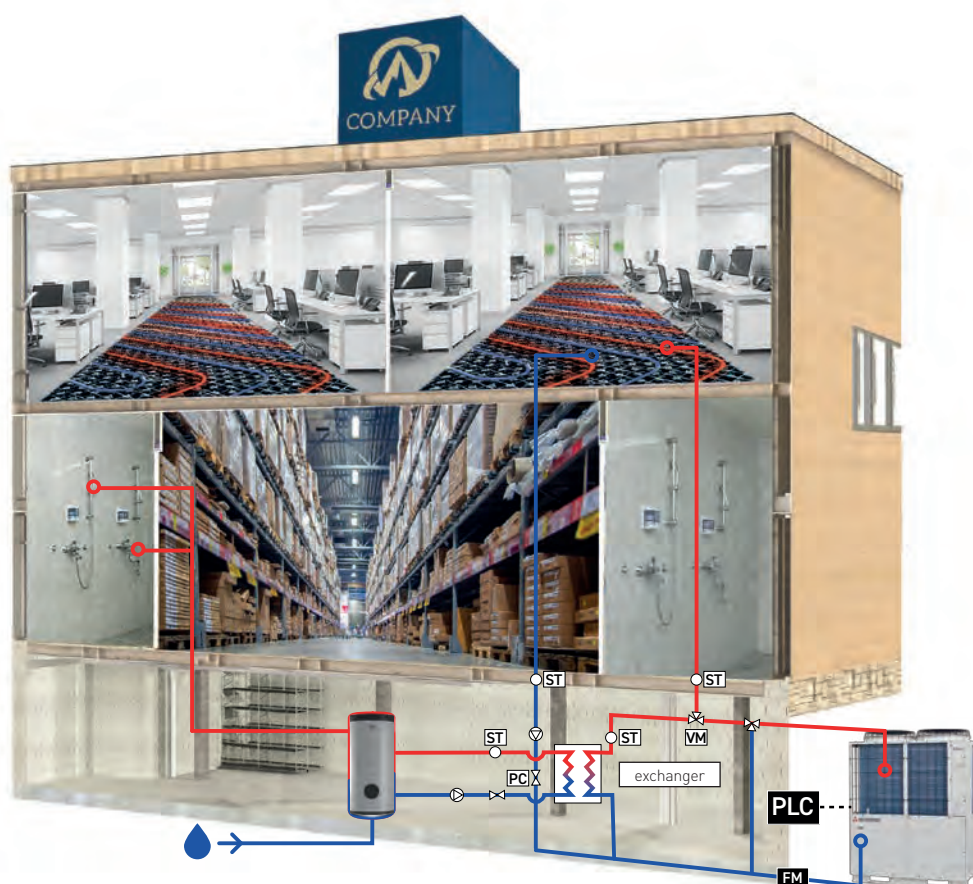
superficie ufficio in m<sup>2</sup>



Radiant flooring

Components to be accessed on site

- Ⓢ Temperature sensor
- Ⓢ Circulation pump
- Ⓢ Mixing valve
- Ⓢ FM Flow meter
- Ⓢ PCX Constant flow control valve
- Ⓢ Heat exchanger
- Ⓢ PLC Control unit



### Q-TON FOR HEATING

Supposing we have a newly built 500 m<sup>2</sup> office, the estimated heating demand is about 27 kWt.

This demand is met by a Q-ton unit feeding a radiant flooring system.

### Q-TON FOR DHW

Q-ton is also able to meet the hot water demand. Supposing that an office of this size has 3 showers and 6 toilets, the daily requirement is around 270 litres.

Q-ton will work on a (third party) exchanger connected to a 500-litre ESA tank.

Calculation according to UNI TS 11300-2

# Q-TON, DHW AND HEATING FROM FREE NATURAL ENERGY

Q-ton systems are the only ones on the market that use R744 gas and that can work on low temperature thermal systems having a seasonal energy efficiency class of A+. These systems, being ECO friendly, are attentive to the possible risks associated with the emission of climate-altering gases into the atmosphere and, to avoid possible gas leaks, are equipped with leakage control sensors.

**R744**

R744 (CO<sub>2</sub>)  
REFRIGERANT  
GAS

**90°C**

DOMESTIC  
HOT WATER  
PRODUCTION  
UP TO 90° C

**52°C**

HOT WATER  
FOR HEATING UP  
TO 52° C

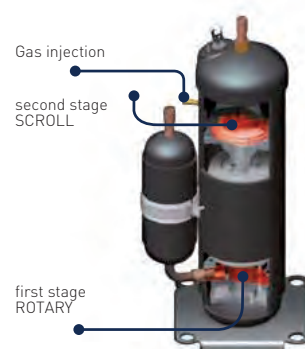
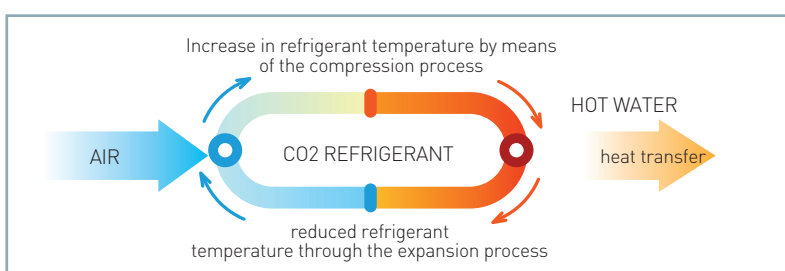
 HEAT PUMP KEYMARK  
Certificate of Approval for the Heat  
Pump KEYMARK Scheme



# Q-TON CO2 HEAT PUMP

## GSR dual stage compressor

Thanks to the action of its dual stage compressor, Q-ton makes it possible to produce a high amount of energy for heating or for domestic hot water production. The nominal thermal power generated is stable and constant even when outside temperatures lower.



## LCD touch panel

The management and main parameters of the system can be controlled both from the LCD wire control and remotely via MODBUS protocols. The system independently selects the operating priority of the system (heating or domestic hot water) by means of the wire control.

The flow temperatures of the circuit can be set either as fixed way or by selecting the climate curve.



### EASY TO USE

LCD panel with lit buttons.  
Wide 2.8-inch display.  
Backlighting.



### PROGRAMMING

Daily, weekly and annual programming can be set.



### PEAK-CUT TIMER

Possibility of setting a DHW production schedule based on peak demand.



### THE TANK

The tank can always be manually filled.



### DAYLIGHT SAVINGS TIME UPDATE

The system automatically adapts to standard time for easy programming.



### CLIMATIC CURVE

In heating mode, you can set a customisable climate curve that automatically defines the flow temperature according to the outside temperature conditions.

## RC-Q1EH2 FOR Q-TON



# Q-TON, DHW PRODUCTION MODE OPERATION

The Q-ton heat pump absorbs “free” heat from the outside air and amplifies it to quickly and efficiently generate hot water, up to 90° C without any need for an additional heating element.

Q-ton reduces operating costs and carbon emissions by 40 to 75% compared to conventional systems. It is suitable for installation in new buildings and does not require a backup heating system. In existing buildings with conventional heating systems, it is applicable with the domestic hot water production function only.



## DOMESTIC HOT WATER

Q-ton installation is ideal for replacing old heating systems such as boilers because it produces DHW according to the actual capacity required by the user.

### PERFORMANCE

Operational up to  
-25° C outside

With DHW production up to 90° C

### OUTPUT

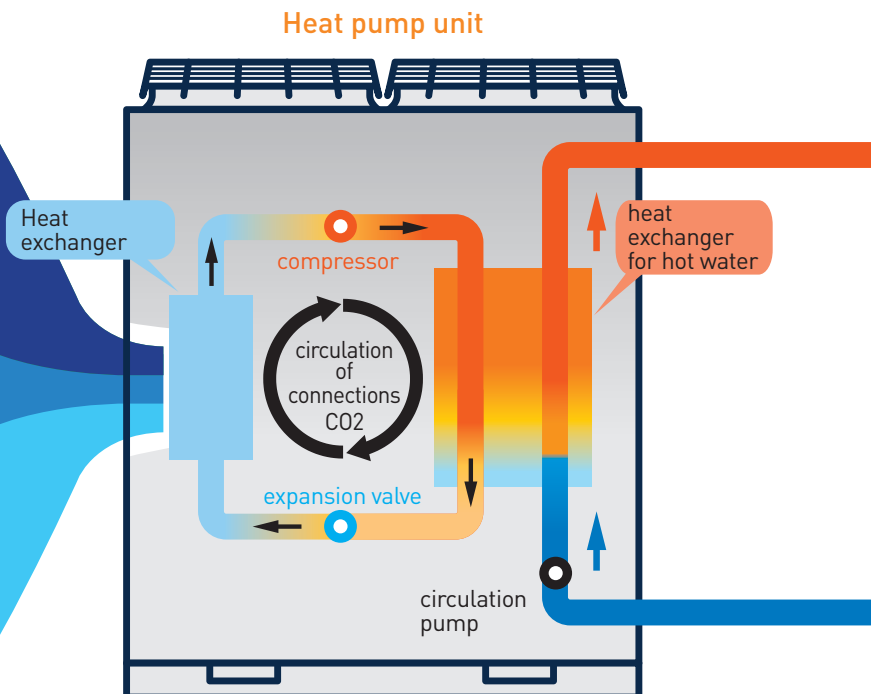
100% up to -7° C

Nominal output kept  
at 100% up to -7° C

### EFFICIENCY

COP 4.3

The highest value on the market





90°C

Achievable temperature

16

Connectable outdoor units

480

Maximum modular power in kW

### HOW IT WORKS

Q-ton uses a cold refrigerant coil that absorbs heat from outside air and compresses the refrigerant with the exclusive 2-stage compressor to increase its temperature. The heat exchanger then uses the heat generated to produce domestic hot water.

### POWER AND DESIGN FLEXIBILITY

Up to 16 outdoor units can be controlled via a single control.

The maximum power that can be achieved by a combined system is 480 kW.

These outputs make Q-ton suitable for installation in large new apartment buildings or in very large apartment buildings with existing district heating systems.

### SENSORS IN THE TANKS

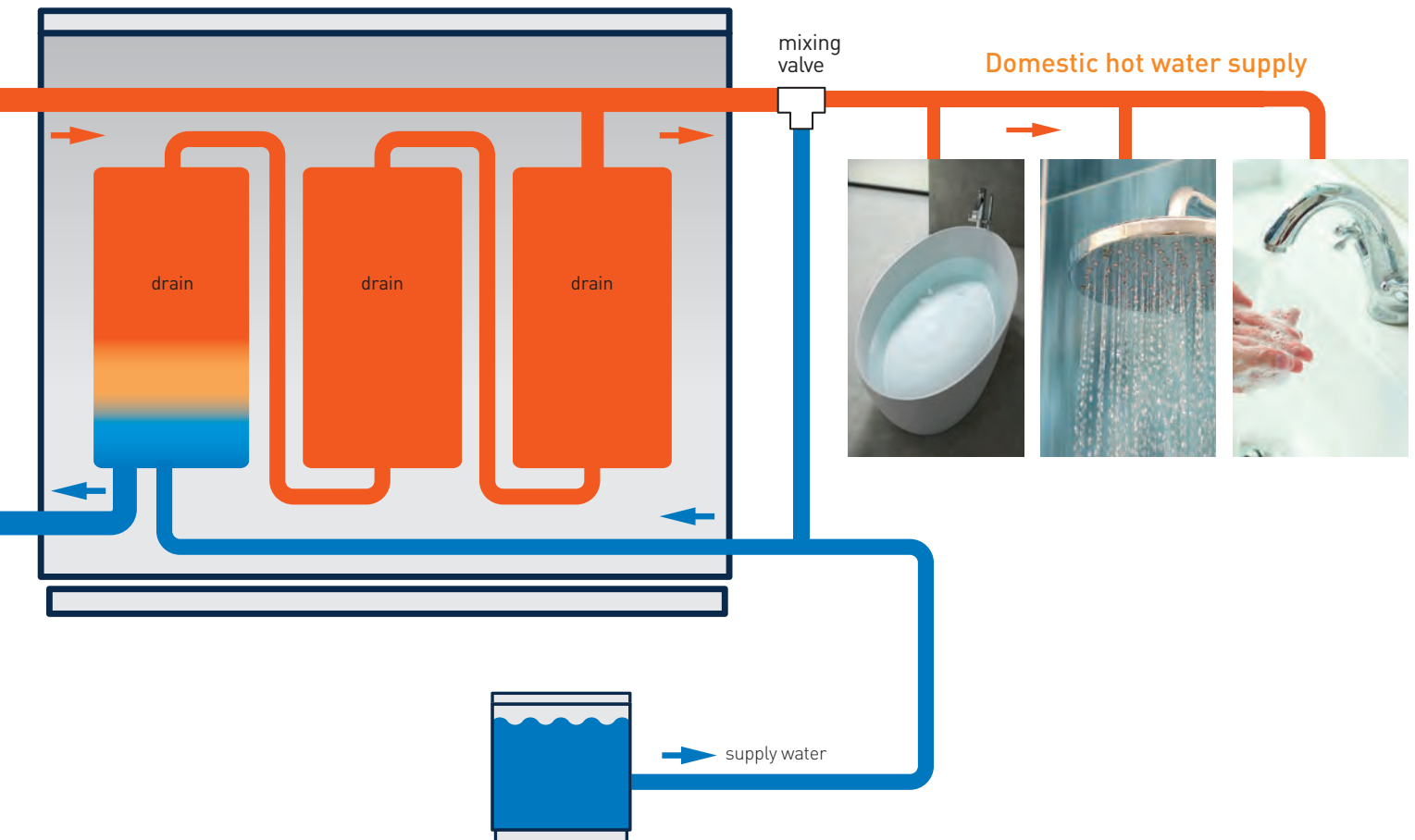
Each storage tank has five compartments into which temperature sensors can be inserted to detect the volume (in %) of hot water contained in the tank at a given time.

### PROGRAMMING

The control system is programmed to maintain specific volumes of hot water at different times of the day, according to user needs.

### LOWER COSTS

Further savings for users thanks to the possibility of heating and storing water at times when electricity rates are lower.



# Q-TON, HEATING MODE OPERATION

The application of Q-ton for heating offers efficiency, low consumption and respect for the environment.

The use of CO<sub>2</sub> as a refrigerant makes the heat pump much more environmentally friendly than conventional systems.



## HEATING

Possibility of heating rooms at low temperature with return temperatures below 30° C.

Q-ton allows combined use with radiant flooring systems and high efficiency radiators.

## POWER AND DESIGN FLEXIBILITY

Up to 16 outdoor units can be controlled via a single control.

The maximum power that can be achieved by a combined system is 480 kW.

These outputs make Q-ton suitable for installation in large new apartment buildings or in very large apartment buildings with existing district heating systems.

## PERFORMANCE

Operational up to  
-25° C outside

## OUTPUT

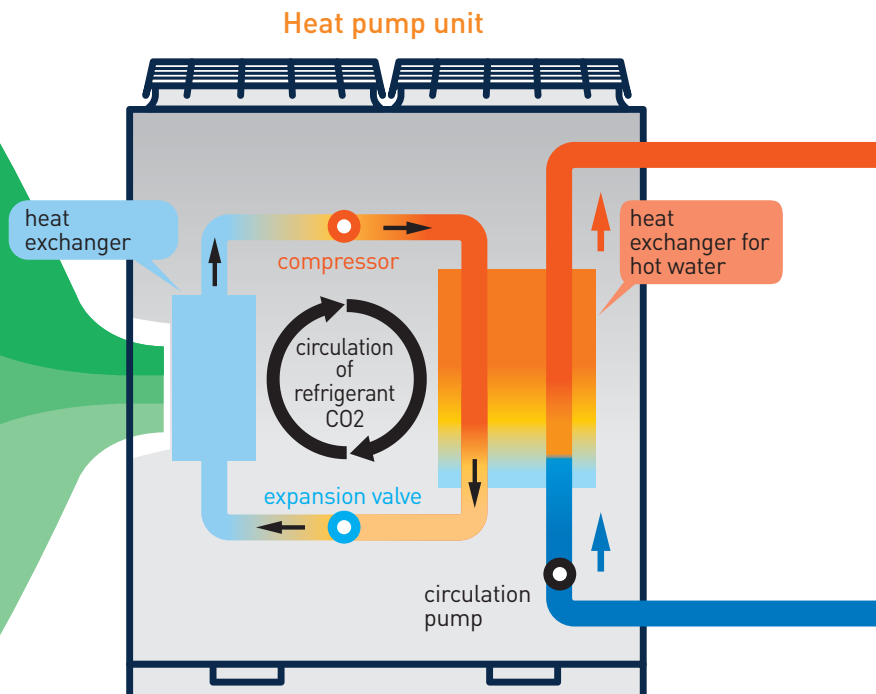
100% up to -7° C

Nominal output kept at 100% up to -7° C

## EFFICIENCY

146%

In average climatic conditions



480

Maximum modular power in kW

52°C

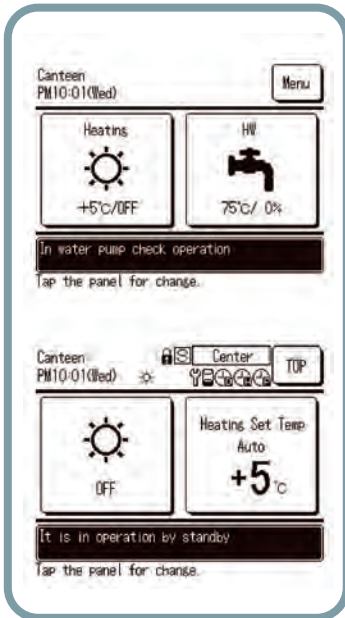
Achievable temperature



For radiant flooring



For high efficiency hydronic terminals

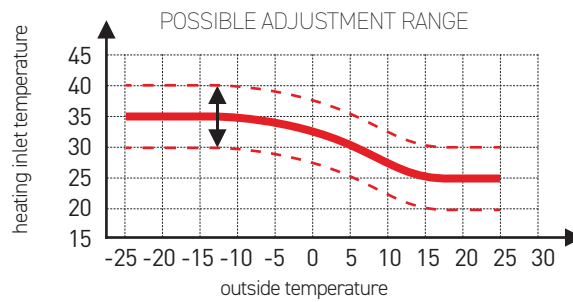


### OPERATING MODES

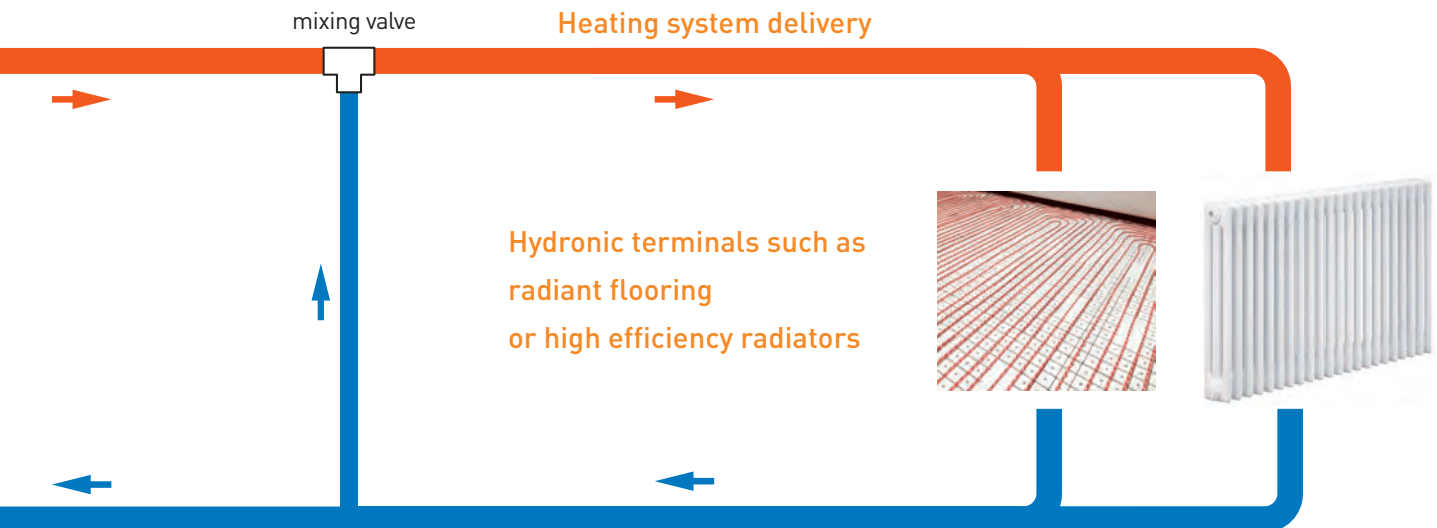
MHI has improved the touch screen control, updating the heating and domestic hot water settings

Two types of control can be set when using the system in heating mode.

**1. AUTO SETTING:** the hydronic system delivery temperature is automatically set according to a climate curve. This curve can be shifted lower or higher within a range of 5° C.



**2. MANUAL SETTING:** The inlet temperature can be set manually between 20° C and 52° C.



# Q-TON, IN COMBINED MODE OPERATION

Q-ton is a high performance, flexible, environmentally-friendly system that is able to meet the many demands of the market.

Thanks to optimal energy management, maximum performance efficiency is ensured, even at low outside temperatures.



## HEATING AND DOMESTIC HOT WATER

Q-ton is a heat pump that can meet low temperature heating and DHW production demands.

The priority of use (heating or DHW) can also be selected.

### PERFORMANCE

Operational up to  
 $-25^{\circ}\text{C}$  outside

### OUTPUT

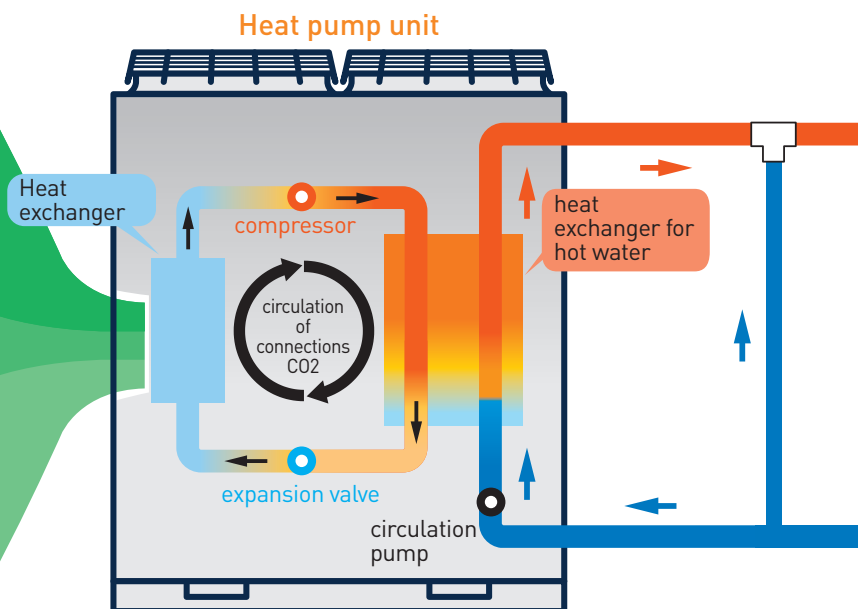
100% up to  $-7^{\circ}\text{C}$

Nominal output kept at 100%  
up to  $-7^{\circ}\text{C}$

### FLEXIBILITY

Heating + DHW

A single system that meets all  
your needs



heating management

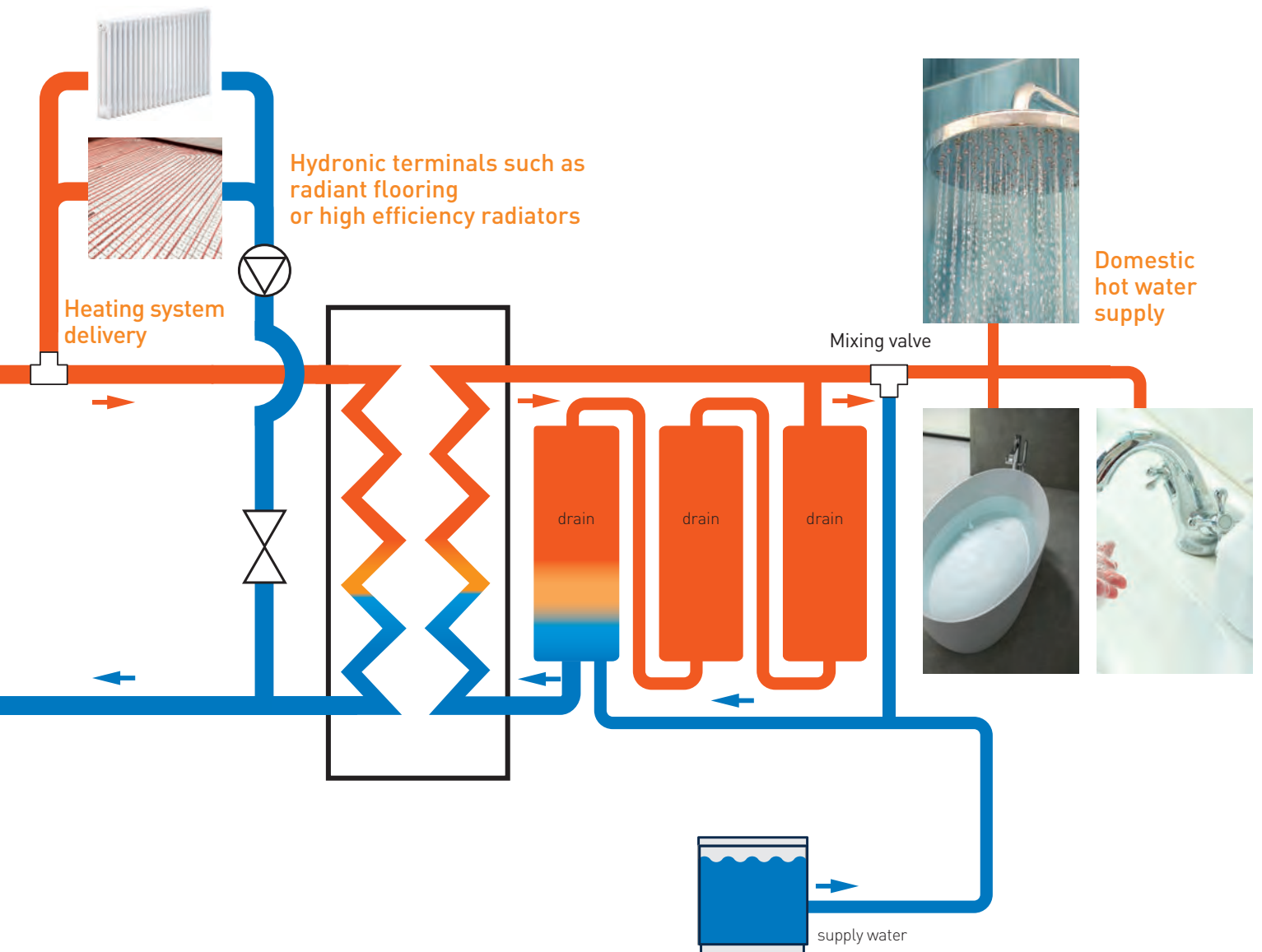


domestic hot water management

### CONTROL INSTALLATION

To make system installation flexible, an external PLC control must be installed to manage the operating and signal information coming from Q-ton, which will be transferred to the main system components (control valve, Inverter pump, mixing valve).

The operating parameters and information on real time system operation can also be managed remotely via MODBUS protocols.



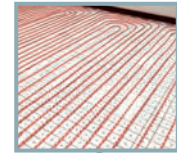
## CONFIGURATIONS

# Q-TON DHW AND HEATING

16 units controlled by a single command

Up to 480 kW of capacity, connecting 16 units, each of them 30 kW.

The extremely flexible modular configuration makes Q-ton installation possible for heating and DHW production, adapting the power of the system to different applications. A single control device can be used to manage the entire system if all units are set to the same operating mode.

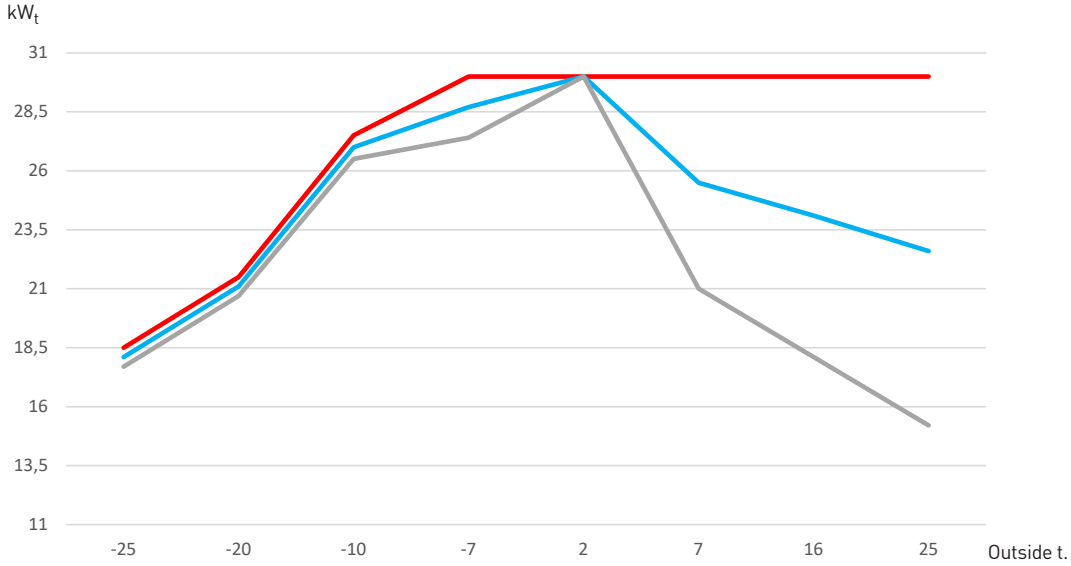


Depending on the application and installation needs, a module of 30 kW can produce 17,000 liters of DHW per day.

Model		ESA30EH2-25	
Heating	Output power (radiant flooring)		30
	Electrical absorption	A7/W35 <sup>1</sup>	8.4
	Performance coefficient		COP 3.57
Domestic Water	Output power (DHW production)		30
	Electrical absorption	A16/W65 <sup>2</sup>	7.0
	Performance coefficient		COP 4.30
Seasonal heating data	Theoretical load (Pdesignh) @-10°C		27
	Seasonal energy efficiency (ns)	W35	146
	Energy efficiency class		A+
	Annual energy consumption		14822 kWh/a
Seasonal domestic water data	Test cycle profile		XXL
	Energy efficiency (ndhw)		114
	Energy efficiency class		A
Operating limits	Outside air temperature	Heating	°C -25~25
		DHW	°C -25~43
	Delivery water temperature	Heating	°C 25~45
DHW		°C 60~90	
Refrigerant circuit data	Refrigerant	type (GWP)	R744 (1)
	Quantity (tons CO2)	kg (t)	8.5 (0.00)
	Compressor	type	Dual Stage - DC Inverter
Hydraulic data	Heat exchanger	type	Tube bundle
	Circulation pump	Prevalence	m (kPa) 5 m (49 kPa) @ 17litres/min
	Water connections	Dimensions	inches 3/4" (DN20)
	Operating pressure	Min/Max	bar 1/5
Electrical data	Power supply	Ph-V-Hz	3Ph-380~415V-50Hz
	Maximum current	A	21
	Power cable (recommended)	type	5x6 mm <sup>2</sup>
Product specifications	Fan	Air flow	m <sup>3</sup> /h 15600
		Prevalence	Pa 50
	Sound power level		dB(A) 77
	Dimensions	LxDxH	mm 1350x720x1690
	Weight	Net	kg 375
Controls	Wire remote control	Not included	RC-Q1EH2
	Climatic curve		Available
	Modbus	Optional	RCI-MDQE2

Notes: The data contained above refer to the following standards: EN14511:2013; EN14825:2013; EN50564:2011; EN12102:2011; (EU)No:811:2013; (EU)No:813:2013; OJ 2014/C 207/02:2014. 1. Water conditions: inlet 20° C, outlet 35° C. 2. Water conditions: inlet 17° C, outlet 65° C.

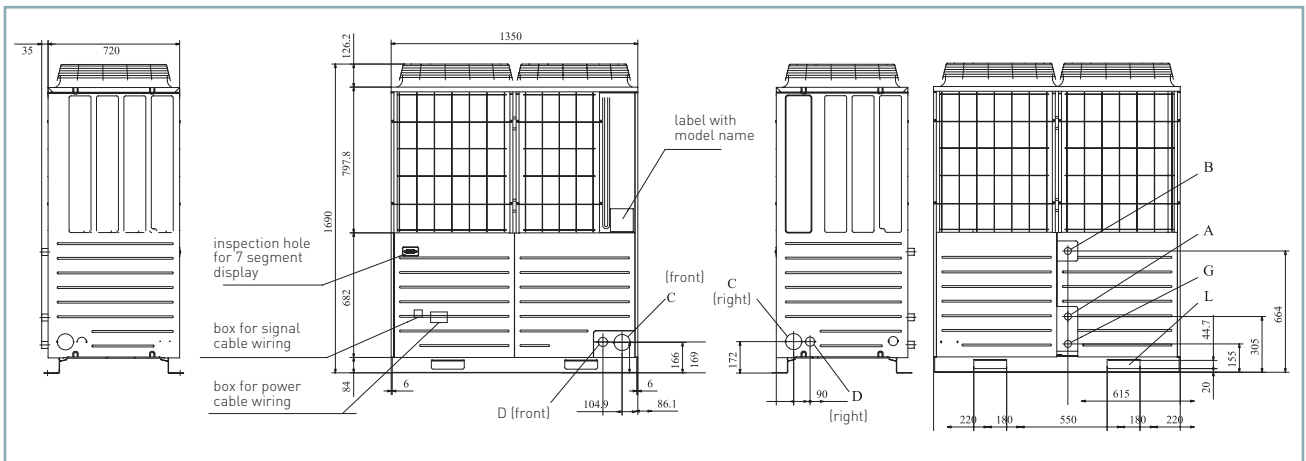
# Output curves in heating at 35° C



The data contained take into account the defrost cycles.

- Water conditions: inlet 20° C, outlet 35° C.
- Water conditions: inlet 25° C, outlet 35° C.
- Water conditions: inlet 30° C, outlet 35° C.

# ESA30EH2-25 diagrams and measurements



Item	Description
A	Water inlet port RC 3/4 (20A copper pipe)
B	Hot water outlet port RC 3/4 (20A copper pipe)
C	Output lines for connection between the heat pump and the tank 0 88 (or 0 100)
D	Power cable inlet 0 50 (right, front) bottom hole 40x80
G	Drain water piping output RC 3/4 (20A copper pipe)
L	Opening for movement 180x44.7

# HYDROLUTION FOR HEATING AND DHW PRODUCTION

HYDROLUTION is a complete system for heating, cooling and hot water. A highly energy-efficient system that reduces consumption and emissions.

## HIGH PERFORMANCE

- Delivery temperature 58° C, at the top of its category Even with outside temperatures between -20° C and 43° C.
- Water up to 65° C with electrical integration.

  
58°C

Delivery temperature without heating element

  
65°C

Temperature with electrical integration

  
-20°C

Operating limits

## ENVIRONMENTALLY RESPONSIBLE

- Ecological, guaranteeing low environmental impact and silent operation.
- Makes use of a Thermal Account for all power levels.

R410A

For all power levels

## EFFICIENCY AT THE TOP

- COP between 4.20 and 4.28 in heating.
- The compressor is designed to be efficient down to -20° C and is suitable for the coldest climates.

-20°C

Maximum efficiency up to -20° C

4,28

Maximum COP in heating

## FLEXIBILITY AND RELIABILITY

- Modular, efficient and low operating costs.
- Boasts wide installation flexibility and versatility of application (from large apartment buildings to single apartments).
- Can also be installed in tight spaces thanks to the All in One configuration.
- Can be integrated with traditional heating systems and renewable sources.
- Compact size.

## ADVANTAGES

- Guarantees water sanitation thanks to periodic anti-legionella cycles.
- Silent mode which reduces the sound emission level to 35 dB(A) at 5 metres.
- Remote control of heating mode and DHW production via MODBUS.

35dB

Sound level at 5 metres



Remote control



# EXAMPLES OF APPLICATION

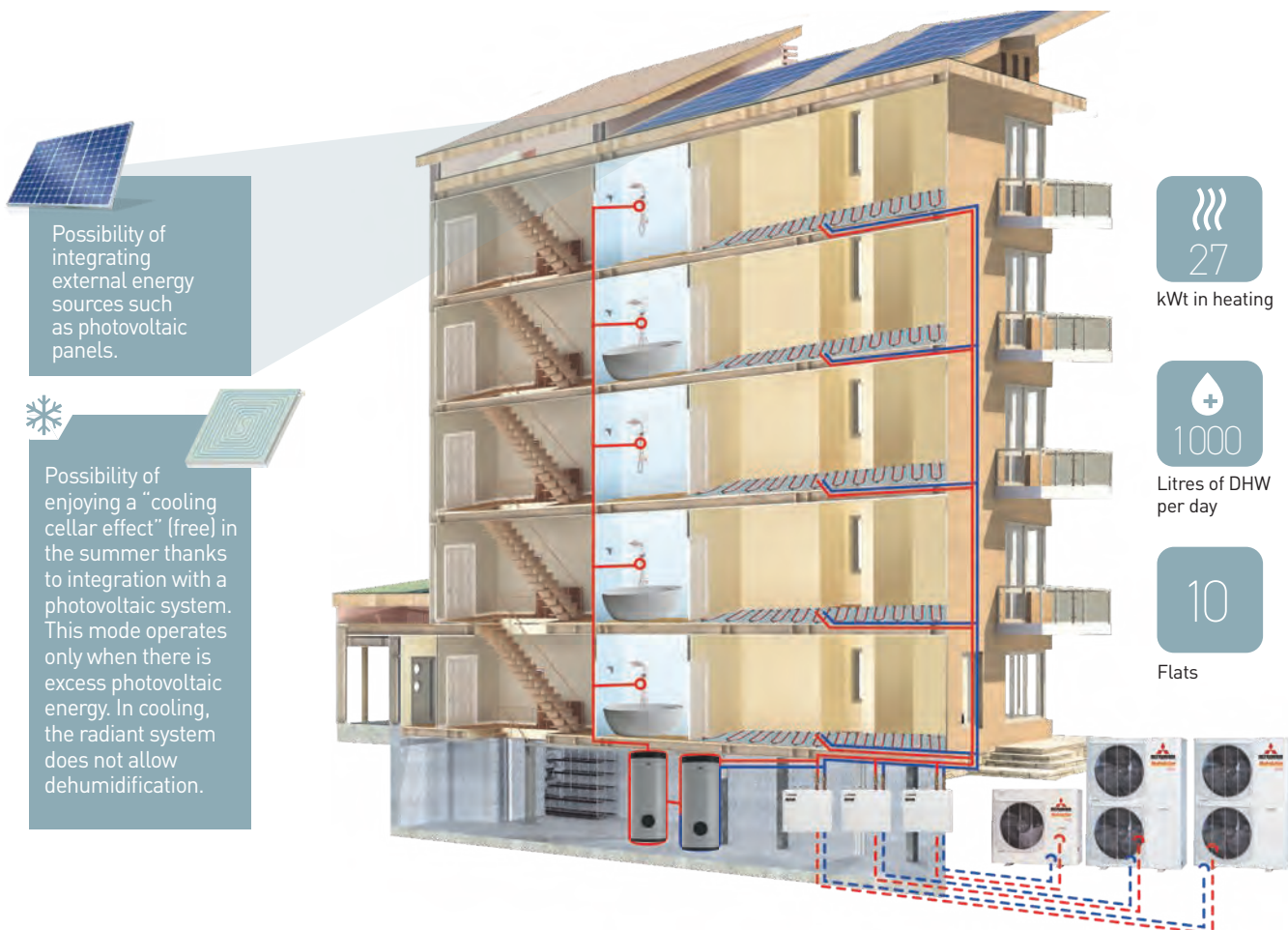


## Residential

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INDEPENDENT HOMES	38

## APARTMENT BUILDINGS

# Centralised heating and DHW, with cool effect, through HYDROLUTION Flexible modular heating



Possibility of integrating external energy sources such as photovoltaic panels.



Possibility of enjoying a "cooling cellar effect" (free) in the summer thanks to integration with a photovoltaic system. This mode operates only when there is excess photovoltaic energy. In cooling, the radiant system does not allow dehumidification.

27

kWt in heating

1000

Litres of DHW per day

10

Flats



underfloor heating



centralised cooling effect



DHW combined with heating

### SYSTEM DESCRIPTION

HYDROLUTION in Flexible modular combination of up to 128 kW, meeting building heating and DHW needs simultaneously.

Supposing we have a newly built condominium consisting of 10 flats (70 m<sup>2</sup> each) estimated heating demand is about 27 kWt.

This demand is met by two 14 kW HYDROLUTION and one 10 kW HYDROLUTION in combination, which supply a radiant flooring system and produce the apartment building's daily DHW demand of around 1000 litres.

### CONTROL SYSTEM

The **single** control **RC-HY40-W** has been created to maximise the potential of HYDROLUTION in the modular Flexible heating configuration, allowing for the following:

- Management of up to 8 systems in heating configuration.
- Management of up to 8 distribution systems at different temperatures (i.e. radiant panels and radiators) using the ECSM40/ ECSM41 accessory kit.
- Guaranteeing efficient adjustment, system durability and service continuity.
- Accounting and allocating of energy consumption by means of a RC-HY40-W control energy meter kit connection.



RC-HY20/40-W control unit

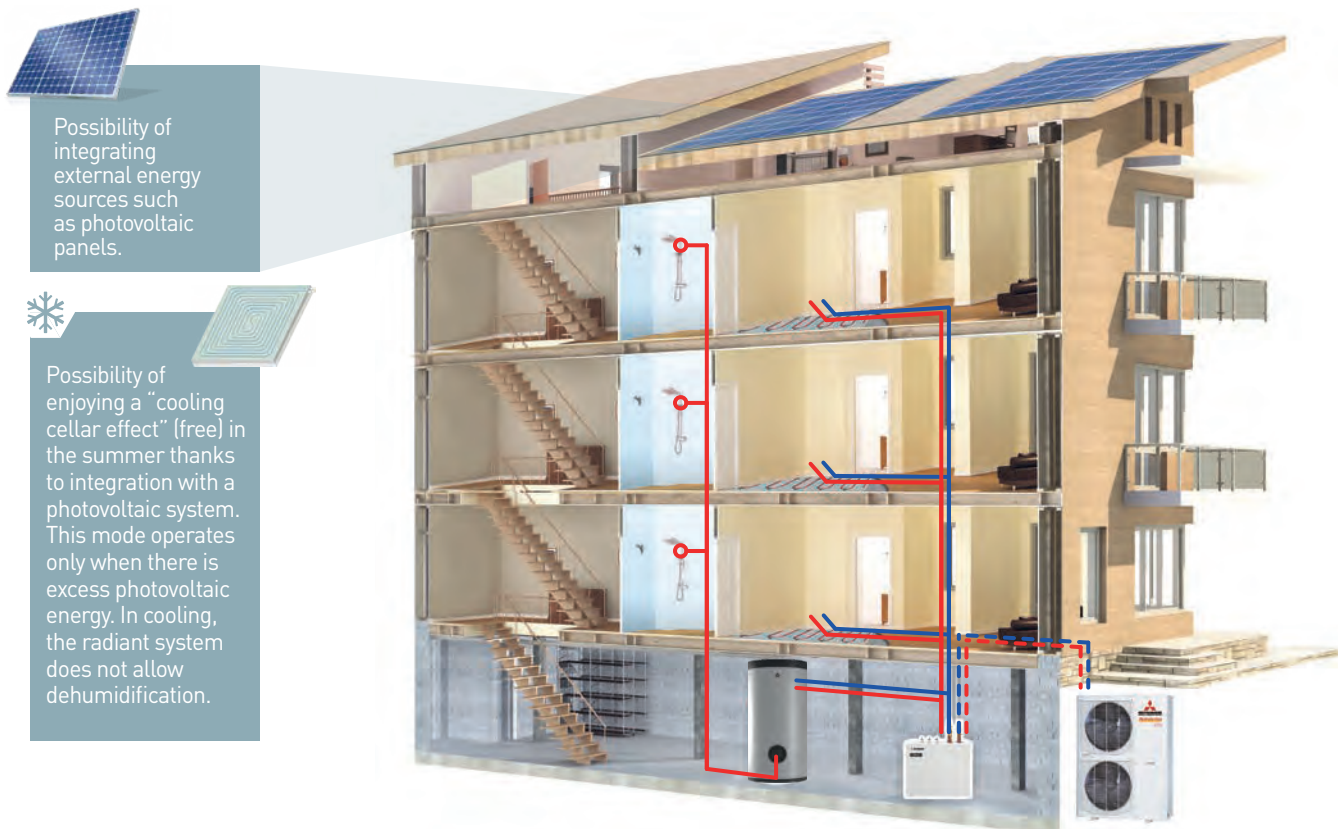


ECSM40/ ECSM41 kit

Calculation according to UNI TS 11300-2

## SMALL APARTMENT BUILDINGS

# Centralised heating and DHW, with cool effect, through HYDROLUTION Flexible



Possibility of integrating external energy sources such as photovoltaic panels.



Possibility of enjoying a "cooling cellar effect" (free) in the summer thanks to integration with a photovoltaic system. This mode operates only when there is excess photovoltaic energy. In cooling, the radiant system does not allow dehumidification.



underfloor heating



DHW combined with heating



centralised cooling effect

### SYSTEM DESCRIPTION

The type of application illustrated in the figure above describes a system inside a small apartment building in which the heating is composed of a HYDROLUTION system in Flexible heating and DHW configuration, with domestic hot water production combined with heating: the DHW tank that can be applied has a capacity from 300 to 500 litres. HYDROLUTION produces hot water for heating up to a maximum temperature of 58°C.

In this example, it is combined with low temperature radiant panels, which can also be used in summer to produce a 'cooling cellar effect'. This centralised solution can always be paired with autonomous split systems.

### CONTROL SYSTEM

**RC-HY20/40-W** is a control system that can be combined with HYDROLUTION in the Flexible heating and DHW configuration to:

- Guarantee regulation efficiency by monitoring the DM parameter.
- Manage the delivery temperature to the system automatically by means of system climate control.
- Set the on/off timer.
- Set the 3 control levels (economic, normal, luxury) for DWH production.
- Manage the Anti-legionella cycles and DHW recirculation pump activation.
- Manage the integration of external energy sources (only with RC-HY40-W).



RC-HY20/40-W control unit

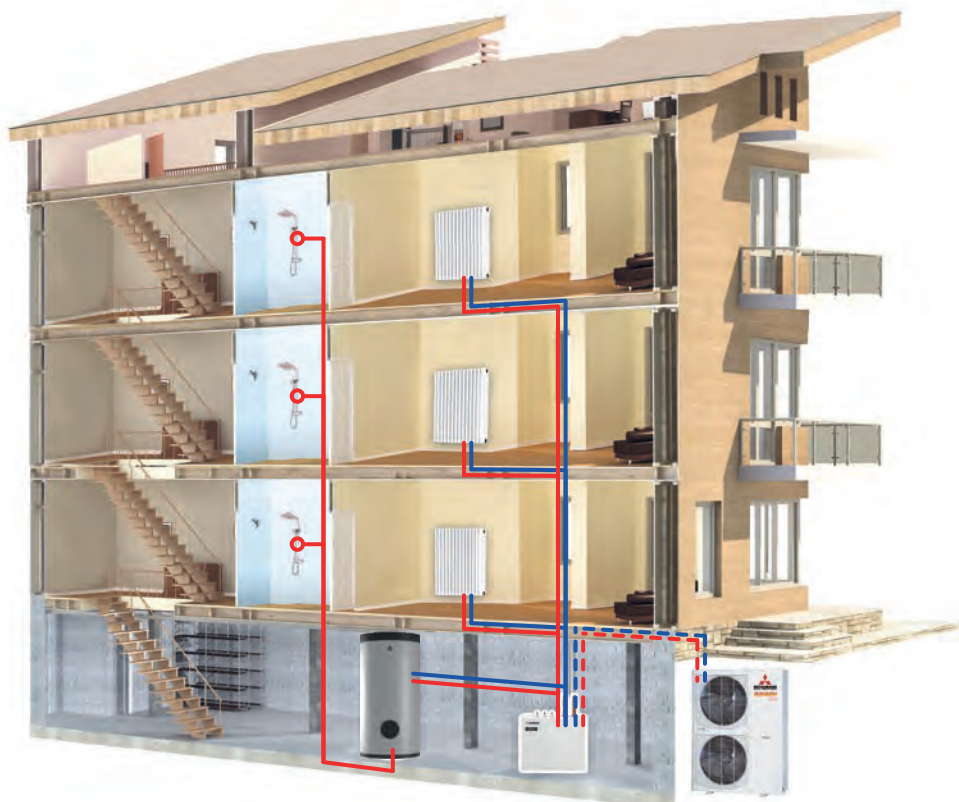
## SMALL APARTMENT BUILDINGS

# Centralised heating and DHW, through HYDROLUTION Flexible

### SYSTEM DESCRIPTION

The type of application illustrated in the figure to the side describes a system inside a small apartment building in which the centralised heating is composed of a HYDROLUTION system in Flexible heating and DHW configuration, with domestic hot water production combined with heating: the DHW tank that can be applied has a capacity from 300 to 500 litres.

HYDROLUTION produces hot water for heating up to a maximum temperature of 58°C. In this example, it is combined with medium temperature heating elements (radiators). It is possible to provide for more than one outdoor unit in modular combination with the RC-HY40-W control unit.



heating with  
high efficiency  
radiators



DHW combined  
with heating

### CONTROL SYSTEM

**RC-HY20/40-W** is a control system that can be combined with HYDROLUTION in the Flexible heating and DHW configuration to:

- Guarantee regulation efficiency by monitoring the DM parameter.
- Manage the delivery temperature to the system automatically by means of system climate control.
- Set the on/off timer.
- Set the 3 control levels (economic, normal, luxury) for DHW production.
- Manage the Anti-legionella cycles and DHW recirculation pump activation.
- Manage the integration of external energy sources (only with RC-HY40-W).



RC-HY20/40-W  
control unit

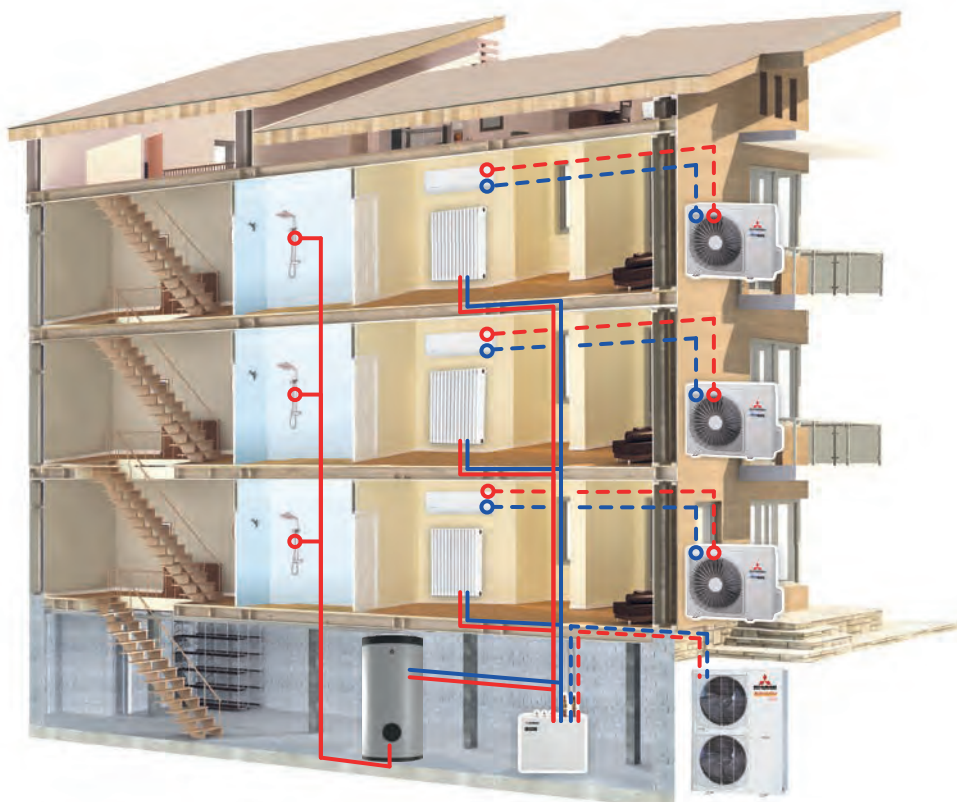
## SMALL APARTMENT BUILDINGS

# Centralised heating and DHW, through HYDROLUTION Flexible, autonomous cooling with monosplit/multisplit systems

### SYSTEM DESCRIPTION

The type of application illustrated in the figure to the side describes a system inside a small apartment building in which the centralised heating is composed of a HYDROLUTION system in Flexible heating and DHW configuration, with domestic hot water production combined with heating: the DHW tank that can be applied has a capacity from 300 to 500 litres. HYDROLUTION produces hot water for heating up to a maximum temperature of 58°C. In this example, it is combined with medium temperature heating elements (radiators). It is possible to provide for more than one outdoor unit in modular combination with the RC-HY40-W control unit.

**The autonomous cooling system is composed of a heat pump system (monosplit/multisplit systems) servicing each apartment with outdoor units on the balcony.**



high efficiency radiators



DHW combined with heating



autonomous cooling

### SISTEMA DI CONTROLLO

**RC-HY20/40-W** è il sistema di controllo abbinabile a HYDROLUTION in configurazione Flexible heating e ACS e consente di:

- garantire efficienza nella regolazione tramite il monitoraggio del parametro DM;
- gestire la temperatura di mandata all'impianto in maniera automatica tramite regolazione climatica del sistema;
- impostare timer di accensione/spegnimento;
- impostare 3 livelli di controllo (economico, normale, lusso) per la produzione di ACS;
- gestire i cicli antilegionella e l'attivazione della pompa di ricircolo dell'ACS;
- gestire l'integrazione di fonti di energie esterne (solo con RC-HY40-W).



RC-HY20/40-W control unit

This type of system is especially suitable for major renovations with insulation, where the goal is to achieve results in terms of energy savings and comfort during summers without intervening with drastic and costly system revisions.

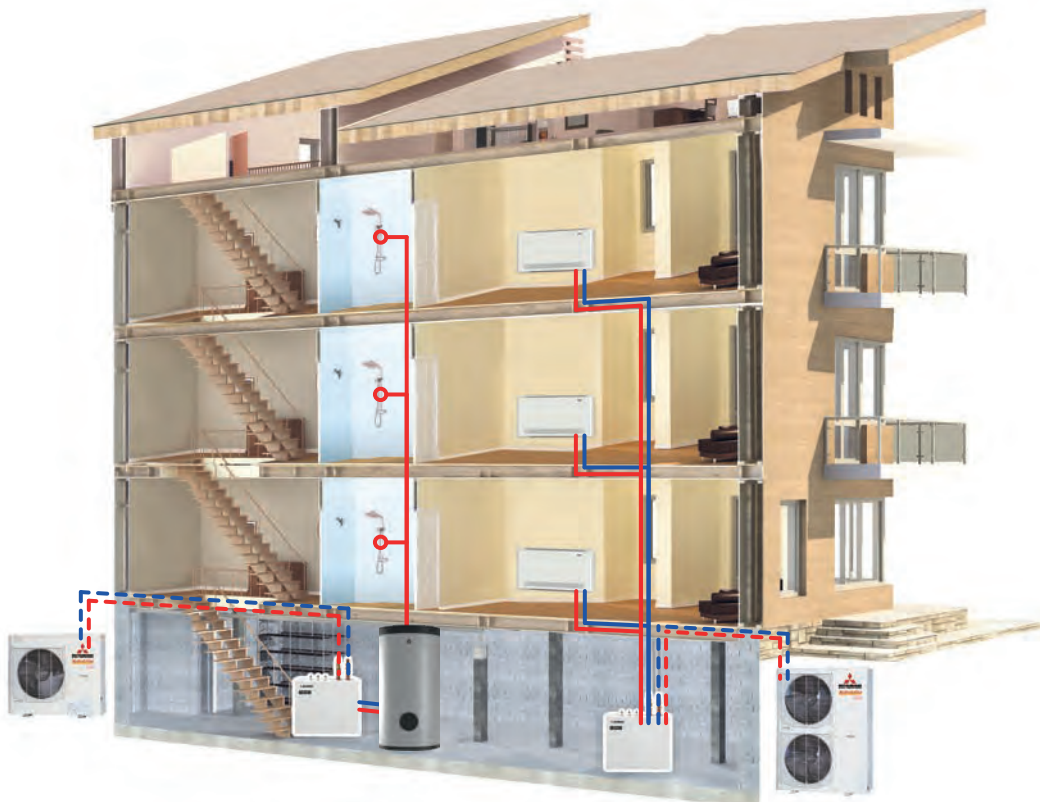
## SMALL APARTMENT BUILDINGS

# Centralised heating, cooling and DHW through HYDROLUTION Flexible

### SYSTEM DESCRIPTION

The type of application illustrated in the figure to the side describes a system inside a small newly built apartment building in which the heating is composed of a HYDROLUTION system in Flexible heating and DHW configuration, with domestic hot water production combined with heating: the DHW tank that can be applied has a capacity from 300 to 500 litres. HYDROLUTION produces hot water for heating up to a maximum temperature of 58°C. In this example, it is combined with warmcoils.

**In this configuration, the HYDROLUTION system is capable of effectively cooling the premises during the summer months.**



heating with warmcoil



DHW with Hydrolution Flexible



cooling with warmcoil

### CONTROL SYSTEM

**RC-HY20/40-W** is a control system that can be combined with HYDROLUTION in the Flexible heating and DHW configuration to:

- Guarantee regulation efficiency by monitoring the DM parameter.
- Manage the delivery temperature to the system automatically by means of system climate control.
- Set the on/off timer.
- Set the 3 control levels (economic, normal, luxury) for DHW production.
- Manage the Anti-legionella cycles and DHW recirculation pump activation.
- Manage the integration of external energy sources (only with RC-HY40-W).



RC-HY20/40-W control unit

### WHAT IS A WARMCOIL?

A warmcoil is a particular radiant effect fan coil which works with very low air movement in the winter and allows for effective air conditioning in the summer.



Calculation according to UNI TS 11300-2

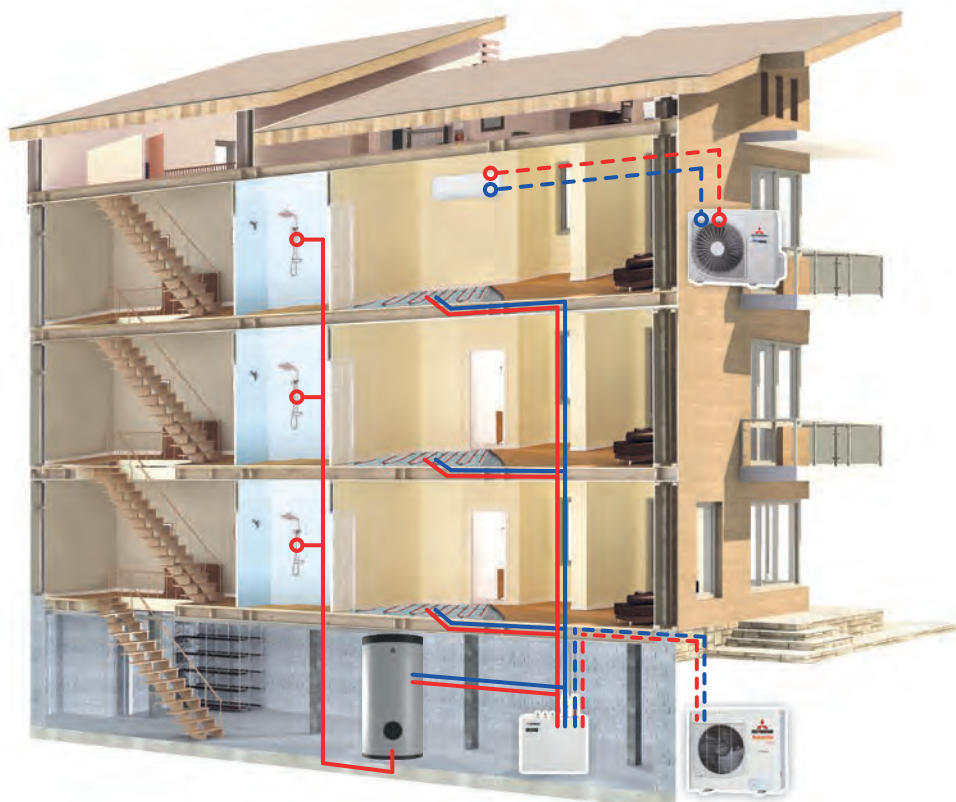
## SMALL APARTMENT BUILDINGS

# Centralised heating and DHW, through HYDROLUTION Flexible and autonomous cooling with monosplit/multisplit systems

### SYSTEM DESCRIPTION

The type of application illustrated in the figure to the side describes a system inside a small apartment building in which the centralised heating is composed of a HYDROLUTION system in Flexible heating and DHW configuration, with domestic hot water production combined with heating: the DHW tank that can be applied has a capacity from 300 to 500 litres. HYDROLUTION produces hot water for heating up to a maximum temperature of 58°C. In this example, it is combined with low temperature heating elements (radiant panels).

**The autonomous cooling system is composed of a heat pump system (monosplit/multisplit systems) servicing each apartment with outdoor units on the balcony.**



underfloor heating



DHW combined with heating



autonomous cooling

### CONTROL SYSTEM

**RC-HY20/40-W** is a control system that can be combined with HYDROLUTION in the Flexible heating and DHW configuration to:

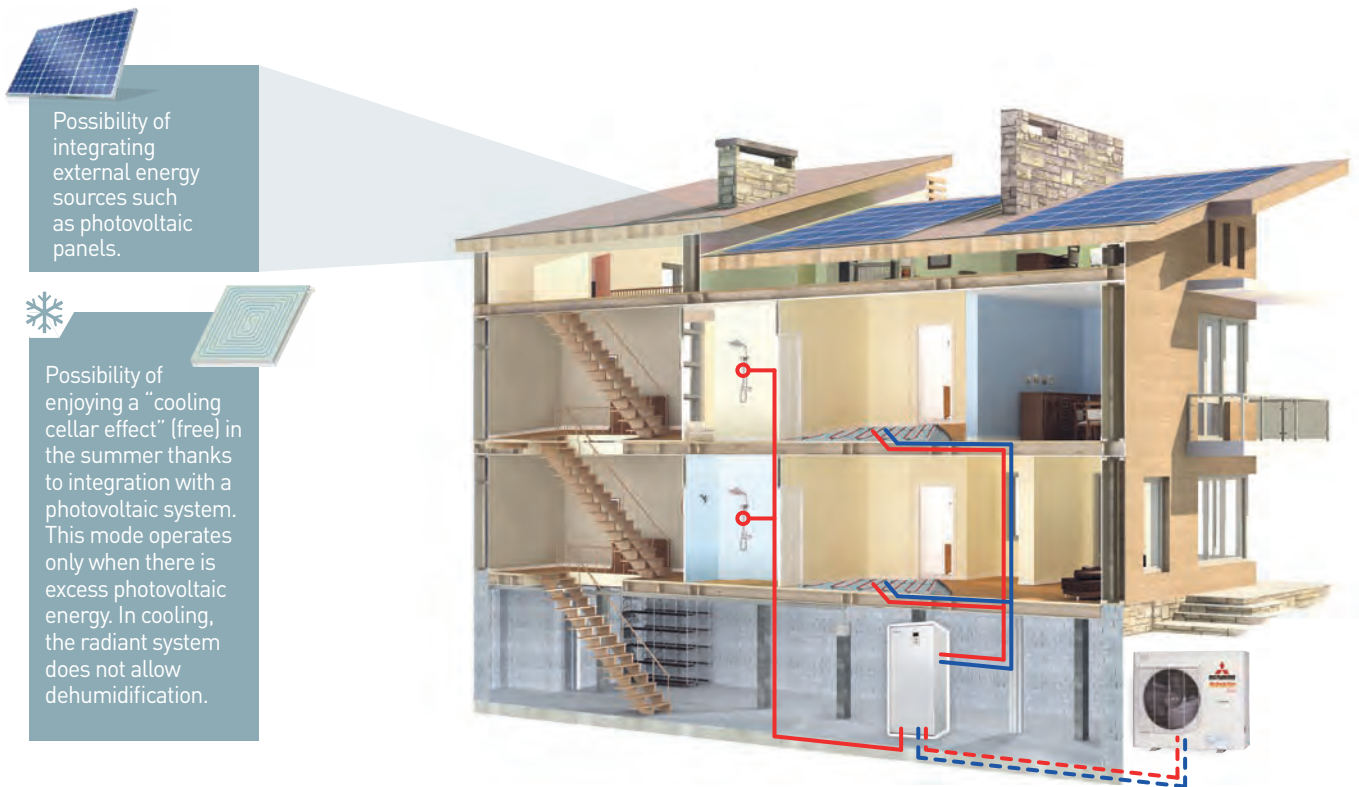
- Guarantee regulation efficiency by monitoring the DM parameter.
- Manage the delivery temperature to the system automatically by means of system climate control.
- Set the on/off timer.
- Set the 3 control levels (economic, normal, luxury) for DHW production.
- Manage the Anti-legionella cycles and DHW recirculation pump activation.
- Manage the integration of external energy sources (only with RC-HY40-W).



RC-HY20/40-W control unit

## INDEPENDENT HOMES

# Autonomous heating and DHW, through HYDROLUTION All in One



Possibility of integrating external energy sources such as photovoltaic panels.



Possibility of enjoying a "cooling cellar effect" (free) in the summer thanks to integration with a photovoltaic system. This mode operates only when there is excess photovoltaic energy. In cooling, the radiant system does not allow dehumidification.



underfloor heating



DHW combined with heating



cooling effect in summer

### SYSTEM DESCRIPTION

The type of application illustrated in the figure above describes an independent home system in which the heating is composed of a HYDROLUTION system in All in One configuration with domestic hot water production combined with heating: the DHW tank that can be applied has a capacity of 180 litres. HYDROLUTION produces hot water for heating up to a maximum temperature of 58°C. In this example, it is combined with low temperature radiant panels, which can also be used in summer to produce a 'cooling cellar effect'. This solution can always be paired with autonomous split systems. Can connect the RMU40M remote control with built-in room sensor.

### CONTROL SYSTEM

The control panel can be used to program HYDROLUTION operation in heating/Silent/DHW mode.

More specifically, the control lets you:

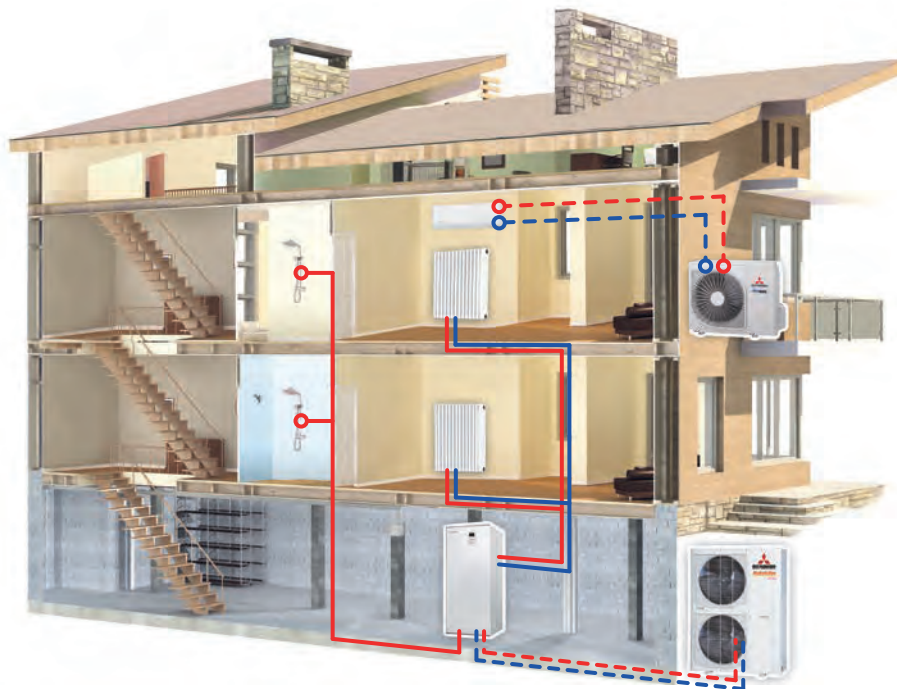
- Create 3 daily operating programs in heating.
- Create 2 hourly operating programs in "Silent" mode.
- Reduce heating and suspend DHW production via the "Holiday" setting.
- Set the 3 control levels (economic, normal, luxury) for DHW production.
- Set the "Temporary luxury" function.
- Manage the integration of external energy sources.

Calculation according to UNI TS 11300-2



## INDEPENDENT HOMES

# Autonomous heating and DHW, through HYDROLUTION All in One and autonomous cooling with monosplit/multisplit systems



heating with high efficiency radiators



DHW combined with heating



autonomous cooling

### SYSTEM DESCRIPTION

The type of application illustrated in the figure to the side describes an independent home system in which the heating is composed of a HYDROLUTION system in All in One configuration with domestic hot water production combined with heating: the DHW tank that can be applied has a capacity of 180 litres. HYDROLUTION produces hot water for heating up to a maximum temperature of 58°C. In this example, it is combined with medium temperature heating elements (radiators).

**The cooling system is composed of a heat pump system (monosplit/multisplit systems) with outdoor units on the balcony.**

Can connect the RMU40M remote control with built-in room sensor.

### CONTROL SYSTEM

The control panel can be used to program HYDROLUTION operation in heating/Silent/DHW mode.

More specifically, the control lets you:

- Create 3 daily operating programs in heating.
- Create 2 hourly operating programs in "Silent" mode.
- Reduce heating and suspend DHW production via the "Holiday" setting.
- Set the 3 control levels (economic, normal, luxury) for DHW production.
- Set the "Temporary luxury" function.
- Manage the integration of external energy sources.

## INDEPENDENT HOMES

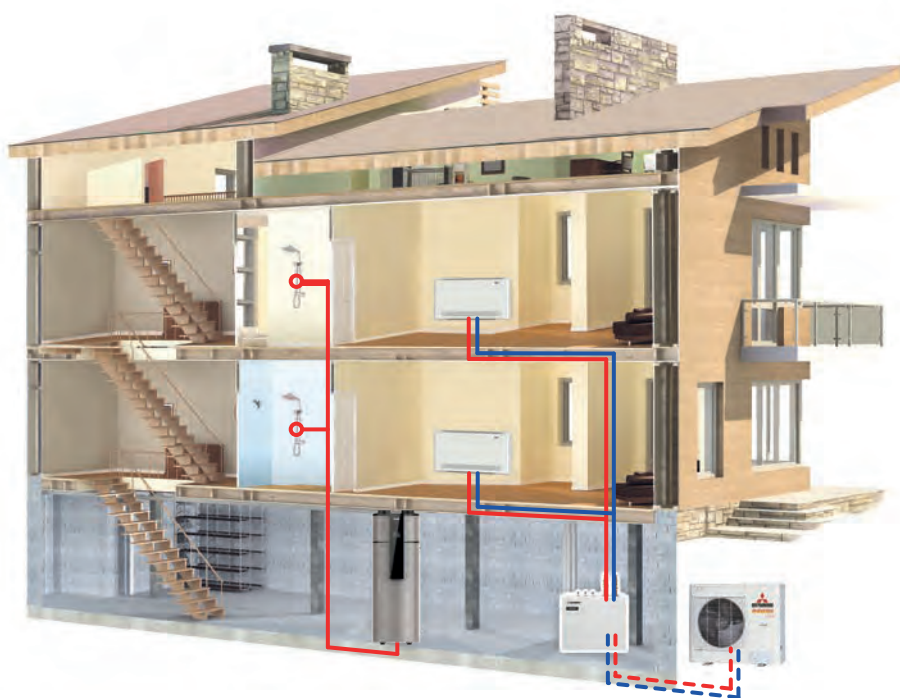
# Autonomous heating and cooling, through HYDROLUTION Flexible and DHW through Hot Water

### SYSTEM DESCRIPTION

The type of application illustrated in the figure to the side describes a newly built independent home system in which heating is composed of a HYDROLUTION system in Flexible heating and DHW configuration. The production of domestic hot water is performed by the Hot Water system: the DHW tank has a capacity of over 180 litres. HYDROLUTION produces hot water for heating up to a maximum temperature of 58° C. In this example, it is combined with warmcoils.

**In this configuration, the HYDROLUTION system is capable of effectively cooling the premises during the summer months.**

Can connect the RMU40M remote control with built-in room sensor (only if RC-HY40-W is present). It is possible to provide for more than one outdoor unit in modular combination with the RC-HY40-W control unit.



heating with  
warmcoil



DHW with  
Hot water



cooling with  
warmcoil

### CONTROL SYSTEM

In the context of this type of system, the **RC-HY20/40-W** is a control system that can be combined with the HYDROLUTION Flexible. The control panel can be used to program HYDROLUTION operation in heating/Silent/DHW mode. More specifically, the control lets you:

- Create 3 daily operating programs in heating.
- Create 2 hourly operating programs in "Silent" mode.
- Reduce heating and suspend DHW production via the "Holiday" setting.
- Set the 3 control levels (economic, normal, luxury) for DWH production.
- Set the "Temporary luxury" function.
- Manage the integration of external energy sources (only with RC-HY40-W).



RC-HY20/40-W  
control unit

### WHAT IS A WARMCOIL?

A warmcoil is a particular radiant effect fan coil which works with very low air movement in the winter and allows for effective air conditioning in the summer.



Calculation according to UNI TS 11300-2



# HYDROLUTION, THE MODULAR SYSTEM FOR HEATING, COOLING AND PRODUCING DHW

**128 kW**

MAXIMUM  
DELIVERABLE  
POWER

**A++**

ENERGY  
CLASS AT  
35° C



## THE HYDROLUTION SYSTEM - ADVANTAGES



Cutting-edge design and technological innovation are at the base of the HYDROLUTION system.



### ENERGY SAVING

HYDROLUTION outdoor units are equipped with Inverter technology and a Twin Rotary compressor: it is possible to vary the operating frequency of the compressor according to the actual demand of the system, resulting in optimisation of the COP and EER values.



### VERY QUIET OUTDOOR UNIT OPERATION

The noise emitted by outdoor air conditioning system units can be a problem, especially during the night. HYDROLUTION systems can reduce fan and compressor speed thanks to their "Silent" mode. The result is significantly less noise. Outdoor unit operation can be set to "Silent" mode via the RC-HY20/40-W control.



### EXTREME COMPACTNESS

In the case of the internal units of the All in One version, the small footprint is due to the high performance of the internal components, in particular the domestic water tank and the plate heat exchanger.



### HOT WATER UP TO 65° C

HYDROLUTION is a heat pump that is particularly suitable for primary heating, tested in numerous projects in Europe: it is capable of producing hot water **up to 58° C**. It is possible to raise this limit up to 65° C by means of an integrative heat source, **and to keep it constant, even with an external temperature of -20° C**. For this reason, it can be combined with: low temperature heating elements (radiant panels), medium temperature heating elements (radiators, warmcoils).



### HIGHLY RELIABLE

The outdoor unit compressor is designed for efficiency even in very cold climates.



### BLUE FIN TREATMENT

Outdoor unit corrosion due to weathering can compromise correct system operation. The "Blue Fin" treatment applied on the heat exchanger helps prevent corrosion.

## THE HYDROLUTION SYSTEM - CONFIGURATIONS

# ALL IN ONE CONFIGURATION

Mitsubishi Heavy Industries' wide range of products offers the right heat pump to meet all needs.

All in One is a comprehensive solution that is suitable for renovations and new buildings.

### ALL IN ONE COMBINATION (OUTDOOR + INDOOR UNIT)

The All in One combination provides a comprehensive solution for all heating, cooling and domestic hot water needs.

Every All in One combination includes an outdoor unit and an HMA system with an integrated DHW tank, a heating element and a circulation pump.

The advantages of HYDROLUTION All in One:

- Heating, cooling and hot water in a single unit.
- Easy installation and operation; the indoor and outdoor units are compact and make installation as easy as possible.
- Ideal for residential use in flats and small homes.
- Three settable control levels (economic, normal, luxury) for DWH production.

#### ■ AVAILABLE POWER LEVELS

10 kW - R410A



## THE HYDROLUTION SOLUTION - HMA MODULE

# HMA MODULE

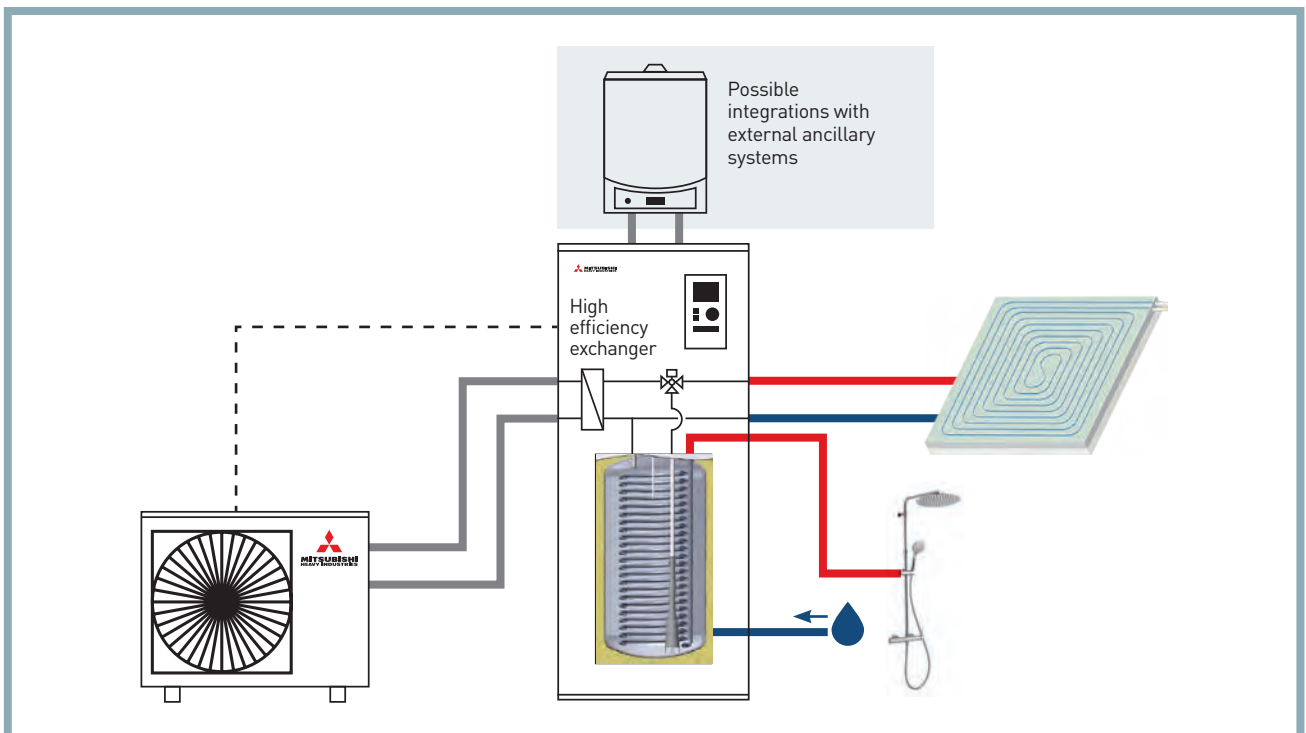
The All in One HYDROLUTION solution meets the main household heating, cooling and DHW needs with a plug-in solution.

### MAIN ADVANTAGES OF THE HMA MODULE

- Integrated on-board control that facilitates system management and installation.
- Compact, high-efficiency heat exchanger that helps reach desired temperatures quickly.
- Integrated 180 litre tank for DHW production.
- Possibility of single-phase or three-phase power supply via a dedicated terminal block.



### OPERATING DIAGRAM



## THE HYDROLUTION SYSTEM - CONFIGURATIONS

# FLEXIBLE CONFIGURATION

In Flexible mode, HYDROLUTION can be used for heating and cooling only or in combination with one or more storage tanks to produce domestic hot water as well. A flexible, modular system that is well suited to both new construction and application in existing buildings.

### FLEXIBLE COMBINATIONS (HSB SYSTEM)

The Flexible combination offers space heating and cooling with the option of adding domestic hot water production.

HYDROLUTION Flexible consists of an outdoor unit and an HSB (split box) system. By combining accessories, installation is even more comprehensive and adapts to any air conditioning requirement.

The advantages of the Flexible solution:

- **HEATING AND COOLING ONLY OPTION**, available by connecting a circulation pump and a heating element in addition to the HYDROLUTION Flexible.
- **DHW OPTION**, available by connecting a circulation pump, a heating element, a tank and a diverter valve in addition to the HYDROLUTION Flexible.
- **FLEXIBLE UNIT INSTALLATION**, components can be combined as needed.
- **AVAILABLE POWER LEVELS**
  - 10 kW - R410A
  - 14 kW - R410A







## THE HYDROLUTION SYSTEM - MODULARITY

### Flexible installation

The HYDROLUTION installation version in modular mode lets you combine 8 systems to one another in the Flexible version in Heating configuration, managed by the RC-HY40-W control.

In addition to raising the power output, the modular HYDROLUTION combination guarantees installation flexibility, **regulation efficiency, system durability and service continuity.**

It is possible to combine all the power levels of the individual systems to one another in order to achieve an installed power commensurate with the actual needs. In this way, it is possible to avoid having an oversized system, significantly reducing costs.

Below are some examples of possible modular configuration combinations.



Example of modular configuration with two 10 kW and 16 kW outdoor units for a total installed power of 26 kW.



Example of modular configuration with two 16 kW outdoor units for a total installed power of 32 kW.



Example of modular configuration with two 16 kW outdoor units and a 10 kW unit for a total installed power of 42 kW.

HYDROLUTION operation is managed by the DM parameter. The DM parameter is defined as the sum of the differences, calculated each minute, between the actual delivery temperature and the temperature calculated by the control system.

## THE HYDROLUTION SYSTEM - MODULARITY

### Regulation efficiency

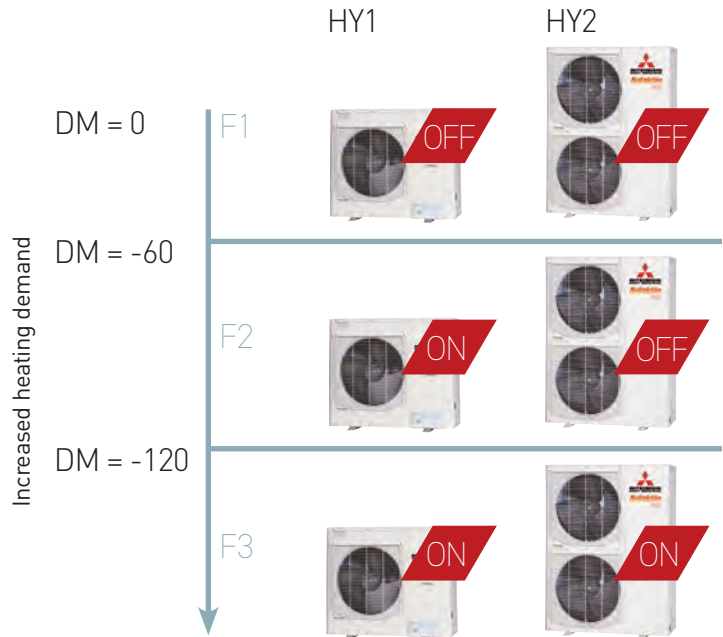
Thanks to its control logic, it is possible through the RC-HY40-W to have quick system responses to changing loads and efficient on/off management of individual outdoor units combined to one another.

The various HYDROLUTION operating phases (operating frequency of compressors, activation/deactivation of one or more outdoor units) in both individual installation mode and in modular installation mode are activated based on the variation of the DM parameter (degrees per minute).

**Phase 1:** DM more than -60.

**Phase 2:** DM between -120 and -60.

**Phase 3:** DM less than -120.



### A durable system

The RC-HY40-W control system is able to store the number of operating hours of compressors on each individual outdoor unit of the system in its memory.

To meet system demands, RC-HY40-W gives priority to first starting the outdoor unit with less operating hours, so as to optimise the useful life of the entire system.

**Phase 1:** DM more than -60.

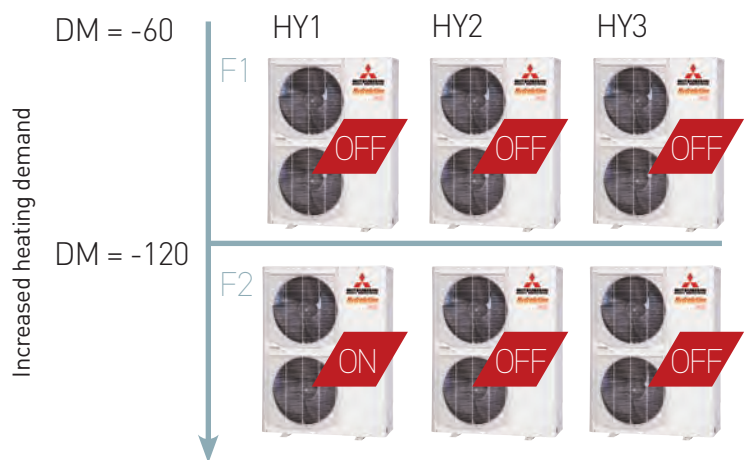
**Phase 2:** DM between -120 and -60.

Below is an example:

HY1 = 100 accumulated hours of operation.

HY2 = 120 accumulated hours of operation.

HY3 = 150 accumulated hours of operation.



When the heat demand increases, first HY1 starts up, then HY2 and HY3 in sequence.

### Service continuity

In the event of malfunction of one of the outdoor units in a modular combination, service continuity is guaranteed by the starting up of another outdoor unit that is part of the system.

Below is an example:

**Phase 1:** HY3 off.

**Phase 2:** HY2 error, HY3 switches on.



## THE HYDROLUTION SYSTEM - MODULAR COMBINATIONS



UP TO 128 KW

**Maximum power 128 kW**

8 FDCW 140VNX-A 16 kW units



UP TO 112 KW

**Maximum power 112 kW**

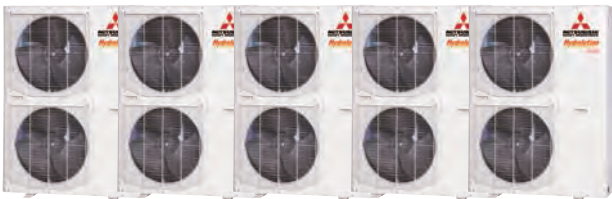
7 FDCW 140VNX-A 16 kW units



UP TO 96 KW

**Maximum power 96 kW**

6 FDCW 140VNX-A 16 kW units



UP TO 80 KW

**Maximum power 80 kW**

5 FDCW 140VNX-A 16 kW units



UP TO 64 KW

**Maximum power 64 kW**

4 FDCW 140VNX-A 16 kW units

## THE HYDROLUTION SYSTEM - MODULAR COMBINATIONS



UP TO 48 KW

**Maximum power 48 kW**

3 FDCW 140VNX-A 16 kW units



UP TO 36 KW

**Maximum power 36 kW**

FDCW 140VNX-A da 16 kW unit + 2 FDCW 100VNX-A 10 kW units



UP TO 32 KW

**Maximum power 32 kW**

2 FDCW 140VNX-A 16 kW units



UP TO 20 KW

**Maximum power 20 kW**

2 FDCW 100VNX-A 10 kW units

## THE HYDROLUTION SYSTEM - ACCESSORIES

Description	Code
	Exchanger for 10 and 16 kW units. HSB100-W HSB140
	Electric heater integration KIT for Flexible system. ELK9M1
	10 kW All in One units. HMA 100-S
	Single unit control. RC-HY20-W
	Modular unit control (up to 8). RC-HY40-W
	Circulation pump (3.5HP). CPD11-25M-65
	Circulation pump (6HP). CPD11-25M-75
	Hot water and heating diverter valve (3.5 - 6HP). VST11M
	Flow reversal valve for power > 16 kW and up to 40 kW. VST20M
	Conditioning heating diverter valve (3.5 - 6HP). VCC11M
	Control kit for secondary heating systems (max 8 syst.) up to 1200 L/h. ECS40M
	Control kit for secondary heating systems (max 8 syst.) up to 1950 L/h. ECS41M
	Circulator control kit for modular combinations. AXC30M
	Room temperature sensor. RTS40M
	Remote control. RMU40M
	Remote control MODBUS. MODBUS40M

## THE HYDROLUTION SYSTEM - ACCESSORIES



### Description

Integrated stainless steel storage tank and coil for instant domestic hot water production.  
300-litre volume.  
Dimensions (Ø x h) 650 x 1486 mm.

### Code

WT-AP-DW1-300 C-1



Integrated stainless steel storage tank and coil for instant domestic hot water production.  
500-litre volume.  
Dimensions (Ø x h) 750 x 1786 mm.

WT-AP-DW1-500 C-1

1.5 kW integrative heating element.

WT-EH-15-C

Titanium anode for 300-litre tank.

WT-AT-2-4-C

Titanium anode for 500-litre tank.

WT-AT-5-C

Hydraulic separator - 25-litre thermal flywheel.

WT-SI-PDC-25 C

Hydraulic separator - 51-litre thermal flywheel.

WT-SI-PDC-50 C

Thermal valve for 100-litre PDC.

WT-VT-PDC-100 C



# THE HYDROLUTION CONTROL SYSTEM

To guarantee maximum system efficiency in an air-water heat pump like that of HYDROLUTION, MHI has designed and built a complete line of management and monitoring devices [RC-HY20-W and RC-HY40-W].

A residential heating system must be subjected to accurate control 24/h: **RC-HY20-W and RC-HY40-W** have been designed to simplify this control and reduce management costs and energy consumption.

The functions of these control devices are extremely flexible and as such they adapt to the configuration of the system to which they are applied.

## RC-HY20-W and RC-HY40-W Features and functions

The **RC-HY20-W and RC-HY40-W** control devices can be used to manage and regulate **centralised and autonomous** systems made with HYDROLUTION in the Flexible heating, Flexible heating and DHW, All in One versions. More specifically, they:

- Manage the system operating modes (on/off) and timing programs.
- Guarantee system regulation efficiency.
- Automatically manage supply water temperature.
- Manage the Anti-legionella cycles and DHW recirculation pump activation.
- Activate the 'Silent' function.



RC-HY20-W

### Sectors of application

Flexible heating  
Flexible heating and DHW



RC-HY40-W

### Sectors of application

Flexible heating  
Flexible heating and DHW  
All in One  
**Modular flexible heating**



## THE HYDROLUTION SYSTEM - CONTROL SYSTEMS



### System ON/OFF and timing programming

The **RC-HY20-W** and **RC-HY40-W** control devices can be used to manage operation (on and off) of the **HYDROLUTION** system as well as "Silent" function operation, programming heating and DHW supply, over the period of a week. During heat pump heating operation, it is possible to:

- Create 3 daily programs in heating mode with the possibility of setting the deviation with respect to the climatic reference curve, or the desired temperature in the single period (only if the internal temperature sensor is present).
- Set 2 hourly programmings in cooling mode;
- Set 2 hourly system operating programs in "Silent" mode.
- Program DHW temperature and supply
  - a) It is possible to program two daily production cycles with different temperature levels for each day of the week using the 3 different DHW production control parameters: economic – normal – luxury.
  - b) It is possible to increase the DHW production temperature for a certain period of time (up to 12 hours) by activating the "Temporary luxury" function.
  - c) It is possible to reduce heating and temporarily suspend DHW production by activating the "Holiday" function.

### System regulation efficiency



It is possible to guarantee system efficiency by monitoring the DM parameter (degrees per minute), which allows for quick responses and better management of the operating frequencies of the outdoor unit compressor.

### Anti-legionella cycle and DHW recirculation



It is possible to set Anti-legionella cycle programming using the "Sterilize" function: the cycle activation interval is from 1 to 90 days.

It is also possible to set 3 daily DHW recirculation pump operating periods.

### "Silent" function

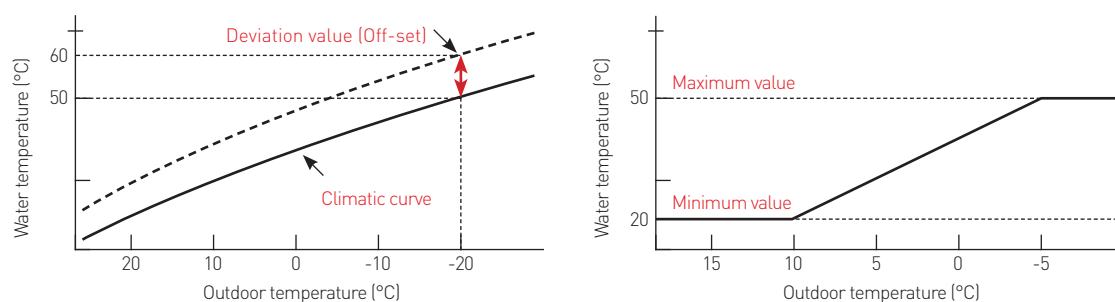


Activation of the "Silent" function significantly reduces the noise emitted by outdoor units, reducing compressor and fan speed. It is possible to set 2 hourly programs in this operating mode.



### Automatic system delivery temperature management

System delivery temperature management is carried out by means of the operating climatic curve setting. From the control device, the user can set a custom climatic curve and modify it quickly as needed, indicating the deviation value with respect to the reference climatic curve ("Off-set" function). A lower and upper system delivery water temperature limit can be established.



**Climatic curve:** to guarantee energy efficiency and indoor comfort, the system regulates the degrees °C of the supply water when the outside temperature changes.

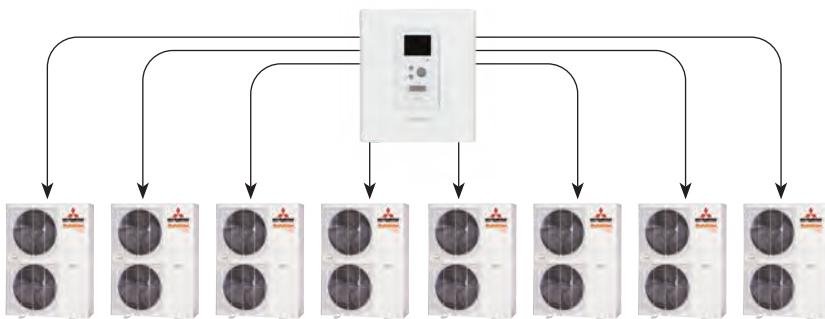
## THE HYDROLUTION SYSTEM - CONTROL SYSTEMS

### RC-HY40-W Features and functions

[Modular Flexible heating configuration]

In addition to being equipped with the characteristics listed in the previous paragraphs, the RC-HY40-W control device offers highly sophisticated continuous monitoring features and provides valuable information on consumption and performance, as well as a wide range of operational data.

The features are described in more detail below.



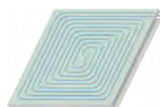
- **RC-HY40-W is able to manage up to 8 HYDROLUTION systems** in Flexible heating configuration.
- **RC-HY40-W guarantees** regulation efficiency , system durability and service continuity.



warmcoils



high efficiency radiators



radiant panels

- **RC-HY40-W is able to manage up to 8 distribution systems at different temperatures** (radiant panels, radiators and fancoils). If there are heating systems that work at different delivery temperatures inside an apartment building, users can set the corresponding climatic curve for each system and use the RC-HY40 control to manage up to 8 distribution systems at different temperatures. An ECSM40/ECSM41 accessory kit needs to be added for each distribution system.
- **RC-HY40-W is able to manage energy consumption metering and distribution:** connection of an energy meter kit to the RC-HY40-W control makes it possible to quantify system consumption and view it directly from the control system. Distribution of the energy consumption of the various utilities can be implemented through the installation of separate heat meters and distribution boxes for each apartment.

## THE HYDROLUTION SYSTEM - CONTROL SYSTEMS

### RC-HY40-W

## Integration with external heat sources

**RC-HY40-W** is able to manage HYDROLUTION system integration with external heat generators. It is possible to raise the maximum water temperature limit of the system to **65°C** through an external generator (i.e. pellet or methane boilers). In the event of heat pump failure, DHW production and heating are guaranteed by the aid of the emergency function, which activates the automatic integration system.

Below are the possible operating modes for this management.

#### AUTOMATIC MODE

Lets you set the external operating temperature limits of heat pump and boiler heating.

#### MANUAL MODE

Lets you activate/deactivate integration from external heat generators.

Lets you activate/deactivate heat pump heating.

#### EXTERNAL GENERATOR ONLY MODE

Lets you use a single external generator for heating and DHW production.

In the event of heat pump failure, DHW production and heating are guaranteed by the aid of the emergency function, which activates the automatic integration system.



## THE HYDROLUTION SYSTEM - TECHNICAL DATA

### “All in One” indoor units

Outdoor unit model				FDCW 100 VNX-A	
Heating	Rated power		A7//W35	9.20 (3.50~10.00)	
	Electrical absorption			2.15	
	Performance coefficient			4.28	
	Rated power		A7//W45	9.00 (3.50~11.00)	
	Electrical absorption			2.62	
	Performance coefficient			3.44	
Cooling	Rated power		A35//W18	11.00 (3.30~12.00)	
	Electrical absorption			3.04	
	Performance coefficient			3.62	
	Rated power		A35//W7	8.00 (3.00~9.00)	
	Electrical absorption			2.85	
	Performance coefficient			2.81	
Seasonal heating data	Theoretical load [Pdesignh] @-10°C		35/55	9/10	
	Seasonal energy efficiency (ns)			165/126	
	Energy efficiency class			A++/A++	
	Annual energy consumption			4181/6391	
Seasonal data sanitary water	Warm-up time			XL	
	Energy efficiency (nwh)			98	
	Classe di efficienza energetica			A	
	Consumo energetico annuo			1702	
Operating limits	Outside air temperature		Heating & DHW Cooling	°C	
				-20~43 15~43	
Refrigerant circuit data	Refrigerant type [GWP]			R410A (2088)	
	Pre-charge quantity (tons CO2)			kg (t)	2.9 (6.055)
	Diameter of liquid/gas piping			mm (inch)	9.52(3/8") / 15.88(5/8")
	Max. splitting length			m	30
	Max height difference O.U./I.U. / I.U.-O.U.			m	7
	Splitting length without additional load			m	15
	Additional load			g/m	60
	Refrigerant control system			Electronic expansion valve	
	Compressor			Type	Rotary- DC Inverter
	Electrical data	Power supply			Ph-V-Hz
Maximum current		A	1ph-230V-50Hz		
Power cable (recommended)		Type	3x6 mm <sup>2</sup>		
Product specifications	Fan			Type	
	Air flow			qty.	DC Inverter
	Sound power level			m <sup>3</sup> /h	4380
	Sound pressure level (at 1 m)			dB(A)	58
	Dimensions			dB(A)	50
	Dimensions		LxDxH	mm	
	Weight			kg	970x370x845
Indoor unit model				HMA 100-S	
Operating limits	Delivery water temperature		Heat. Cool.	°C	
	DHW temperature (tank)			Max	25~58 7~25
Hydraulic system data	DHW tank capacity			L	
	Water/freon heat exchanger			Type	80
	Circulation pump			Brand	180
	Water connections			Dimensions	Braze-welded plates
	Operating pressure (system)			Max	Wilo
	Expansion tank			Volume	22
Electrical data	Power supply			Ph-V-Hz	
	Electrical integration			Supply 230V/400V	1ph-230V-50Hz / 3ph-400V-50Hz
	Electrical absorption (Max)			A	4.5 / 9
	Power cable (recommended)			Type	45 / 23
	Sound power level			dB(A)	3x10 mm <sup>2</sup> / 3x6 mm <sup>2</sup>
Product specifications	Dimensions		LxDxH	mm	
	Weight			kg	33
	Control (included)				600x610x1589
	Remote control via Modbus (optional)				164
				On-board machine MODBUS40M	

The data contained above refer to the following standards: EN 14511:2018; EN 14825:2019; EN50564:2011; EN12102-1:2018; EN12102-2:2019; [EU]No:811:2013; [EU]No:813:2013; OJ 2014/C 207/02:2014.

### Outdoor units

Model	FDCW100VNX-A		FDCW140VNX-A	
Power	1 ph-230V-50Hz			
Height x Width x Depth	mm		mm	
Net	845 x 970 x 370		1300 x 970 x 370	
Sound power level [A7/W35]	kg		kg	
Sound pressure level at 1 metre [A7/W35]	81		105	
Handled air (max)	dB(A)		dB(A)	
Refrigerant type	64,5		71	
Refrigerant volume (splitting length without additional load)	50		54	
Refrigerant pipe diameter	m <sup>3</sup> /h		m <sup>3</sup> /h	
Connection type	4380		6000	
Maximum absorption	R410A		R410A	
	kg (m)		kg (m)	
	2,9 (15)		4,0 (15)	
	gas	mm	15,88 (5/8")	
	liquid	(inches)	9,52 (3/8")	
	Flare		Flare	
	23		25	

# THE HYDROLUTION SYSTEM - TECHNICAL DATA

## FLEXIBLE indoor units

Outdoor unit model				FDCW 100 VNX-A	FDCW 140 VNX-A	
Heating	Rated power	A7//W35	kW	9.20 [3.50~10.00]	16.00 [4.20~16.00]	
	Electrical absorption			2.15	3.81	
	Performance coefficient			4.28	4.20	
	Rated power	A7//W45	kW	9.00 [3.50~11.00]	16.00 [5.80~16.00]	
	Electrical absorption			2.62	4.83	
	Performance coefficient			3.44	3.31	
Cooling	Rated power	A35//W18	kW	11.00 [3.30~12.00]	16.50 [5.20~16.50]	
	Electrical absorption			3.04	4.36	
	Performance coefficient			3.62	3.78	
	Rated power	A35//W7	kW	8.00 [3.00~9.00]	11.80 [3.10~11.80]	
	Electrical absorption			2.85	4.45	
	Performance coefficient			2.81	2.65	
Seasonal heating data	Theoretical load [Pdesignh] @ -10°C	35/55	kW	9/10	13/13	
	Seasonal energy efficiency (ns)			%	165/126	166/133
	Energy efficiency class			-	A++/A++	A++/A++
	Annual energy consumption			kWh/a	4181/6391	7906/6099
Seasonal data sanitary water	Warm-up time			XXL	XXL	
	Energy efficiency (nwh)		%	89	88	
	Classe di efficienza energetica			A	A	
	Consumo energetico annuo		kWh/a	2430	2449	
Operating limits	Outside air temperature	Heating & DHW	°C	-20~43	-20~43	
		Cooling		15~43	15~43	
Refrigerant circuit data	Refrigerant type [GWP]			R410A [2088]	R410A [2088]	
	Pre-charge quantity (tons CO2)		kg [t]	2.9 [6.055]	4.0 [8.352]	
	Diameter of liquid/gas piping		mm [inch]	9.52[3/8"] / 15.88[5/8"]	9.52[3/8"] / 15.88[5/8"]	
	Max. splitting length		m	30	30	
	Max height difference O.U./I.U. / I.U.-O.U.		m	7	7	
	Splitting length without additional load		m	15	15	
	Additional load		g/m	60	60	
	Refrigerant control system			Electronic expansion valve		
	Compressor		Type	Rotary- DC Inverter		
	Electrical data	Power supply		Ph-V-Hz	1ph-230V-50Hz	
Maximum current			A	23	25	
Power cable (recommended)			Type	3x6 mm <sup>2</sup>	3x6 mm <sup>2</sup>	
Product specifications	Fan	Type	qty.	DC Inverter		
		Air flow	m <sup>3</sup> /h	4380	6000	
	Sound power level		dB(A)	58	58	
	Sound pressure level (at 1 m)		dB(A)	50	54	
	Dimensions	LxDxH	mm	970x370x845	970x370x1300	
Weight	Net	kg	81	105		
Indoor unit model				HSB 100-W	HSB 140	
Operating limits	Delivery water temperature	Heat.	°C	25~58	25~58	
		Cool.		7~25	7~25	
Hydraulic system data	DHW temperature (tank)	Max		80	80	
	DHW tank capacity		L	300	500	
	Water/freon heat exchanger		Type	Braze-welded plates		
Electrical data	Water connections	Dimensions	mm	28	28	
	Operating pressure (system)	Max	bar	3	3	
	Power supply		Ph-V-Hz	1ph-230V-50Hz		
Product specifications	Power cable (recommended)		Type	3x1.5 mm <sup>2</sup>	3x1.5 mm <sup>2</sup>	
	Sound power level		dB(A)	33	33	
	Dimensions	LxDxH	mm	460x250x400	460x250x400	
	Weight	Net	kg	18	23	
	Control (included)			RC-HY20-W / RC-HY40-W		
Remote control via Modbus (optional)			MODBUS40M1			

The data contained above refer to the following standards: EN 14511:2018; EN 14825:2019; EN50564:2011; EN12102-1:2018; EN12102-2:2019; (EU)No:811:2013; (EU)No:813:2013; OJ 2014/C 207/02:2014.

1. Not compatible with RC-HY20-W.

## Split box

Model	HSB100-W	HSB140
Power	1 ph-230V 50Hz	
Operating limit (water temperature)	heating	25~60° C (65° C, with heating element)
	cooling	7~25° C
Maximum pressure	10	
Connector diameter	28	28
Room temperature	5~35	
Height x Width x Depth	400 x 460 x 250	
Net	18	23
Refrigerant type	R410A/R32	R410A

## Tank

Model	WT-AP-DW1-300 C-1	WT-AP-DW1-500 C-1
Power	-	-
Volume	litre	291
Heating element	kW	498
Height/diameter	mm/ø	Optional
Net	kg	1486/650
Connector diameter	inches	75
Maximum tank pressure	Bar	118
Maximum exchanger pressure	Bar	1" 1/4"
Energy class		10
		12
	C	C



As a result of the ongoing technological evolution of products, we reserve the right to change the technical specifications in this catalogue at any time and without notice. The products shown are only illustrative of the types of applications. The data is measured under the following conditions (ISO-T1). Cooling: indoor temperature 27° C D.B., 19° W.B. and outdoor temperature 35° C B.S.; heating: indoor temperature 20° C D.B., and outdoor temperature 7° C D.B., 6° C W.B. Energy efficiency values refer to measurements carried out following harmonised standard EN 14511:3.





**TERMAL srl**



Via della Salute 14 | 40132 Bologna | Italia  
tel. +39 051 41 33 111 | fax +39 051 41 33 112  
info@termal.it | [www.termal.it](http://www.termal.it)

[www.mitsubishi-termal.it](http://www.mitsubishi-termal.it)