MITSUBISHI ELECTRIC
HYDRONICS & IT COOLING SYSTEMS S.p.A.

# INTEGRA

Units for 4-pipe systems, air and water source, with scroll, screw and inverter screw compressors, from 33 to 1125 kW

- Highest energy efficiency
- Self-adaptability with simultaneous loads
- System simplification
- Reduction of on-site operations

CLIMAVENETA®

# When combining perfect comfort and maximum, efficiency is the biggest challenge

# Modern mixed-use buildings, shopping centres, large business centres, hotels, swimming pools, and wellness centres are characterised by increasingly complex comfort requirements.

Many years of experience in these applications has led Climaveneta to develop its own solution to the main challenges posed by these structures, without making any compromises:

## Simultaneous heating and cooling

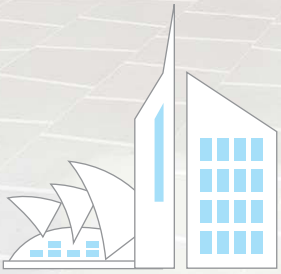
Due to the fact that in a single building there are areas dedicated to different functions with very variable heat loads, combined with a large percentage of glass surfaces, the simultaneous demand for heating and cooling during the year is increasingly common.

## Growing attention to comfort

The need to guarantee ideal temperature, humidity, and air quality conditions throughout the year means that system solutions must be provided in order to offer a zero-compromise answer for the comfort requirements of different users.


## Challenging energy efficiency and sustainability targets

Reduced investment and operating costs, respect for progressively stricter regulatory restrictions, attention to environmental impact, and use of renewables are increasingly vital factors not only for the value of the property but also for the feasibility of carrying it out.



## Ambitious architectural solutions

Innovative concepts and a systematic quest for excellence push technology and materials to the limit, in order to guarantee excellent usability of the building and strong visual characterization, as well as zero-compromise on the aesthetic front.

# INTEGRA

## Multi-use units are the most evolved solution for 4-pipe systems

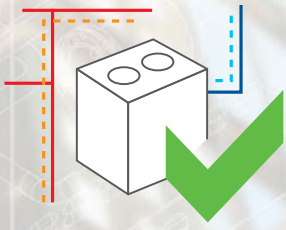
Maximum comfort, simultaneous hot and cold water production, unbeatable energy and system efficiency. The advantages of the INTEGRA all-in-one units installed in a 4-pipe system are limitless.

## Maximum energy efficiency

The construction approach that characterizes Climaveneta multi-use units has been designed to maximize their usefulness. The maximum efficiency of the system is reached with simultaneous loads, the energy produced is used to satisfy the hot and cold demands of the total system. In modern buildings with opposite overlapping thermal loads, the INTEGRA units are the greenest and most efficient solution compared to any other.

## Self-adaptability with simultaneous loads

Thanks to their advanced control logic, multi-use units are always able to respond to building climate control requirements, especially if overlapping loads occur. The unit can independently produce cooling and heating simultaneously, according the actual needs.



## System simplification

The use of a unit that independently produces both heating and cooling eliminates the need for separate heating and cooling resources.
This significantly simplifies the system: plant areas are reduced, hydronic circuits are simplified, maintenance is reduced by half, and control is rationalized.


## Reduction of on-site operations

A simplified system results in a significant reduction in the operations to be carried out on site. In fact, it is no longer necessary to connect it to the gas network, install and commission auxiliary boilers, or manage areas to be used for conventional heating units. This means substantial savings in terms of time and cost for the client.

# Total Efficiency Ratio

## TER =

Cooling power + Heating capacity

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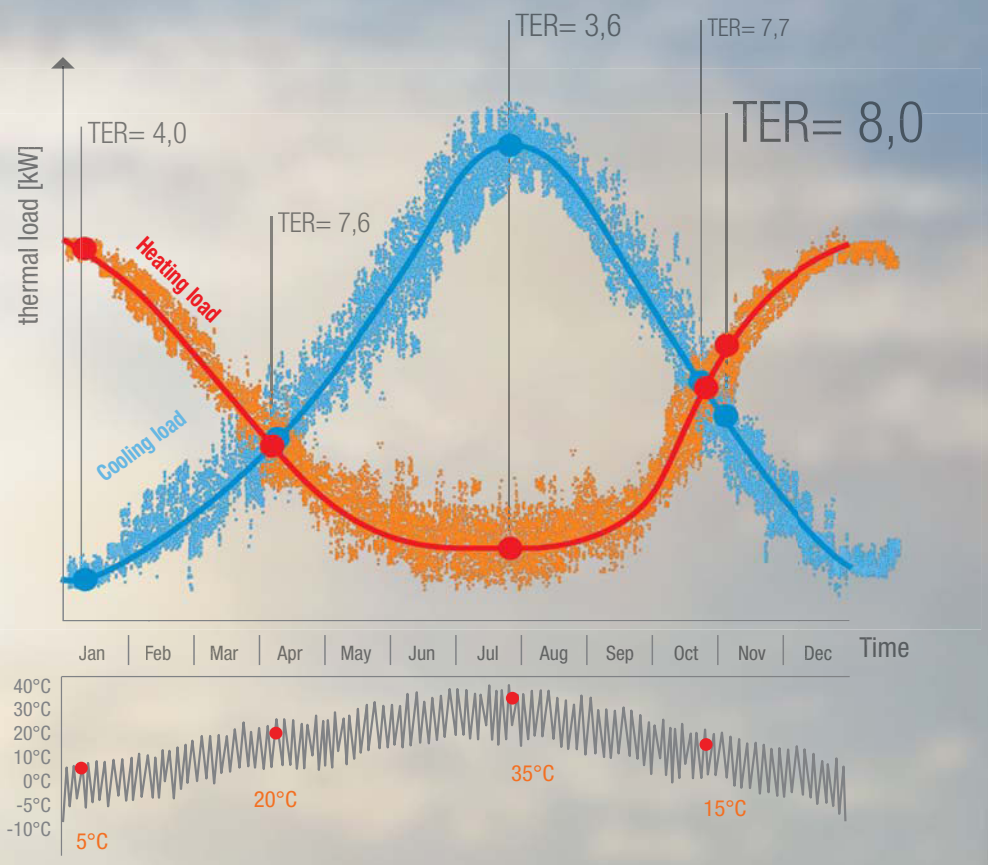
Power consumption

In all cases in which INTEGRA simultaneously produces cold and hot water, the real efficiency of the unit is the sum of the performance in hot and cold water production.




Using traditional ratings such as EER and COP to measure efficiency of 4-pipe units would be limiting.
To objectively measure performance under simultaneous load conditions, Climaveneta, a pioneer in the development of this technology, has conceived TER – total efficiency ratio.

The TER is calculated as the ratio between the sum of the delivered heating and cooling power and electrical power input.

Considered today the most effective way of representing the real efficiency of the unit, the TER reaches its maximum value when the loads are completely balanced.

# The most precise way to measure efficiency

Completely integrated functions and maximum performance synergy require an advanced measurement rating for the total efficiency of the unit: TER - Total Efficiency Ratio.

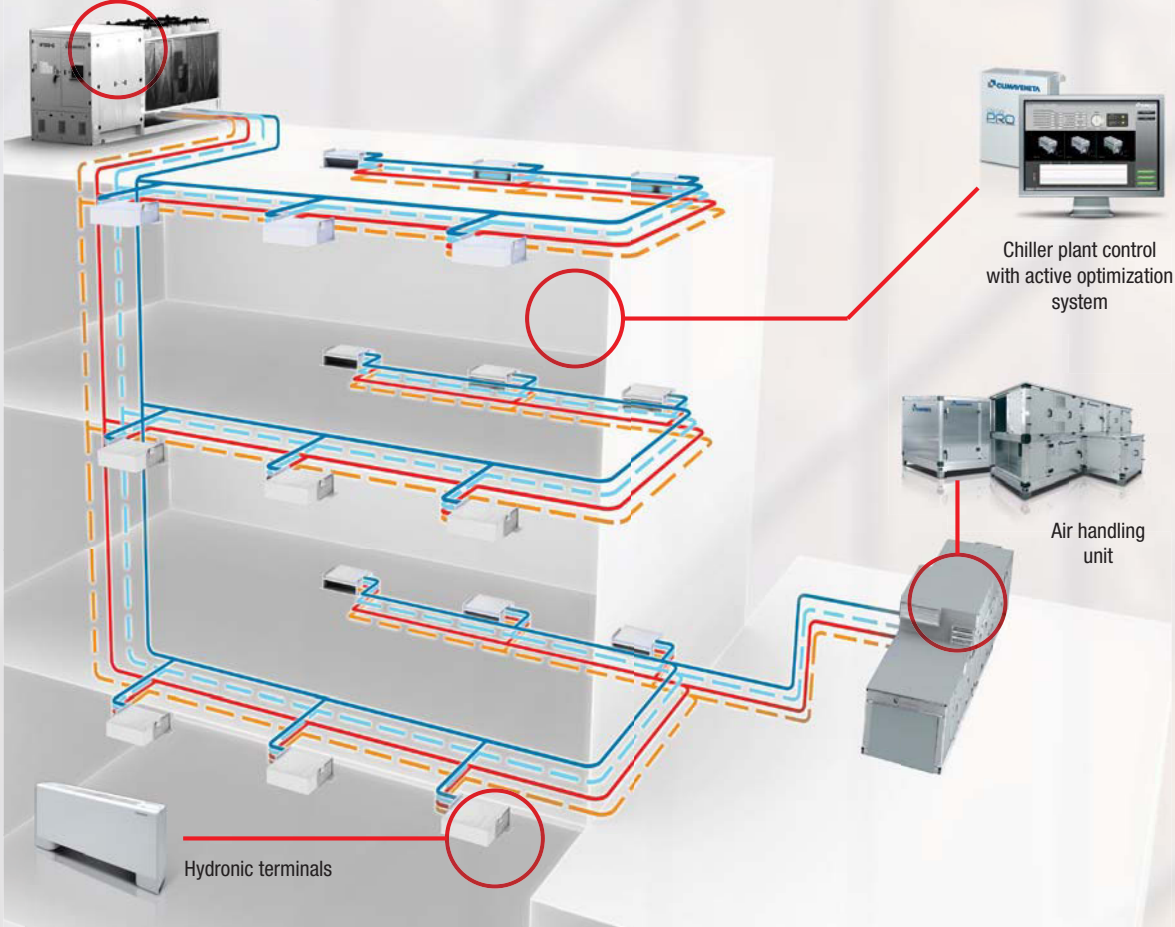
INTEGRA

## Focus on: 4-pipe systems

This type of system is suitable for air-conditioning in buildings that require separate areas to be heated and cooled at the same time.

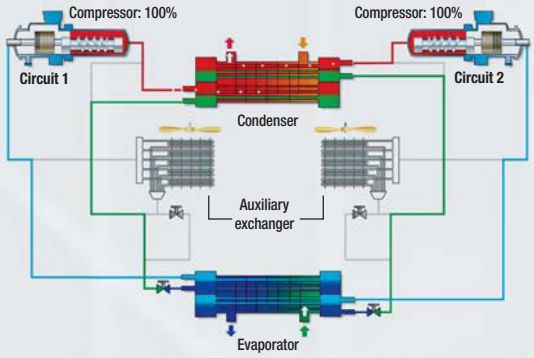
It is combined with centralized solutions capable of producing hot and cold water in the two hydronic circuits of the system, assuring maximum comfort in every room of the building, independently and in any period of the year.

From today, a single intelligent unit is sufficient for the management of these complex systems: INTEGRA.

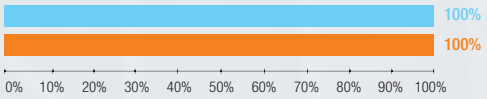


# INTEGRA

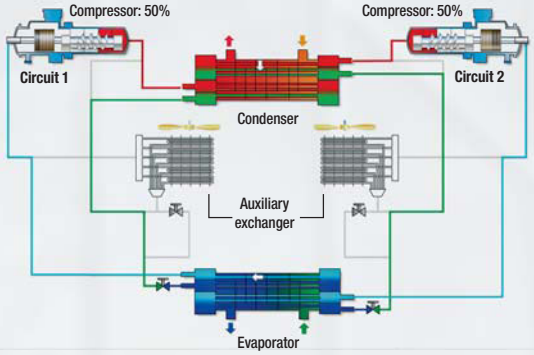
The main feature of INTEGRA units is the ability to manage the overall capacity, which refers to both cooling and heating demands, based on the actual load requirements of the total system. The operational flexibility is total: all combinations of heating and cooling loads can be met.



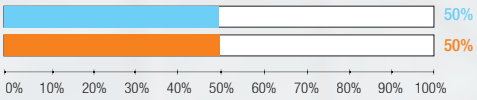

## 100% cold side / 100% hot side




The two circuits operate at maximum power, evaporating in the cold-side exchanger and condensing in the hot-side one. The source-side heat exchanger (air coil or water exchanger, depending on the type of unit) is not used, which means that in these conditions there is no energy waste.

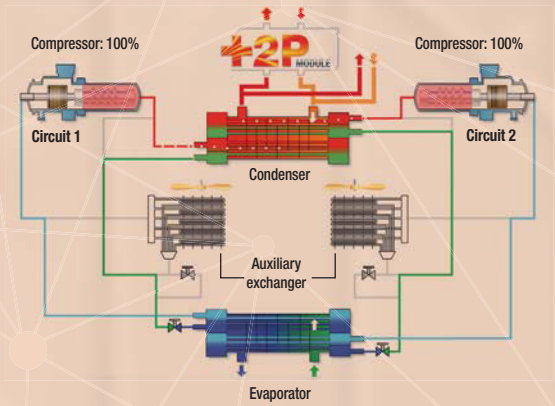



## 50% cold side / 50% hot side

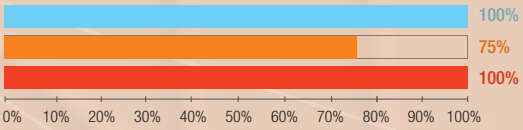



Also in this situation the unit operates like a water-water unit, as all the evaporating and condensing energy is used for the system. Since the system only requires 50% of the total energy, each circuit operates in partial load conditions. In this particular state, the exchangers are oversized, thus achieving an even higher efficiency.

# Operating modes with +2P MODULE



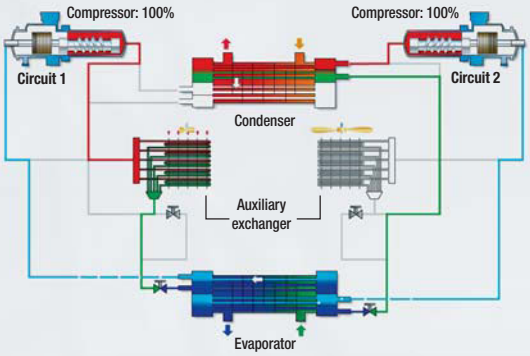

## 100% cold side
## 75% hot side
## 100% very hot side



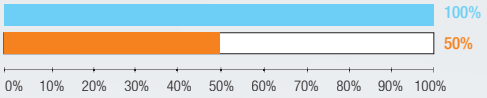

In this state, both the compressors operate at full load in order to meet the demands of the plant. Both circuits evaporate all the refrigerant in the cold-side heat exchanger and condense in the hot-side one, so the auxiliary source-side heat exchanger is not used.
Part of the hot temperature water flow produced in the hot-side heat exchanger is used by the +2P module to produce very hot water (up to 78°C).

# Operating mode

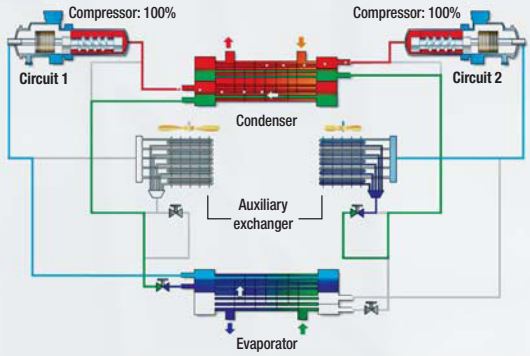
The multi-purpose units are therefore a simple and integrated response for all applications that require simultaneously and independently a hot and a cold load, such as the air conditioning of large plant with complex loads. The following are four of the many possible modes of operation of INTEGRA units.



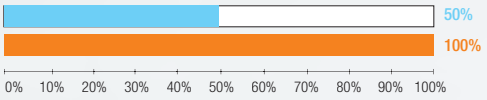

## 100% cold side / 50% hot side




Both the circuits operate to produce the amount of energy necessary for the cooling of the plant, evaporating all the refrigerant in the cold-side heat exchanger. While one circuit carries out the condensation on the hot-side heat exchanger, thus supplying the total energy necessary to heat the building, the other circuit exchanges the remaining heating energy in the external environment by using the auxiliary source-side heat exchanger (air coil or water exchanger, depending on the type of unit).

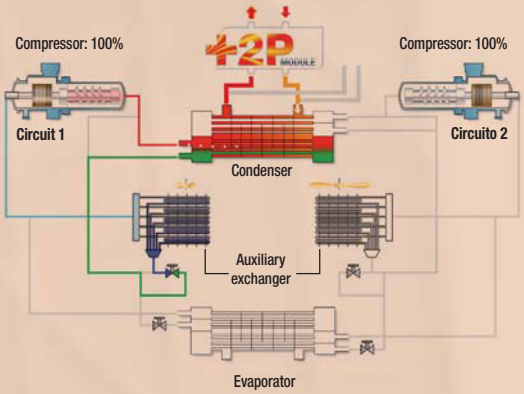



## 50% cold side / 100% hot side

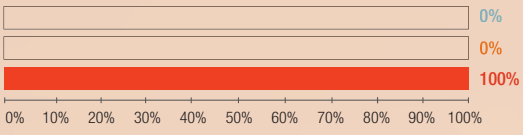



Just like the previous case, in this state both circuits operate differently, to supply the system with the correct amount of required energy.
The unit uses two sources to produce the requested hot water flow: in fact, one circuit evaporates the refrigerant in the cold-side heat exchanger, thus producing the cold water demand, while the other circuit uses the auxiliary source-side heat exchanger. In this way both circuits move energy through the hot-side heat exchanger, fulfilling the request for hot water flow.

With the +2P module option, INTEGRA units can simultaneously and independently fulfill 3 different thermal loads (cold, hot and very hot water). The following operating modes are two working examples of INTEGRA units with a +2P module fitted in.




## 0% cold side
## 0% hot side
## 100% very hot side



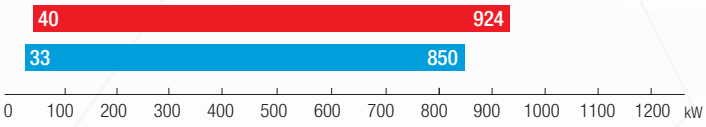

This particular state, shows the flexibility of the INTEGRA units with a +2P module: even in the case of no thermal loads (neither cooling, nor heating) requested by the plant, the unit can still provide the very hot water if necessary.
In this case, only one circuit is operating partially in order to provide the right amount of hot water needed by the +2P module. A +2P module can produce very hot water (up to 78°C).

AIR SOURCE

# Air source units

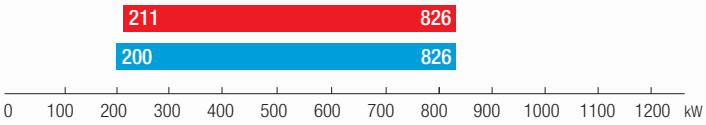
## i-FX-Q$_2$ / NECS-Q / ERACS2-Q

SCROLL



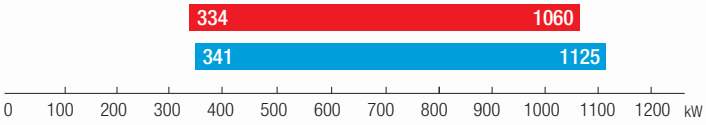

Acoustic versions
B: Standard
LN: Low Noise
SL: Super low noise
CA: High Efficiency
SL-CA: High Efficiency Super Low Noise

SCREW




Acoustic versions
CA: High efficiency
LN-CA: Low Noise, High Efficiency
SL-CA: Super Low Noise, High Efficiency
XL-CA: Extra Low Noise, High Efficiency
XL-CA-E: Extra Low Noise, High Efficiency-Enhanced

SCREW INVERTER




Acoustic versions
CA: High efficiency
SL-CA: Super Low Noise, High Efficiency
XL-CA: Extra Low Noise, High Efficiency

## Smart Defrost

The INTEGRA air source units are characterized by their wide operating range, achieved by the efficient energy management of the defrosting activity.

Energy Storage System

## Energy storage function

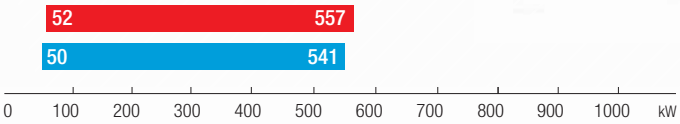
INTEGRA heat pumps are equipped with dedicated control functions, specially developed by Climaveneta in order to further enhance the key characteristics of these units.
Thanks to the dynamic detection of all control parameters, the energy storage function allows the unit to promote its heat recovery function whenever is possible. Thus, INTEGRA can smartly interpret the plant requirements, always favouring the most efficient operation mode.

WATER SOURCE

# Units with water source

NECS-WQ / ERACS2-WQ

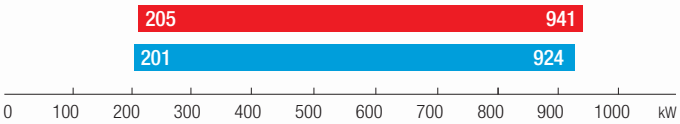
SCROLL




Acoustic versions

B:Standard + compressors' acoustic enclosure [up to -10 dB(A)]

SCREW




Acoustic versions

B:Standard + compressors' acoustic enclosure 'Basic' [up to -10 dB(A)] + compressors' acoustic enclosure 'Plus' [up to -16 dB(A)]

PLUG & PLAY

These units are coupled with natural water sources (ground water or surface water) to which the unit may be directly connected, without using an intermediate heat exchanger, hence improving the overall efficiency.

Water Saving function

For all applications with natural water source, it is key to reduce the flow rates to a minimum. This makes it possible to cut the operating costs of pumping and reduce the discharge costs of drained water. Thanks to the "Water Saving function" the water flow rate directed to the auxiliary heat exchanger is reduced in proportion to the unit's partialisation, ensuring the maximum overall efficiency of the system.

INTEGRA Qi

## Special Qi function

INTEGRA units in special QI execution are designed and created to exchange heat using the most convenient source between air or water.

In this way, for some periods of the year, it is possible to stop the pumps for draining the water from the well, reducing the impact both of the pump consumption and the costs related to the use of public water. Qi evolved technology can manage the operation with a double heat source in the best way.

# FULL INVERTER technology

The inverter technology with continuous variable speed shows its advantages particularly when applied to multi-purpose units.


The new inverter driven i-FX-Q2 units always reach higher efficiencies than fixed speed units, with any combination of cold / hot load, and in any season.

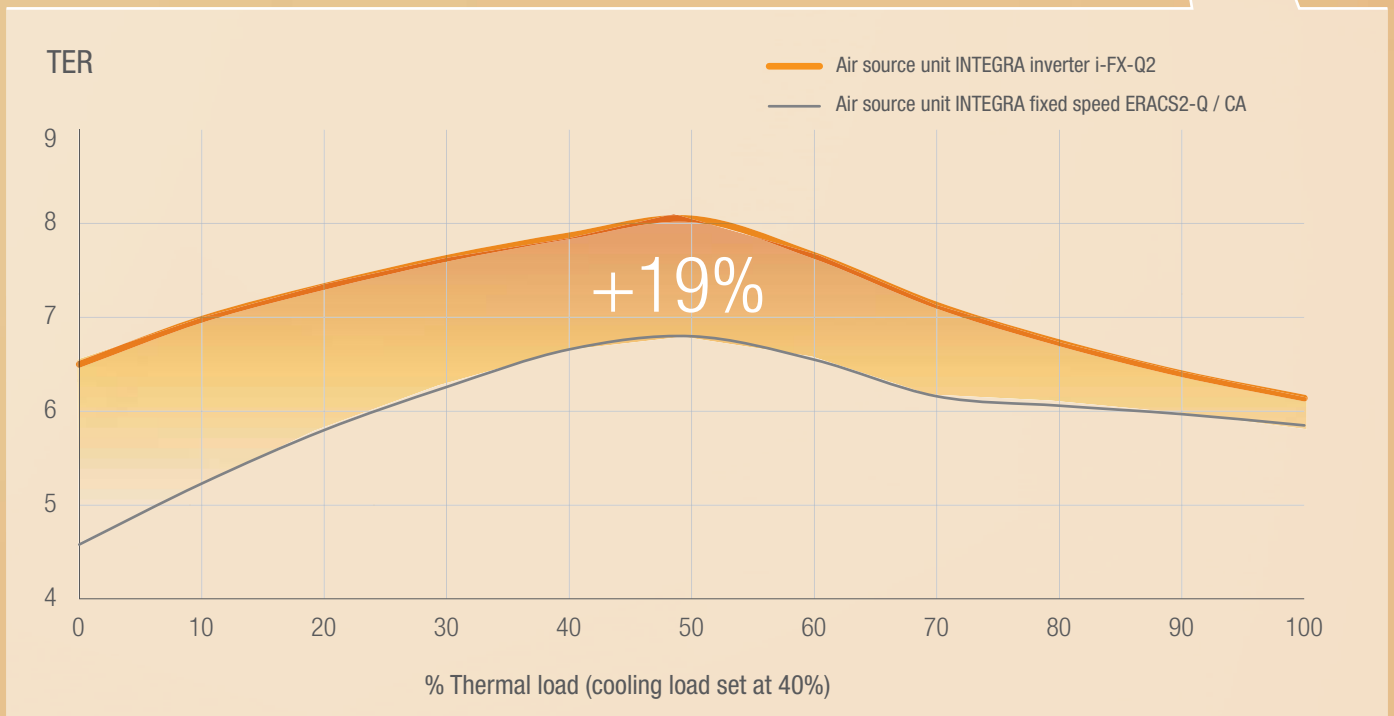
# The highest energy efficiency, always.

The presence of Variable Speed Drive (VSD) compressors allows the INTEGRA unit, i-FX-Q2 to effectively follow each combination of thermal loads required by the system, with increasingly higher TER efficiencies (up to 19%) compared to those units with fixed speed compressors.

| Cooling load [%](*) | Thermal load [%](*) | Median increase in TER VSD vs. fixed speed |
|---|---|---|
| 0% | 0%-100% | +14% |
| 20% | 0%-100% | +18% |
| **40%** | 0%-100% | **+19%** |
| 60% | 0%-100% | +17% |
| 80% | 0%-100% | +9% |
| 100% | 0%-100% | +5% |
| Average value | | **+14%** |

The comparison was made between an INTEGRA ERACS-Q /CA air source unit with fixed speed screw compressor and an i-FX-Q2 one with VSD screw compressors.

* Load refers to the maximum cooling capacity of the unit in the following conditions:
Evaporator water (in / out) = 12/7 ° C
Condenser water (in / out) = 40/45 ° C
Air room temperature = 15 ° C



# FULL INVERTER technology

ErP 2021 COMPLIANT

## Unbeatable efficiency at partial loads

In traditional comfort applications the HVAC plant usually works at full load only for few hours every year. Most of the time the unit works at partial loads.

It is in this situation that the efficiency achieved by the units with inverter technology is much higher than traditional fixed speed units:
SCOP fino a +20%
SEER fino a +32%

The minimum efficiency requirements of the EU regulation, ErP 2009/125 / EC, are also pinpointed in TIER 2021


SEER seasonal efficiency as per EN14825:2013 — Part load ratio

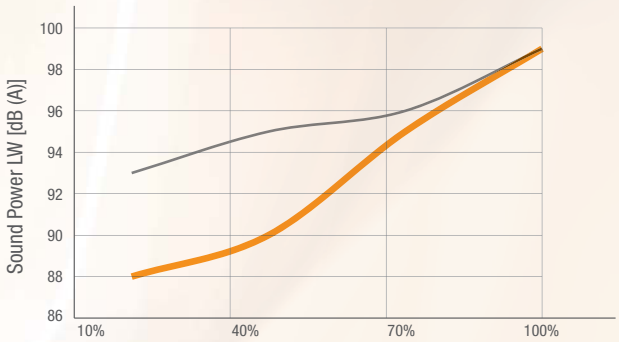

SCOP seasonal efficiency as per EN14825: 2013 — Part load ratio

Air units INTEGRA inverter i-FX-Q2
Air units INTEGRA fixed speed ERACS2-Q / CA

## Minimum sound emissions
## Highest acoustical comfort

The more you increase the partialisation activity the lower your sound emissions will be, thanks to capacity of inverter technology to continually modulate the compressor rotation.
Most of the time the units are characterized by lower capacities compared to fixed speed compressor units, this always ensures the highest acoustical comfort.
The sound emissions can be further reduced thanks to dedicated versions and a vast array of accessories.

Sound Power of the two units in partialisation




Partialisation SEER values as per EN14825: 2013 — Part load ratio

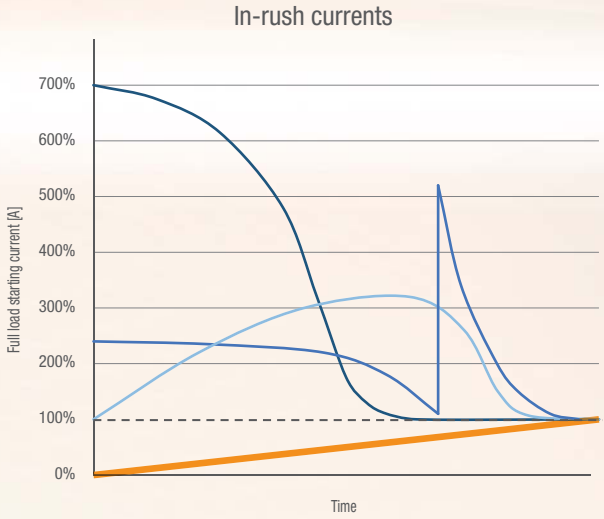
Air units INTEGRA inverter i-FX-Q2
Air units INTEGRA fixed speed ERACS2-Q / CA

# The highest energy efficiency, always.

## No in-rush current

The inverter technology involves a start-up phase with very low in-rush current, lower than any other mode (direct start, star / delta, part winding or soft start). The absence of sudden peaks and abrupt changes in the starting torque, in addition to eliminating possible disturbances to the electricity power network, reduces the stress to zero on the electrical components and improves the reliability of the system.

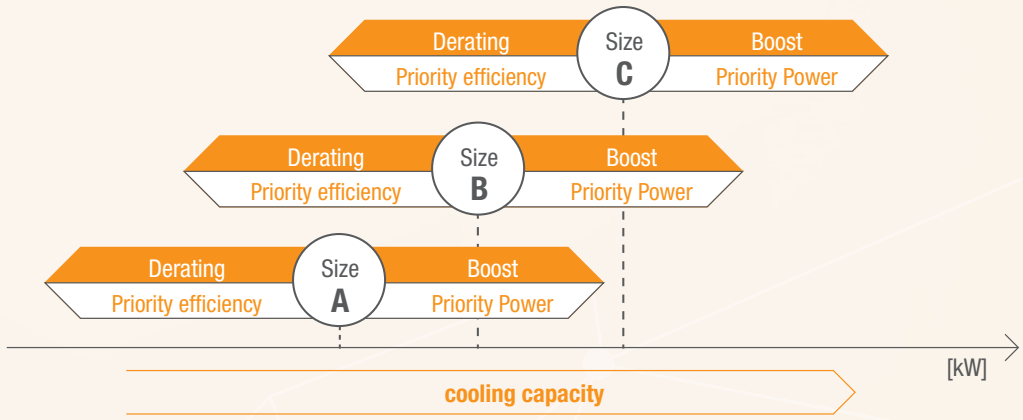
The frequency converters chosen by Climaveneta are characterized by values of Displacement Power Factor of between 0.97 and 0.99. The resulting unit power factor at rated nominal operating conditions is always higher than that of similar technology without an inverter unit. The need to install power factor correction devices of the loads is therefore reduced.




## Flexibilty in selecting units

Thanks to specific technical solutions and proprietary control functions, Climaveneta's inverter units can be selected at various speed conditions, which is different from the nominal ones.

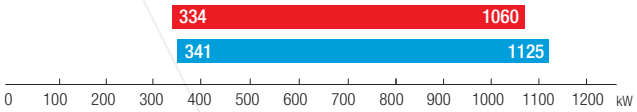
Whatever the needs to be met: maximum operating efficiency, reducing the initial investment, future power increase of the plant, it is always possible to identify the most suitable units.



# INTEGRA i-FX-Q 2

4-pipe air source unit, inverter-driven screw compressors and EC fans. Cooling capacity from 341 to 1125 kW

i-FX-Q2 is a multi-purpose outdoor unit able to simultaneously produce chilled and hot water by means of two independent hydronic circuits. Thanks to the full inverter technology of the screw compressors and the EC fans, these units effectively follow each combination of thermal loads, always providing the exact thermal energy required by the system. This results in top-level efficiency values and very low energy consumption throughout the year, whatever the cooling mode and the weather condition.

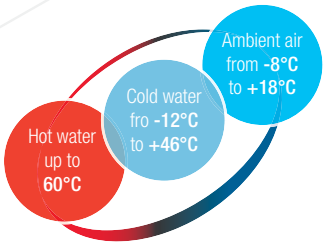



**Versions:**

**CA** Class A Efficiency
**SL-CA** Super Low noise, Class A Efficiency
**XL-CA** Extra Low noise, Class A Efficiency

Main accessories:

- "LT" kit for working down to -12°C in heat pump mode
- NOISE REDUCER (only on not silenced versions)
- Special fan diffusers
- Thicker soundproofing cladding
- Hydronic group
- VPF (Variable Primary Flow) system
- Set-up for remote connectivity with ModBus, Echelon, Bacnet, Bacnet over-IP.
- Touch Screen visual display
- Leak detector




### Extended working range

An extended working range which ensures the working operation of the unit all year long and in any working mode.

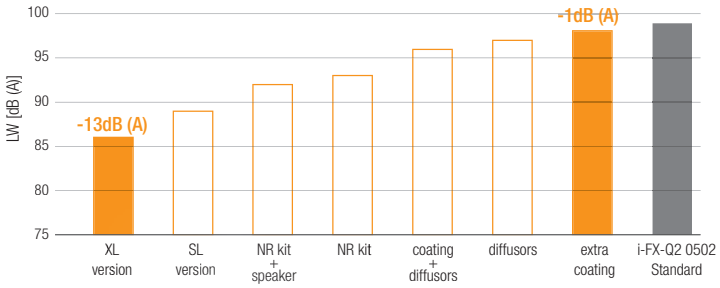

### Full inverter technology

Independent circuits with screw compressors inverters and EC standard fans.


### HFO refrigerant

Use of innovative green refrigerants, with minimal environmental impact (very low GWP).

## Acoustical Casings




### Super silent

Up to 8 different acoustic casings for a total sound emission control (of -1dB (A) up to -13 dB (A) compared to the standard configuration).

KIP LINK
Keyboard In your Pocket

## KIPlink, the keyboard in your pocket

KIPlink is the innovative system that allows you to directly control the unit via smartphone or tablet through the QR code and using the Wi-Fi directly installed in the equipment.

SCREW INVERTER

HFC R-134a

ErP 2021 COMPLIANT

AIR SOURCE

EC AXIAL

SHELL & TUBES

Full INVERTER Technology

| i-FX-Q2 CA | | | 0502 | 0532 | 0602 | 0652 | 0702 | 0802 | 0902 | 1002 | 1102 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Power supply | | V/ph/Hz | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 |
| **PERFORMANCE** | | | | | | | | | | | |
| **SELECTION RANGE** | | | | | | | | | | | |
| Cooling capacity range | (1) | kW | 400-520 | 429-536 | 456-570 | 517-671 | 598-712 | 630-787 | 786-982 | 881-1036 | 1046-1125 |
| EER (up to) | (1) | kW/kW | 3,34 | 3,30 | 3,36 | 3,25 | 3,24 | 3,32 | 3,25 | 3,22 | 3,03 |
| Heating capacity range | (3) | kW | 379-492 | 394-492 | 421-526 | 491-638 | 570-678 | 606-757 | 745-931 | 836-983 | 986-1060 |
| COP (up to) | (3) | kW/kW | 3,45 | 3,42 | 3,42 | 3,47 | 3,45 | 3,51 | 3,50 | 3,51 | 3,49 |
| **SELECTION RATED** | | | | | | | | | | | |
| **COOLING ONLY (GROSS VALUE)** | | | | | | | | | | | |
| Cooling capacity | (1)(10) | kW | 488 | 531 | 570 | 627 | 689 | 787 | 915 | 985 | 1083 |
| Total power input | (1)(10) | kW | 155 | 168 | 182 | 199 | 219 | 251 | 288 | 312 | 360 |
| EER | (1)(10) | kW/kW | 3,14 | 3,15 | 3,14 | 3,15 | 3,14 | 3,13 | 3,18 | 3,16 | 3,01 |
| **COOLING ONLY (EN14511 VALUE)** | | | | | | | | | | | |
| Cooling capacity | (1)(2)(10) | kW | 486 | 529 | 568 | 625 | 687 | 786 | 912 | 982 | 1079 |
| EER | (1)(2)(10) | kW/kW | 3,10 | 3,10 | 3,10 | 3,10 | 3,10 | 3,10 | 3,14 | 3,12 | 2,97 |
| **HEATING ONLY (GROSS VALUE)** | | | | | | | | | | | |
| Total heating capacity | (3)(10) | kW | 458 | 486 | 526 | 593 | 652 | 757 | 862 | 928 | 1018 |
| Total power input | (3)(10) | kW | 133 | 143 | 154 | 171 | 189 | 216 | 248 | 265 | 292 |
| COP | (3)(10) | kW/kW | 3,44 | 3,40 | 3,42 | 3,47 | 3,45 | 3,51 | 3,47 | 3,50 | 3,48 |
| **HEATING ONLY (EN14511 VALUE)** | | | | | | | | | | | |
| Total heating capacity | (2)(3)(10) | kW | 460 | 487 | 527 | 594 | 654 | 759 | 865 | 931 | 1020 |
| COP | (2)(3)(10) | kW/kW | 3,42 | 3,38 | 3,41 | 3,45 | 3,43 | 3,49 | 3,44 | 3,48 | 3,46 |
| **COOLING WITH TOTAL HEAT RECOVERY** | | | | | | | | | | | |
| Cooling capacity | (4)(10) | kW | 489 | 533 | 571 | 624 | 683 | 785 | 914 | 987 | 1102 |
| Total power input | (4)(10) | kW | 137 | 151 | 161 | 174 | 193 | 221 | 258 | 274 | 310 |
| Recovery heat exchanger capacity | (4)(10) | kW | 617 | 675 | 722 | 788 | 864 | 993 | 1157 | 1245 | 1393 |
| TER | (4)(10) | kW/kW | 8,08 | 8,01 | 8,04 | 8,11 | 8,02 | 8,03 | 8,02 | 8,13 | 8,06 |
| **SEASONAL EFFICIENCY IN HEATING (EN14825 VALUE)** | | | | | | | | | | | |
| PDesign | (5)(10) | kW | 365 | 365 | 385 | - | - | - | - | - | - |
| SCOP | (5)(10) | | 4,10 | 4,08 | 4,07 | - | - | - | - | - | - |
| Performance ηs (Reg. 811/2013 UE) | (5)(10) | % | 161 | 160 | 160 | - | - | - | - | - | - |
| Seasonal efficiency class (Regulation (UE) 811/2013) | (5)(10) | | - | - | - | - | - | - | - | - | - |
| **EXCHANGERS** | | | | | | | | | | | |
| **HEAT EXCHANGER USER SIDE IN REFRIGERATION** | | | | | | | | | | | |
| Water flow | (1)(10) | l/s | 23,31 | 25,41 | 27,26 | 29,97 | 32,95 | 37,65 | 43,76 | 47,12 | 51,77 |
| Pressure drop | (1)(10) | kPa | 40,8 | 51,6 | 32,5 | 40,5 | 45,4 | 29,0 | 39,7 | 42,3 | 51,4 |
| **HEAT EXCHANGER USER SIDE IN HEATING** | | | | | | | | | | | |
| Water flow | (3)(10) | l/s | 22,13 | 23,47 | 25,38 | 28,61 | 31,49 | 36,55 | 41,61 | 44,81 | 49,14 |
| Pressure drop | (3)(10) | kPa | 22,5 | 25,4 | 21,4 | 27,0 | 32,0 | 32,2 | 41,7 | 34,9 | 30,0 |
| **REFRIGERANT CIRCUIT** | | | | | | | | | | | |
| Compressors nr. | N° | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| No. Circuits | N° | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Regulation | | | STEPLESS | STEPLESS | STEPLESS | STEPLESS | STEPLESS | STEPLESS | STEPLESS | STEPLESS | STEPLESS |
| Refrigerant | | | R134a | R134a | R134a | R134a | R134a | R134a | R134a | R134a | R134a |
| Refrigerant charge | kg | | 230,0 | 235,0 | 240,0 | 260,0 | 260,0 | 325,0 | 350,0 | 470,0 | 470,0 |
| **NOISE LEVEL** | | | | | | | | | | | |
| Sound pressure | (6)(10) | dB(A) | 66 | 66 | 68 | 68 | 68 | 68 | 69 | 69 | 69 |
| Sound power level in cooling | (7)(8)(10) | dB(A) | 99 | 99 | 101 | 101 | 101 | 101 | 102 | 102 | 102 |
| Sound power level in heating | (7)(9)(10) | dB(A) | 99 | 99 | 101 | 101 | 101 | 101 | 102 | 102 | 102 |
| **SIZE AND WEIGHT** | | | | | | | | | | | |
| Lenght | (11) | mm | 8150 | 8150 | 8900 | 9650 | 10400 | 10400 | 10400 | 11900 | 11900 |
| Width | (11) | mm | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 |
| Height | (11) | mm | 2530 | 2530 | 2530 | 2530 | 2530 | 2530 | 2530 | 2530 | 2530 |
| Operating weight | (11) | kg | 8350 | 8380 | 9080 | 9590 | 10060 | 11010 | 12310 | 14110 | 14150 |

Notes:

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C.
2 Values in compliance with EN14511-3:2013.
3 Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.
4 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Plant (side) heat exchanger water (in/out) 40°C/45°C.
5 Seasonal space heating energy efficiency class LOW TEMPERATURE in AVERAGE climate conditions [REGULATION (UE) N. 811/2013]
6 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
7 Sound power on the basis of measurements made in compliance with ISO 9614.
8 Sound power level in cooling, outdoors.
9 Sound power level in heating, outdoors.
10 Data referred to the selection rated.
11 Unit in standard configuration/execution, without optional accessories.

**The units highlighted in this publication contain HFC R134a [GWP100 1430] fluorinated greenhouse gases.**

Thanks to dedicated visuals and graphics, KIPlink allows the user to directly access the same functions as with a traditional keyboard.

KIPlink is installed as standard in all i-FX-Q2 units.

# NECS-Q

HFC R-410A | AIR SOURCE | REVERSIBLE HEAT PUMP | SCROLL | AXIAL | P PLATES | T SHELL & TUBES

| NECS-Q / B | | | 0152 | 0182 | 0202 | 0252 | 0262 | 0302 | 0412 | 0512 | 0612 | 0604 | 0704 | 0804 | 0904 | 1004 | 1104 | 1204 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Power supply | | V/ph/Hz | | | | | | | 400/3+N/50 | | | | | | | | | |
| **PERFORMANCE** | | | | | | | | | | | | | | | | | | |
| **COOLING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | | | | | |
| Cooling capacity | (1) | kW | 36,6 | 43,2 | 48,5 | 55,8 | 61,2 | 73,3 | 94,8 | 120 | 151 | 150 | 166 | 189 | 211 | 240 | 277 | 311 |
| Total power input | (1) | kW | 14,2 | 15,4 | 18,8 | 21,3 | 24,2 | 27,6 | 35,5 | 44,0 | 58,9 | 58,9 | 69,0 | 75,8 | 85,2 | 95,6 | 107 | 120 |
| EER | (1) | kW/kW | 2,58 | 2,81 | 2,58 | 2,62 | 2,53 | 2,66 | 2,67 | 2,73 | 2,56 | 2,54 | 2,41 | 2,49 | 2,48 | 2,51 | 2,58 | 2,58 |
| **COOLING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | | | | | |
| Cooling capacity | (1)(2) | kW | 36,3 | 42,8 | 48,2 | 55,4 | 60,8 | 72,9 | 94,3 | 120 | 150 | 149 | 166 | 188 | 210 | 239 | 276 | 310 |
| EER | (1)(2) | kW/kW | 2,51 | 2,72 | 2,52 | 2,55 | 2,47 | 2,60 | 2,62 | 2,68 | 2,51 | 2,50 | 2,37 | 2,45 | 2,44 | 2,48 | 2,54 | 2,54 |
| **HEATING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | | | | | |
| Total heating capacity | (3) | kW | 41,1 | 48,9 | 55,3 | 62,5 | 68,1 | 83,1 | 107 | 136 | 173 | 167 | 185 | 209 | 234 | 266 | 306 | 344 |
| Total power input | (3) | kW | 14,2 | 15,6 | 18,1 | 21,1 | 22,8 | 26,3 | 34,0 | 42,3 | 54,4 | 58,0 | 64,9 | 72,1 | 79,8 | 92,0 | 104 | 116 |
| COP | (3) | kW/kW | 2,89 | 3,13 | 3,06 | 2,96 | 2,99 | 3,16 | 3,16 | 3,21 | 3,17 | 2,88 | 2,86 | 2,90 | 2,93 | 2,90 | 2,94 | 2,96 |
| **HEATING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | | | | | |
| Total heating capacity | (2)(3) | kW | 41,4 | 49,4 | 55,7 | 63,0 | 68,6 | 83,7 | 108 | 136 | 174 | 168 | 186 | 210 | 235 | 268 | 308 | 346 |
| COP | (2)(3) | kW/kW | 2,85 | 3,07 | 3,01 | 2,91 | 2,95 | 3,11 | 3,12 | 3,17 | 3,13 | 2,86 | 2,83 | 2,88 | 2,91 | 2,87 | 2,91 | 2,93 |
| **COOLING WITH TOTAL HEAT RECOVERY** | | | | | | | | | | | | | | | | | | |
| Cooling capacity | (4) | kW | 37,2 | 43,6 | 50,6 | 57,2 | 64,1 | 76,3 | 97,7 | 123 | 160 | 151 | 173 | 194 | 220 | 246 | 280 | 317 |
| Total power input | (4) | kW | 12,8 | 14,2 | 16,6 | 18,9 | 21,0 | 24,5 | 31,9 | 39,6 | 51,3 | 49,8 | 57,1 | 64,5 | 72,1 | 79,8 | 92,8 | 105 |
| Recovery heat exchanger capacity | (4) | kW | 49,2 | 56,9 | 66,2 | 75,0 | 83,8 | 99,3 | 128 | 161 | 208 | 198 | 226 | 255 | 288 | 321 | 368 | 415 |
| TER | | kW/kW | 6,75 | 7,08 | 7,04 | 6,99 | 7,04 | 7,16 | 7,07 | 7,18 | 7,19 | 7,00 | 6,99 | 6,96 | 7,04 | 7,10 | 6,98 | 6,99 |
| **SEASONAL EFFICIENCY IN HEATING (EN14825 VALUE)** | | | | | | | | | | | | | | | | | | |
| PDesign | (5) | kW | 31,0 | 35,0 | 39,7 | 47,9 | 51,1 | 60,5 | 76,2 | 98,1 | 132 | 127 | 143 | 156 | 171 | 205 | 231 | 255 |
| SCOP | (5) | | 3,07 | 3,23 | 3,21 | 3,07 | 3,12 | 3,25 | 3,23 | 3,28 | 3,33 | 3,25 | 3,26 | 3,35 | 3,21 | 3,23 | 3,28 | 3,26 |
| Performance ηs (Reg. 811/2013 UE) | (5) | % | 120 | 126 | 125 | 120 | 122 | 127 | 126 | 128 | 130 | 127 | 127 | 131 | 126 | 126 | 128 | 128 |
| Seasonal efficiency class (Regulation (UE) 811/2013) | (5) | | A | A+ | A+ | A | A | A+ | - | - | - | - | - | - | - | - | - | - |
| **EXCHANGERS** | | | | | | | | | | | | | | | | | | |
| **HEAT EXCHANGER USER SIDE IN REFRIGERATION** | | | | | | | | | | | | | | | | | | |
| Water flow | (1) | m³/h | 6,29 | 7,44 | 8,35 | 9,61 | 10,5 | 12,6 | 16,3 | 20,7 | 25,9 | 25,8 | 28,6 | 32,5 | 36,3 | 41,3 | 47,7 | 53,5 |
| Pressure drop | (1) | kPa | 41,7 | 58,2 | 42,2 | 55,9 | 44,5 | 45,0 | 44,3 | 46,6 | 47,7 | 41,9 | 43,0 | 43,7 | 42,8 | 44,4 | 47,3 | 47,2 |
| **HEAT EXCHANGER USER SIDE IN HEATING** | | | | | | | | | | | | | | | | | | |
| Water flow | (3) | m³/h | 7,14 | 8,50 | 9,61 | 10,9 | 11,8 | 14,4 | 18,7 | 23,6 | 30,0 | 29,1 | 32,2 | 36,4 | 40,7 | 46,3 | 53,2 | 59,8 |
| Pressure drop | (3) | kPa | 53,6 | 75,9 | 55,9 | 71,3 | 56,1 | 59,1 | 57,9 | 60,6 | 63,8 | 53,1 | 54,5 | 54,8 | 53,7 | 55,8 | 58,9 | 58,9 |
| **COMPRESSORS** | | | | | | | | | | | | | | | | | | |
| Compressors nr. | | N° | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| No. Circuits | | N° | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| **NOISE LEVEL** | | | | | | | | | | | | | | | | | | |
| Noise Pressure | (6) | dB(A) | 52 | 52 | 52 | 52 | 52 | 53 | 54 | 55 | 55 | 60 | 60 | 60 | 61 | 62 | 63 | 63 |
| Sound power level in cooling | (7)(8) | dB(A) | 84 | 84 | 84 | 84 | 84 | 85 | 86 | 87 | 87 | 92 | 92 | 92 | 93 | 94 | 95 | 95 |
| Sound power level in heating | (7)(9) | dB(A) | 84 | 84 | 84 | 84 | 84 | 85 | 86 | 87 | 87 | 92 | 92 | 92 | 93 | 94 | 95 | 95 |
| **SIZE AND WEIGHT** | | | | | | | | | | | | | | | | | | |
| Length | (10) | mm | 2038 | 2038 | 2038 | 2538 | 2538 | 2538 | 3088 | 3588 | 3588 | 3110 | 3110 | 3110 | 4110 | 4110 | 4110 | 4110 |
| Width | (10) | mm | 1304 | 1304 | 1304 | 1304 | 1304 | 1304 | 1304 | 1304 | 1304 | 2220 | 2220 | 2220 | 2220 | 2220 | 2220 | 2220 |
| Height | (10) | mm | 1695 | 1695 | 1695 | 1695 | 1695 | 1695 | 1695 | 1695 | 1695 | 2150 | 2150 | 2150 | 2150 | 2150 | 2150 | 2150 |
| Operating weight | (10) | kg | 585 | 615 | 635 | 700 | 720 | 770 | 1110 | 1270 | 1390 | 1600 | 1840 | 2120 | 2320 | 2480 | 2680 | 2860 |

| NECS-Q / CA | | | 1314 | 1414 | 1614 | 1716 | 1816 | 2016 | 2116 | 2416 | 2418 | 2618 | 2818 | 3018 | 3218 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Power supply | | V/ph/Hz | | | | | 400/3/50 | | | | | | | | |
| **PERFORMANCE** | | | | | | | | | | | | | | | |
| **COOLING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | | |
| Cooling capacity | (1) | kW | 362 | 387 | 425 | 471 | 524 | 559 | 581 | 637 | 680 | 724 | 775 | 813 | 850 |
| Total power input | (1) | kW | 122 | 128 | 145 | 157 | 173 | 185 | 192 | 217 | 230 | 244 | 256 | 272 | 289 |
| EER | (1) | kW/kW | 2,96 | 3,03 | 2,94 | 3,01 | 3,04 | 3,03 | 3,03 | 2,94 | 2,95 | 2,96 | 3,03 | 2,99 | 2,94 |
| **COOLING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | | |
| Cooling capacity | (1)(2) | kW | 361 | 385 | 423 | 470 | 522 | 557 | 579 | 635 | 677 | 720 | 773 | 810 | 846 |
| EER | (1)(2) | kW/kW | 2,91 | 2,98 | 2,89 | 2,97 | 2,99 | 2,99 | 2,99 | 2,89 | 2,91 | 2,91 | 2,99 | 2,94 | 2,89 |
| **HEATING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | | |
| Total heating capacity | (3) | kW | 394 | 420 | 462 | 507 | 546 | 603 | 630 | 693 | 729 | 788 | 840 | 882 | 924 |
| Total power input | (3) | kW | 120 | 127 | 140 | 155 | 166 | 183 | 189 | 210 | 221 | 239 | 253 | 266 | 280 |
| COP | (3) | kW/kW | 3,30 | 3,31 | 3,30 | 3,28 | 3,29 | 3,30 | 3,32 | 3,30 | 3,29 | 3,29 | 3,33 | 3,31 | 3,30 |
| **HEATING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | | |
| Total heating capacity | (2)(3) | kW | 396 | 422 | 464 | 509 | 549 | 606 | 633 | 696 | 732 | 792 | 843 | 886 | 928 |
| COP | (2)(3) | kW/kW | 3,26 | 3,28 | 3,26 | 3,25 | 3,26 | 3,27 | 3,29 | 3,27 | 3,26 | 3,26 | 3,30 | 3,28 | 3,27 |
| **COOLING WITH TOTAL HEAT RECOVERY** | | | | | | | | | | | | | | | |
| Cooling capacity | (4) | kW | 355 | 379 | 423 | 460 | 500 | 547 | 568 | 636 | 667 | 711 | 758 | 802 | 848 |
| Total power input | (4) | kW | 107 | 113 | 126 | 139 | 150 | 163 | 170 | 189 | 200 | 213 | 226 | 240 | 252 |
| Recovery heat exchanger capacity | (4) | kW | 455 | 485 | 542 | 590 | 640 | 700 | 728 | 814 | 854 | 911 | 971 | 1027 | 1085 |
| TER | | kW/kW | 7,55 | 7,66 | 7,64 | 7,55 | 7,63 | 7,67 | 7,64 | 7,68 | 7,62 | 7,61 | 7,63 | 7,63 | 7,67 |
| **SEASONAL EFFICIENCY IN HEATING (EN14825 VALUE)** | | | | | | | | | | | | | | | |
| PDesign | (5) | kW | 283 | 317 | 363 | 376 | 390 | - | - | - | - | - | - | - | - |
| SCOP | (5) | | 3,75 | 3,86 | 3,73 | 3,86 | 3,77 | - | - | - | - | - | - | - | - |
| Performance ηs (Reg. 811/2013 UE) | (5) | % | 147 | 151 | 146 | 152 | 148 | - | - | - | - | - | - | - | - |
| Seasonal efficiency class (Regulation (UE) 811/2013) | (5) | | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **EXCHANGERS** | | | | | | | | | | | | | | | |
| **HEAT EXCHANGER USER SIDE IN REFRIGERATION** | | | | | | | | | | | | | | | |
| Water flow | (1) | m³/h | 62,4 | 66,6 | 73,2 | 81,1 | 90,2 | 96,3 | 100 | 110 | 117 | 125 | 133 | 140 | 146 |
| Pressure drop | (1) | kPa | 56,4 | 49,2 | 59,4 | 41,5 | 51,3 | 44,5 | 48,1 | 49,3 | 50,7 | 57,4 | 44,5 | 48,9 | 53,5 |
| **HEAT EXCHANGER USER SIDE IN HEATING** | | | | | | | | | | | | | | | |
| Water flow | (3) | m³/h | 68,5 | 73,0 | 80,3 | 88,1 | 95,0 | 105 | 109 | 120 | 127 | 137 | 146 | 153 | 161 |
| Pressure drop | (3) | kPa | 68,0 | 59,1 | 71,5 | 48,9 | 56,8 | 52,7 | 57,5 | 59,4 | 59,3 | 69,4 | 53,3 | 58,7 | 64,4 |
| **COMPRESSORS** | | | | | | | | | | | | | | | |
| Compressors nr. | | N° | 4 | 4 | 4 | 6 | 6 | 6 | 6 | 6 | 8 | 8 | 8 | 8 | 8 |
| No. Circuits | | N° | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 |
| **NOISE LEVEL** | | | | | | | | | | | | | | | |
| Noise Pressure | (6) | dB(A) | 65 | 65 | 65 | 64 | 65 | 65 | 65 | 66 | 66 | 66 | 67 | 67 | 67 |
| Sound power level in cooling | (7)(8) | dB(A) | 97 | 97 | 97 | 97 | 98 | 98 | 98 | 99 | 99 | 99 | 100 | 100 | 100 |
| Sound power level in heating | (7)(9) | dB(A) | 97 | 97 | 97 | 97 | 98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SIZE AND WEIGHT** | | | | | | | | | | | | | | | |
| Length | (10) | mm | 5080 | 5080 | 5080 | 6255 | 7430 | 7430 | 7430 | 7430 | 9780 | 9780 | 9780 | 9780 | 9780 |
| Width | (10) | mm | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 |
| Height | (10) | mm | 2450 | 2450 | 2450 | 2450 | 2450 | 2450 | 2450 | 2450 | 2450 | 2450 | 2450 | 2450 | 2450 |
| Operating weight | (10) | kg | 3850 | 3950 | 3980 | 5460 | 5740 | 5890 | 5970 | 6020 | 7350 | 7500 | 7700 | 7740 | 7770 |

# ERACS2-Q

| ERACS2-Q / CA | | | 1062 | 1162 | 1362 | 1562 | 1762 | 1962 | 2022 | 2222 | 2422 | 2622 | 2722 | 3222 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Power supply | | V/ph/Hz | | | | | | 400/3/50 | | | | | | |
| **PERFORMANCE** | | | | | | | | | | | | | | |
| **COOLING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | |
| Cooling capacity | (1) | kW | 210 | 248 | 302 | 329 | 380 | 425 | 483 | 525 | 554 | 624 | 701 | 826 |
| Total power input | (1) | kW | 72,1 | 84,8 | 101 | 109 | 129 | 144 | 156 | 167 | 176 | 201 | 222 | 264 |
| EER | (1) | kW/kW | 2,91 | 2,93 | 2,98 | 3,01 | 2,95 | 2,95 | 3,10 | 3,14 | 3,16 | 3,10 | 3,15 | 3,13 |
| **COOLING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | |
| Cooling capacity | (1)(2) | kW | 209 | 247 | 301 | 328 | 379 | 424 | 485 | 527 | 556 | 628 | 704 | 828 |
| EER | (1)(2) | kW/kW | 2,88 | 2,89 | 2,94 | 2,97 | 2,91 | 2,92 | 3,08 | 3,11 | 3,12 | 3,07 | 3,14 | 3,11 |
| **HEATING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | |
| Total heating capacity | (3) | kW | 218 | 258 | 308 | 339 | 396 | 434 | 492 | 541 | 571 | 615 | 711 | 826 |
| Total power input | (3) | kW | 67,0 | 80,7 | 92,2 | 101 | 122 | 131 | 149 | 159 | 169 | 178 | 207 | 240 |
| COP | (3) | kW/kW | 3,25 | 3,20 | 3,35 | 3,35 | 3,25 | 3,32 | 3,31 | 3,41 | 3,38 | 3,46 | 3,43 | 3,44 |
| **HEATING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | |
| Total heating capacity | (2)(3) | kW | 218 | 259 | 310 | 340 | 397 | 435 | 489 | 539 | 569 | 611 | 708 | 823 |
| COP | (2)(3) | kW/kW | 3,23 | 3,17 | 3,32 | 3,32 | 3,23 | 3,31 | 3,25 | 3,34 | 3,31 | 3,37 | 3,39 | 3,39 |
| **COOLING WITH TOTAL HEAT RECOVERY** | | | | | | | | | | | | | | |
| Cooling capacity | (4) | kW | 209 | 248 | 305 | 329 | 381 | 428 | 484 | 522 | 550 | 631 | 701 | 826 |
| Total power input | (4) | kW | 60,6 | 72,2 | 87,1 | 92,5 | 111 | 122 | 134 | 145 | 153 | 170 | 193 | 228 |
| Recovery heat exchanger capacity | (4) | kW | 266 | 316 | 386 | 416 | 486 | 542 | 609 | 658 | 694 | 791 | 883 | 1041 |
| TER | | kW/kW | 7,83 | 7,81 | 7,93 | 8,06 | 7,80 | 7,97 | 8,18 | 8,14 | 8,12 | 8,35 | 8,19 | 8,17 |
| **SEASONAL EFFICIENCY IN HEATING (EN14825 VALUE)** | | | | | | | | | | | | | | |
| PDesign | (5) | kW | 155 | 210 | 219 | 241 | 282 | 311 | 354 | 383 | - | - | - | - |
| SCOP | (5) | | 3,41 | 3,21 | 3,45 | 3,53 | 3,40 | 3,54 | 3,37 | 3,46 | - | - | - | - |
| Performance ηs (Reg. 811/2013 UE) | (5) | % | 133 | 125 | 135 | 138 | 133 | 139 | 132 | 136 | - | - | - | - |
| Seasonal efficiency class (Regulation (UE) 811/2013) | | (5) | - | - | - | - | - | - | - | - | - | - | - | - |
| **EXCHANGERS** | | | | | | | | | | | | | | |
| **HEAT EXCHANGER USER SIDE IN REFRIGERATION** | | | | | | | | | | | | | | |
| Water flow | (1) | m³/h | 36,2 | 42,8 | 52,1 | 56,7 | 65,5 | 73,2 | 83,1 | 90,4 | 95,3 | 107 | 121 | 142 |
| Pressure drop | (1) | kPa | 28,8 | 40,2 | 36,6 | 43,4 | 40,3 | 27,9 | 26,7 | 29,0 | 32,3 | 23,1 | 30,5 | 30,9 |
| **HEAT EXCHANGER USER SIDE IN HEATING** | | | | | | | | | | | | | | |
| Water flow | (3) | m³/h | 37,8 | 44,9 | 53,6 | 58,9 | 68,7 | 75,4 | 85,5 | 94,1 | 99,2 | 107 | 124 | 143 |
| Pressure drop | (3) | kPa | 31,5 | 44,3 | 38,8 | 46,9 | 44,4 | 29,6 | 28,2 | 31,4 | 34,9 | 22,8 | 31,9 | 31,5 |
| **COMPRESSORS** | | | | | | | | | | | | | | |
| Compressors nr. | N° | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| No. Circuits | N° | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| **NOISE LEVEL** | | | | | | | | | | | | | | |
| Noise Pressure | (6) | dB(A) | 65 | 65 | 65 | 66 | 66 | 66 | 66 | 68 | 68 | 68 | 68 | 69 |
| Sound power level in cooling | (7)(8) | dB(A) | 97 | 97 | 97 | 98 | 99 | 99 | 99 | 101 | 101 | 101 | 101 | 102 |
| Sound power level in heating | (7)(9) | dB(A) | 97 | 97 | 97 | 98 | 99 | 99 | 99 | 101 | 0 | 0 | 0 | 0 |
| **SIZE AND WEIGHT** | | | | | | | | | | | | | | |
| Length | (10) | mm | 4610 | 4610 | 5610 | 5610 | 6610 | 6610 | 6300 | 7200 | 7200 | 7200 | 8400 | 9700 |
| Width | (10) | mm | 2220 | 2220 | 2220 | 2220 | 2220 | 2220 | 2260 | 2260 | 2260 | 2260 | 2260 | 2260 |
| Height | (10) | mm | 2150 | 2420 | 2430 | 2430 | 2430 | 2430 | 2350 | 2350 | 2350 | 2350 | 2350 | 2350 |
| Operating weight | (10) | kg | 3600 | 3870 | 4620 | 5040 | 5520 | 5670 | 8650 | 9230 | 9330 | 9770 | 10310 | 12480 |

Note

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C.
2 Values in compliance with EN14511-3:2011.
3 Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.
4 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Plant (side) heat exchanger water (in/out) 40°C/45°C.
5 Seasonal space heating energy efficiency class LOW TEMPERATURE in AVERAGE climate conditions [REGULATION (UE) N. 811/2013]
6 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
7 Sound power on the basis of measurements made in compliance with ISO 9614.
8 Sound power level in cooling, outdoors.
9 Sound power level in heating, outdoors.
10 Unit in standard configuration/execution, without optional accessories.

**The units highlighted in this publication contain HFC R134a [GWP100 1430] fluorinated greenhouse gases.**

# NECS-WQ

HFC R-410A | WATER SOURCE | REVERSIBLE HEAT PUMP | SCROLL | PLATES

| NECS-WQ | | | 0152 | 0182 | 0202 | 0252 | 0262 | 0302 | 0412 | 0512 | 0612 | 0604 | 0704 | 0804 | 0904 | 1004 | 1104 | 1204 | 1404 | 1604 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Power supply | | V/ph/Hz | | | | | | | | | 400/3/50 | | | | | | | | | |
| **PERFORMANCE** | | | | | | | | | | | | | | | | | | | | |
| **COOLING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | | | | | | | |
| Cooling capacity | (1) | kW | 48,4 | 55,6 | 64,6 | 73,4 | 82,8 | 97,0 | 127 | 158 | 205 | 193 | 224 | 254 | 284 | 315 | 363 | 412 | 466 | 520 |
| Total power input | (1) | kW | 8,56 | 9,73 | 11,2 | 13,2 | 14,7 | 17,4 | 22,8 | 28,2 | 36,6 | 34,7 | 40,1 | 45,5 | 50,9 | 56,4 | 64,8 | 73,0 | 84,8 | 96,5 |
| EER | (1) | kW/kW | 5,65 | 5,71 | 5,77 | 5,56 | 5,63 | 5,57 | 5,56 | 5,59 | 5,60 | 5,57 | 5,59 | 5,59 | 5,58 | 5,59 | 5,60 | 5,64 | 5,49 | 5,39 |
| **COOLING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | | | | | | | |
| Cooling capacity | (1)(2) | kW | 48,2 | 55,4 | 64,3 | 73,1 | 82,4 | 96,6 | 126 | 157 | 204 | 192 | 223 | 253 | 283 | 314 | 362 | 410 | 464 | 518 |
| EER | (1)(2) | kW/kW | 5,45 | 5,53 | 5,59 | 5,39 | 5,45 | 5,40 | 5,38 | 5,41 | 5,43 | 5,40 | 5,43 | 5,43 | 5,43 | 5,44 | 5,45 | 5,49 | 5,35 | 5,26 |
| **HEATING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | | | | | | | |
| Total heating capacity | (3) | kW | 52,1 | 59,7 | 69,3 | 79,0 | 88,9 | 104 | 135 | 169 | 219 | 208 | 240 | 270 | 303 | 338 | 388 | 440 | 498 | 557 |
| Total power input | (3) | kW | 12,4 | 13,8 | 16,2 | 18,5 | 20,4 | 23,9 | 31,0 | 38,4 | 49,9 | 47,7 | 54,7 | 61,8 | 69,2 | 76,8 | 88,4 | 99,6 | 113 | 126 |
| COP | (3) | kW/kW | 4,20 | 4,33 | 4,28 | 4,27 | 4,36 | 4,37 | 4,35 | 4,40 | 4,39 | 4,36 | 4,38 | 4,37 | 4,38 | 4,40 | 4,39 | 4,41 | 4,41 | 4,42 |
| **HEATING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | | | | | | | |
| Total heating capacity | (2)(3) | kW | 52,4 | 60,0 | 69,6 | 79,4 | 89,3 | 105 | 136 | 170 | 220 | 209 | 241 | 271 | 305 | 339 | 390 | 442 | 500 | 559 |
| COP | (2)(3) | kW/kW | 4,10 | 4,23 | 4,19 | 4,18 | 4,26 | 4,27 | 4,25 | 4,30 | 4,29 | 4,27 | 4,29 | 4,28 | 4,30 | 4,31 | 4,31 | 4,33 | 4,33 | 4,34 |
| **COOLING WITH TOTAL HEAT RECOVERY** | | | | | | | | | | | | | | | | | | | | |
| Cooling capacity | (4) | kW | 40,4 | 46,7 | 54,1 | 61,7 | 69,7 | 82,0 | 106 | 133 | 172 | 163 | 188 | 212 | 238 | 266 | 305 | 346 | 392 | 438 |
| Total power input | (4) | kW | 12,4 | 13,8 | 16,2 | 18,5 | 20,4 | 23,9 | 31,0 | 38,4 | 49,9 | 47,7 | 54,7 | 61,8 | 69,2 | 76,8 | 88,4 | 99,6 | 113 | 126 |
| Recovery heat exchanger capacity | (4) | kW | 52,1 | 59,7 | 69,3 | 79,0 | 88,9 | 104 | 135 | 169 | 219 | 208 | 240 | 270 | 303 | 338 | 388 | 440 | 498 | 557 |
| TER | | kW/kW | 7,46 | 7,71 | 7,62 | 7,61 | 7,77 | 7,80 | 7,75 | 7,85 | 7,83 | 7,79 | 7,82 | 7,80 | 7,83 | 7,86 | 7,84 | 7,89 | 7,88 | 7,90 |
| **SEASONAL EFFICIENCY IN HEATING (EN14825 VALUE)** | | | | | | | | | | | | | | | | | | | | |
| PDesign | (5) | kW | 62,2 | 71,1 | 82,8 | 94,4 | 106 | 125 | 162 | 202 | 262 | 248 | 289 | 325 | 360 | - | - | - | - | - |
| SCOP | (5) | | 5,71 | 5,88 | 5,93 | 5,74 | 5,79 | 5,79 | 5,73 | 5,72 | 5,76 | 5,80 | 5,65 | 5,78 | 5,93 | - | - | - | - | - |
| Performance ηs (Reg. 811/2013 UE) | (5) | % | 220 | 227 | 229 | 222 | 224 | 224 | 221 | 221 | 222 | 224 | 218 | 223 | 229 | - | - | - | - | - |
| Seasonal efficiency class (Regulation (UE) 811/2013) | (5) | | A++ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **EXCHANGERS** | | | | | | | | | | | | | | | | | | | | |
| **HEAT EXCHANGER USER SIDE IN REFRIGERATION** | | | | | | | | | | | | | | | | | | | | |
| Water flow | (1) | m³/h | 2,31 | 2,66 | 3,09 | 3,51 | 3,96 | 4,64 | 6,06 | 7,54 | 9,79 | 9,24 | 10,72 | 12,16 | 13,58 | 15,08 | 17,35 | 19,69 | 22,26 | 24,86 |
| Pressure drop | (1) | | 28,4 | 25,6 | 25,0 | 28,7 | 31,9 | 33,8 | 39,1 | 42,4 | 44,0 | 41,7 | 44,1 | 43,7 | 43,0 | 43,9 | 43,7 | 44,2 | 45,6 | 44,0 |
| **HEAT EXCHANGER SOURCE SIDE IN REFRIGERATION** | | | | | | | | | | | | | | | | | | | | |
| Water flow | (1) | m³/h | 0,85 | 0,97 | 1,13 | 1,28 | 1,45 | 1,70 | 2,22 | 2,76 | 3,58 | 3,38 | 3,93 | 4,45 | 4,97 | 5,52 | 6,35 | 7,20 | 8,17 | 9,15 |
| Pressure drop | (1) | kPa | 3,79 | 3,42 | 3,32 | 3,85 | 4,26 | 4,53 | 5,25 | 5,68 | 5,89 | 5,60 | 5,91 | 5,85 | 5,77 | 5,89 | 5,86 | 5,91 | 6,15 | 5,97 |
| **HEAT EXCHANGER SOURCE SIDE IN HEATING** | | | | | | | | | | | | | | | | | | | | |
| Water flow | (3) | m³/h | 2,51 | 2,88 | 3,35 | 3,82 | 4,29 | 5,04 | 6,51 | 8,15 | 10,57 | 10,05 | 11,56 | 13,04 | 14,64 | 16,30 | 18,74 | 21,22 | 24,04 | 26,88 |
| Pressure drop | (3) | kPa | 33,5 | 30,1 | 29,3 | 34,0 | 37,5 | 39,8 | 45,1 | 49,5 | 51,2 | 49,3 | 51,3 | 50,2 | 50,0 | 51,3 | 51,0 | 51,4 | 53,2 | 51,5 |
| **HEAT EXCHANGER USER SIDE IN HEATING** | | | | | | | | | | | | | | | | | | | | |
| Water flow | (4) | m³/h | 1,38 | 1,60 | 1,85 | 2,11 | 2,38 | 2,80 | 3,61 | 4,53 | 5,88 | 5,58 | 6,43 | 7,24 | 8,14 | 9,07 | 10,42 | 11,82 | 13,39 | 14,98 |
| Pressure drop | (4) | kPa | 10,1 | 9,25 | 8,95 | 10,4 | 11,5 | 12,3 | 13,9 | 15,3 | 15,8 | 15,2 | 15,8 | 15,5 | 15,5 | 15,9 | 15,8 | 15,9 | 16,5 | 16,0 |
| **COMPRESSORS** | | | | | | | | | | | | | | | | | | | | |
| Compressors nr. | | N° | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| No. Circuits | | N° | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| **NOISE LEVEL** | | | | | | | | | | | | | | | | | | | | |
| Noise Pressure | (6) | dB(A) | 42 | 43 | 43 | 43 | 44 | 45 | 46 | 47 | 48 | 54 | 55 | 56 | 57 | 58 | 59 | 59 | 59 | 59 |
| Sound power level in cooling | (7)(8) | dB(A) | 73 | 74 | 74 | 74 | 75 | 76 | 77 | 78 | 79 | 86 | 87 | 88 | 89 | 90 | 91 | 91 | 91 | 91 |
| Sound power level in heating | (7)(9) | dB(A) | 73 | 74 | 74 | 74 | 75 | 76 | 77 | 78 | 79 | 86 | 87 | 88 | 89 | 0 | 0 | 0 | 0 | 0 |
| **SIZE AND WEIGHT** | | | | | | | | | | | | | | | | | | | | |
| Length | (10) | mm | 1220 | 1220 | 1220 | 1220 | 1220 | 1220 | 1220 | 1220 | 1220 | 2560 | 2560 | 2560 | 2560 | 2560 | 2560 | 2560 | 2560 | 2560 |
| Width | (10) | mm | 877 | 877 | 877 | 877 | 877 | 877 | 877 | 877 | 877 | 891 | 891 | 891 | 891 | 891 | 891 | 891 | 891 | 891 |
| Height | (10) | mm | 1496 | 1496 | 1496 | 1496 | 1496 | 1496 | 1496 | 1496 | 1496 | 1810 | 1810 | 1810 | 1810 | 1810 | 1810 | 1810 | 1810 | 1810 |
| Operating weight | (10) | kg | 450 | 470 | 490 | 505 | 525 | 550 | 745 | 825 | 910 | 975 | 1165 | 1365 | 1445 | 1610 | 1710 | 1810 | 1895 | 2000 |

Note

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C.
2 Values in compliance with EN14511-3:2011.
3 Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.
4 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Plant (side) heat exchanger water (in/out) 40°C/45°C.
5 Seasonal space heating energy efficiency class LOW TEMPERATURE in AVERAGE climate conditions [REGULATION (UE) N. 811/2013]
6 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
7 Sound power on the basis of measurements made in compliance with ISO 9614.
8 Sound power level in cooling, outdoors.
9 Sound power level in heating, outdoors.
10 Unit in standard configuration/execution, without optional accessories

**The units highlighted in this publication contain HFC R134a [GWP100 1430] fluorinated greenhouse gases.**

# ERACS2-WQ

| ERACS2-WQ | | | 0802 | 1002 | 1102 | 1302 | 1502 | 1702 | 1902 | 2152 | 2502 | 2602 | 2702 | 3202 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Power supply | | V/ph/Hz | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 |
| **PERFORMANCE** | | | | | | | | | | | | | | |
| **COOLING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | |
| Cooling capacity | (1) | kW | 189 | 234 | 268 | 318 | 363 | 424 | 468 | 542 | 633 | 686 | 763 | 870 |
| Total power input | (1) | kW | 35,7 | 44,9 | 50,6 | 59,7 | 68,7 | 80,2 | 89,7 | 98,8 | 116 | 125 | 140 | 160 |
| EER | (1) | kW/kW | 5,31 | 5,22 | 5,30 | 5,32 | 5,29 | 5,29 | 5,21 | 5,48 | 5,46 | 5,48 | 5,44 | 5,44 |
| **COOLING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | |
| Cooling capacity | (1)(2) | kW | 189 | 233 | 267 | 317 | 362 | 422 | 467 | 541 | 632 | 685 | 761 | 867 |
| EER | (1)(2) | kW/kW | 5,19 | 5,09 | 5,15 | 5,20 | 5,18 | 5,15 | 5,13 | 5,40 | 5,35 | 5,39 | 5,34 | 5,31 |
| **HEATING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | |
| Total heating capacity | (3) | kW | 205 | 255 | 291 | 344 | 393 | 459 | 514 | 589 | 686 | 738 | 831 | 941 |
| Total power input | (3) | kW | 45,7 | 56,9 | 65,8 | 76,3 | 86,9 | 103 | 117 | 128 | 148 | 158 | 180 | 205 |
| COP | (3) | kW/kW | 4,49 | 4,48 | 4,43 | 4,51 | 4,52 | 4,44 | 4,41 | 4,59 | 4,62 | 4,68 | 4,63 | 4,60 |
| **HEATING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | |
| Total heating capacity | (2)(3) | kW | 206 | 256 | 293 | 346 | 394 | 461 | 515 | 590 | 688 | 740 | 834 | 944 |
| COP | (2)(3) | kW/kW | 4,42 | 4,40 | 4,33 | 4,42 | 4,44 | 4,35 | 4,35 | 4,54 | 4,55 | 4,62 | 4,56 | 4,52 |
| **COOLING WITH TOTAL HEAT RECOVERY** | | | | | | | | | | | | | | |
| Cooling capacity | (4) | kW | 162 | 201 | 229 | 272 | 311 | 362 | 404 | 468 | 547 | 589 | 662 | 748 |
| Total power input | (4) | kW | 45,7 | 56,9 | 65,8 | 76,3 | 86,9 | 103 | 117 | 128 | 148 | 158 | 180 | 205 |
| Recovery heat exchanger capacity | (4) | kW | 205 | 255 | 291 | 344 | 393 | 459 | 514 | 589 | 686 | 738 | 831 | 941 |
| TER | | kW/kW | 8,05 | 8,01 | 7,91 | 8,08 | 8,10 | 7,94 | 7,88 | 8,24 | 8,31 | 8,43 | 8,32 | 8,26 |
| **SEASONAL EFFICIENCY IN HEATING (EN14825 VALUE)** | | | | | | | | | | | | | | |
| PDesign | (5) | kW | 249 | 309 | 353 | 418 | - | - | - | - | - | - | - | - |
| SCOP | (5) | | 5,59 | 5,56 | 5,18 | 5,45 | - | - | - | - | - | - | - | - |
| Performance ηs (Reg. 811/2013 UE) | (5) | % | 216 | 214 | 199 | 210 | - | - | - | - | - | - | - | - |
| Seasonal efficiency class | | | - | - | - | - | - | - | - | - | - | - | - | - |
| (Regulation (UE) 811/2013) | (5) | | | | | | | | | | | | | |
| PDesign | (6) | kW | 220 | 274 | 315 | 368 | - | - | - | - | - | - | - | - |
| SCOP | (6) | | 4,33 | 4,46 | 3,97 | 4,26 | - | - | - | - | - | - | - | - |
| Performance ηs (Reg. 811/2013 UE) | (6) | % | 165 | 170 | 151 | 162 | - | - | - | - | - | - | - | - |
| Seasonal efficiency class | | | - | - | - | - | - | - | - | - | - | - | - | - |
| (Regulation (UE) 811/2013) | (6) | | | | | | | | | | | | | |
| **EXCHANGERS** | | | | | | | | | | | | | | |
| **HEAT EXCHANGER USER SIDE IN REFRIGERATION** | | | | | | | | | | | | | | |
| Water flow | (1) | m³/h | 9,06 | 11,20 | 12,82 | 15,20 | 17,38 | 20,28 | 22,37 | 25,92 | 30,29 | 32,82 | 36,50 | 41,61 |
| Pressure drop | (1) | kPa | 27,6 | 34,9 | 46,8 | 40,4 | 36,5 | 47,1 | 27,2 | 25,5 | 34,8 | 29,0 | 35,9 | 46,7 |
| **HEAT EXCHANGER SOURCE SIDE IN REFRIGERATION** | | | | | | | | | | | | | | |
| Water flow | (1) | m³/h | 3,34 | 4,14 | 4,73 | 5,61 | 6,41 | 7,49 | 8,28 | 9,52 | 11,13 | 12,05 | 13,42 | 15,29 |
| Pressure drop | (1) | kPa | 3,76 | 4,78 | 6,38 | 5,50 | 4,98 | 6,42 | 3,73 | 3,44 | 4,70 | 3,92 | 4,85 | 6,31 |
| **HEAT EXCHANGER SOURCE SIDE IN HEATING** | | | | | | | | | | | | | | |
| Water flow | (3) | m³/h | 9,91 | 12,30 | 14,06 | 16,61 | 18,96 | 22,17 | 24,79 | 28,41 | 33,12 | 35,60 | 40,13 | 45,40 |
| Pressure drop | (3) | kPa | 33,1 | 42,1 | 56,3 | 48,3 | 43,5 | 56,3 | 33,4 | 30,7 | 41,6 | 34,2 | 43,4 | 55,6 |
| **HEAT EXCHANGER USER SIDE IN HEATING** | | | | | | | | | | | | | | |
| Water flow | (4) | m³/h | 5,55 | 6,88 | 7,83 | 9,31 | 10,63 | 12,37 | 13,80 | 16,00 | 18,67 | 20,14 | 22,63 | 25,57 |
| Pressure drop | (4) | kPa | 10,4 | 13,2 | 17,5 | 15,2 | 13,7 | 17,5 | 10,4 | 9,72 | 13,2 | 10,9 | 13,8 | 17,6 |
| **COMPRESSORS** | | | | | | | | | | | | | | |
| Compressors nr. | | N° | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| No. Circuits | | N° | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| **NOISE LEVEL** | | | | | | | | | | | | | | |
| Noise Pressure | (7) | dB(A) | 62 | 63 | 65 | 65 | 65 | 65 | 65 | 66 | 67 | 67 | 67 | 67 |
| Sound power level in cooling | (8)(9) | dB(A) | 94 | 95 | 97 | 97 | 97 | 97 | 97 | 98 | 99 | 99 | 99 | 99 |
| Sound power level in heating | (8)(10) | dB(A) | 94 | 95 | 97 | 97 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SIZE AND WEIGHT** | | | | | | | | | | | | | | |
| Length | (11) | mm | 3680 | 3680 | 3680 | 3680 | 3680 | 3680 | 3800 | 3800 | 3800 | 5000 | 5000 | 5000 |
| Width | (11) | mm | 1170 | 1170 | 1170 | 1170 | 1170 | 1170 | 1490 | 1490 | 1490 | 1490 | 1490 | 1490 |
| Height | (11) | mm | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 | 2050 | 2050 | 2050 |
| Operating weight | (11) | kg | 2420 | 2470 | 2880 | 3580 | 3690 | 3750 | 4920 | 5310 | 5730 | 6470 | 6590 | 7370 |

Note

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C.
2 Values in compliance with EN14511-3:2011.
3 Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.
4 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Plant (side) heat exchanger water (in/out) 40°C/45°C.
5 Seasonal space heating energy efficiency class LOW TEMPERATURE in AVERAGE climate conditions [REGULATION (UE) N. 811/2013]
6 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
7 Sound power on the basis of measurements made in compliance with ISO 9614.
8 Sound power level in cooling, outdoors.
9 Sound power level in heating, outdoors.
10 Unit in standard configuration/execution, without optional accessories

**The units highlighted in this publication contain HFC R134a [GWP100 1430] fluorinated greenhouse gases.**

# INTEGRA INVERTER - CASE STUDY

## London - Mixed-use building

## The project

Plant renovation of a multifunctional complex in London.

The building is composed of 7 floors of over 1488 m² each and has both areas for commercial activities and offices.

The HVAC system is a 4-pipe system.

A comparison of the different systems solutions:

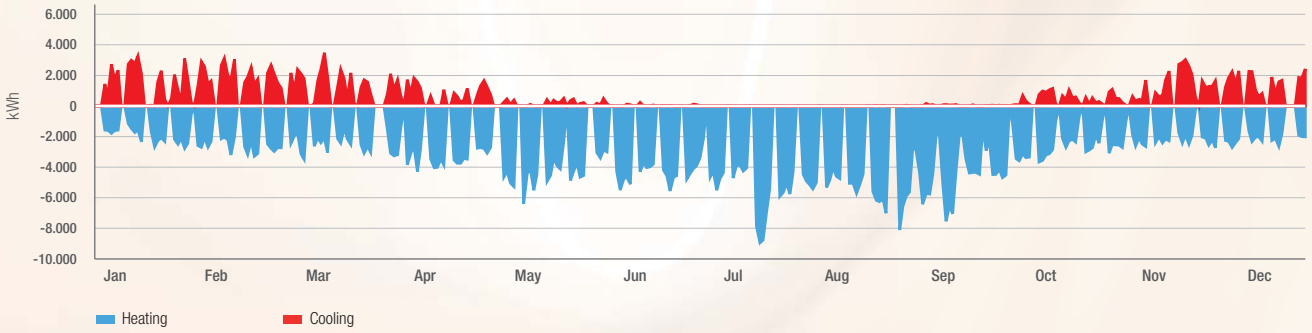
| Solution | Cooling | Heating |
|---|---|---|
| 1. Traditional system (high efficiency chiller + boiler) | FOCS2 SL-CA 2602 | Gas boiler |
| 2. INTEGRA fixed speed solution | ERACS2-Q SL-CA 2422 | |
| 3. INTEGRA full inverter solution | i-FX-Q2 SL-CA 0602 | |

## Heating loads and units considered

**Maximum power used for sizing:**
Cooling: 509 kW – Set point: 7°C
Heating: 476 kW – Set point: 45°C

**Operating methods in the analysis:**
In operation from 9:00 to 19:00, Monday to Friday.

Daily heating loads



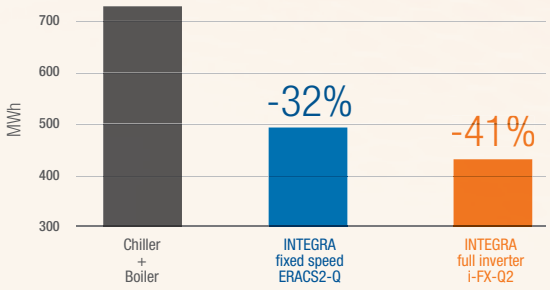
The new INTEGRA inverter units, thanks to their ability to continuously modulate the compressors speed, and their use of special control logic, allow the unit to satisfy the demands of the plant reaching unbeatable efficiencies.

# Results

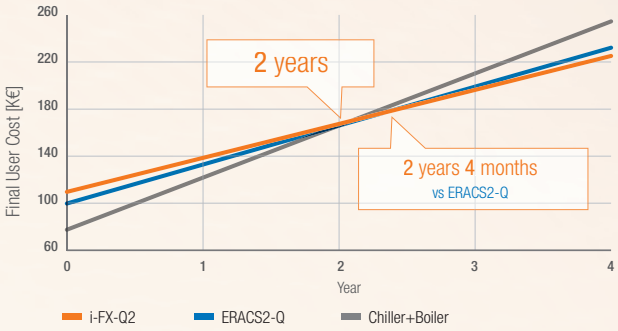
## Comparison between traditional system and INTEGRA solutions

Assuming the cost of electricity is equal to 0,15 € / kWh and the cost of natural gas is 0,42 €/m³, both INTEGRA solutions are much more efficient than a traditional HVAC plant of chiller + boiler.
The consumption of primary energy is reduced by more than 1/3, allowing the return on investment in about two years for both solutions.

### Primary energy



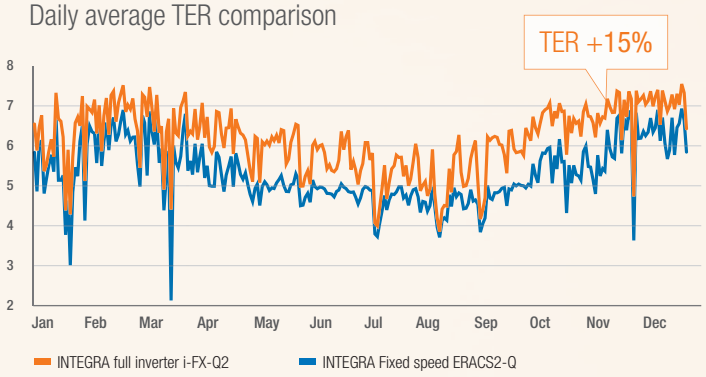

### Payback




## Comparison between INTEGRA Full inverter and INTEGRA Fixed speed solutions

The variable speed drive technology (VSD) applied to INTEGRA i-FX-Q2 allows an average annual increase of 15% TER and then a payback of 2 years and 4 months with respect to the INTEGRA fixed speed solution.

### Daily average TER comparison




## At a glance

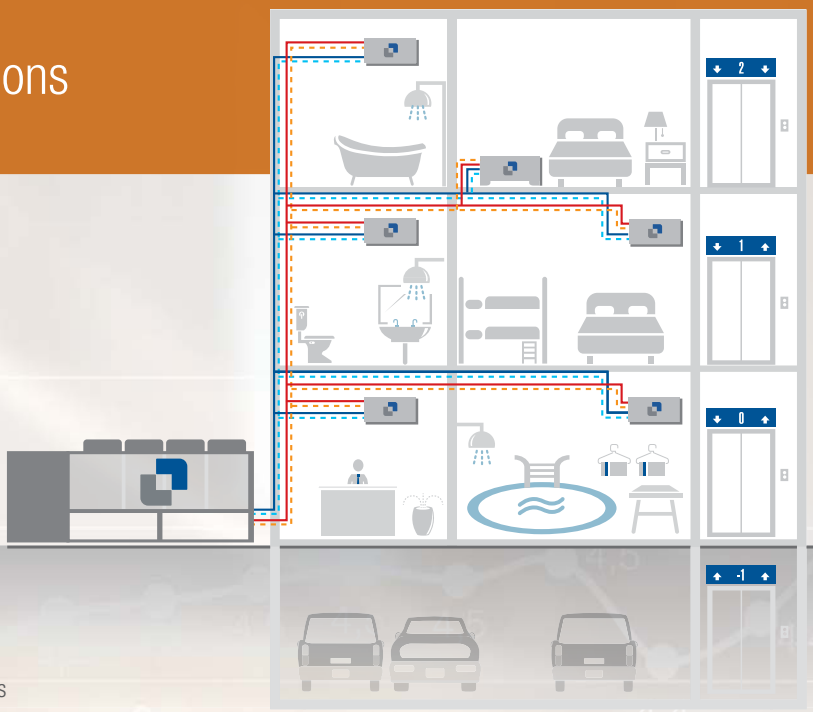
| | Reduction of primary energy* | Reduction of $CO_2$ emissions* | Payback* |
|---|---|---|---|
| **INTEGRA full inverter i-FX-Q2** | 298.046 kWh | 61.338 Kg = 1 car that runs 360.800 km | 2 years |
| **INTEGRA fixed speed ERACS2-Q** | 235.564 kWh | 47.647 Kg = 1 car that runs 280.300 km | |

*Compared to the traditional chiller+boiler solution

# INTEGRA The versatile and multi-functional

## Comfort Applications

- Auto adaptability to variable loads
- Highest efficiency in all load conditions
- Plant simplification and reduction of technical spaces
- A gas network is no longer needed
- Smart management of thermal energy




Ideale in:

- Mixed-use buildings
- Residential applications
- Environments with complex and variable thermal loads
- Areas with large glass surfaces

To cool and simultaneously heat mixed-use environments is a frequent trend in the building and constructions segment.
In these cases, the use of a smart INTEGRA heat pumps is key for producing hot and cold water simultaneously and independently, matching any kind of load combinations whilst ensuring optimal comfort and highest energy efficiency all year long.

## IT Cooling

INTEGRA heat pumps are ideal solutions for mixed-use buildings featuring variable thermal and cooling capacities.

In a typical IT Cooling application with a data center located within an office building, INTEGRA heat pumps are the perfect solution to recover the thermal energy of IT equipment and transfer it to other office areas nearby.

The thermal energy can therefore be reused, turning it into a precious economic asset.

A forward-looking system that combines perfect comfort with zero energy waste, improving the energy class of the building and providing large annual energy savings.

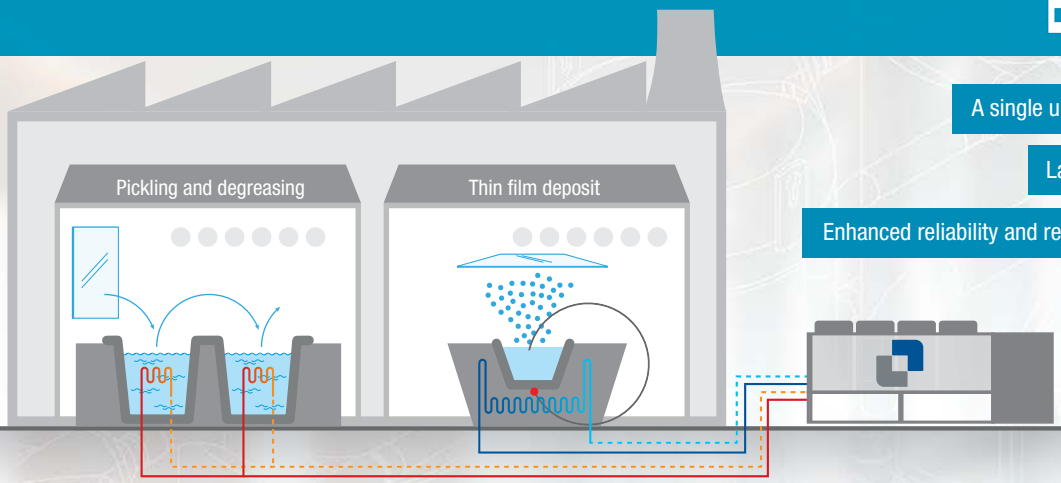
- Two in one unit
- Smart management of thermal energy
- Zero kW/h wasted

Ideal for:

- IT Rooms with offices connected
- Multifunctional spaces in combination with other Climaveneta units

# heat pump for all applications

## Industrial process




**A single unit for multiple uses**

**Large energy savings**

**Enhanced reliability and reduced maintenance**

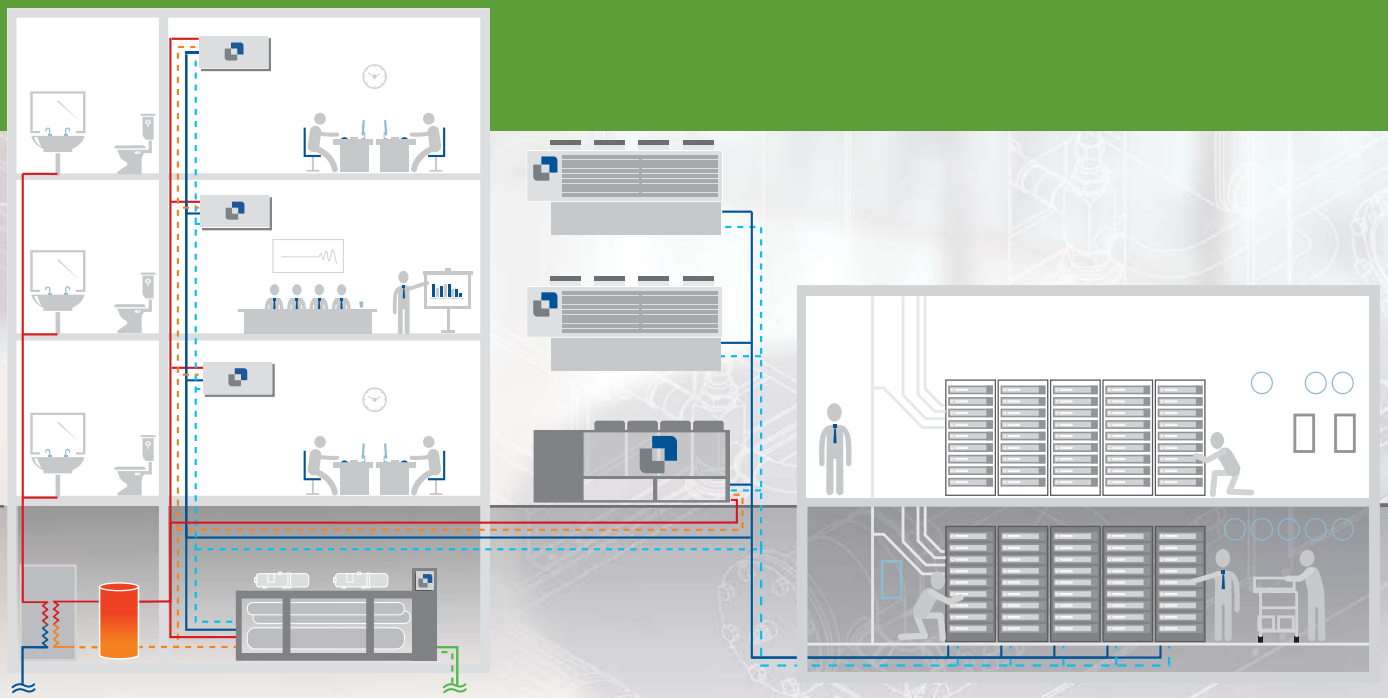
Most industrial applications are characterized by processes requiring simultaneous and variable heating and cooling. The capacity of INTEGRA to manage and efficiently balance both hot and cold loads allows you to respond to all the process requirements and those of the office spaces nearby, by means of one single heat pump.

☒The diagram above shows a typical industrial application of thin film deposit on surfaces, in particular in the process of mirror manufacturing. This process requires thermal energy during clean-up and preparation of the surfaces to be treated and cooling energy in the thin film deposition step.

INTEGRA is the ideal solution to meet both thermal demands, all by itself. All these advantages can be achieved without the installation of an auxiliary plant and with the guarantee of premium efficiency all year long.

Ideal for:

- ✔ Industrial processes that require cooling and heating
- ✔ Industrial complexes that need to be air-conditioned and that have adjacent offices



# +2P MODULE

78° HEATING

PATENTS PENDING

## **+2P**: an integrated module for the independent production of high temperature water (up to 78 ° C). From 70 to 279 kW

**+2P** it is the innovative solution for the production of high temperature water (up to 78 °C). Designed as a fully integrated module, **+2P** is installed inside the unit for support and grants efficiencies without compromise. The multipurpose heat pump with integrated **+2P** module is therefore able to satisfy, independently and simultaneously, 3 different thermal requirements at 3 different temperatures, without limiting operational flexibility.
Thanks to **+2P**, other supplementary sources will no longer be necessary for the production of high temperature water

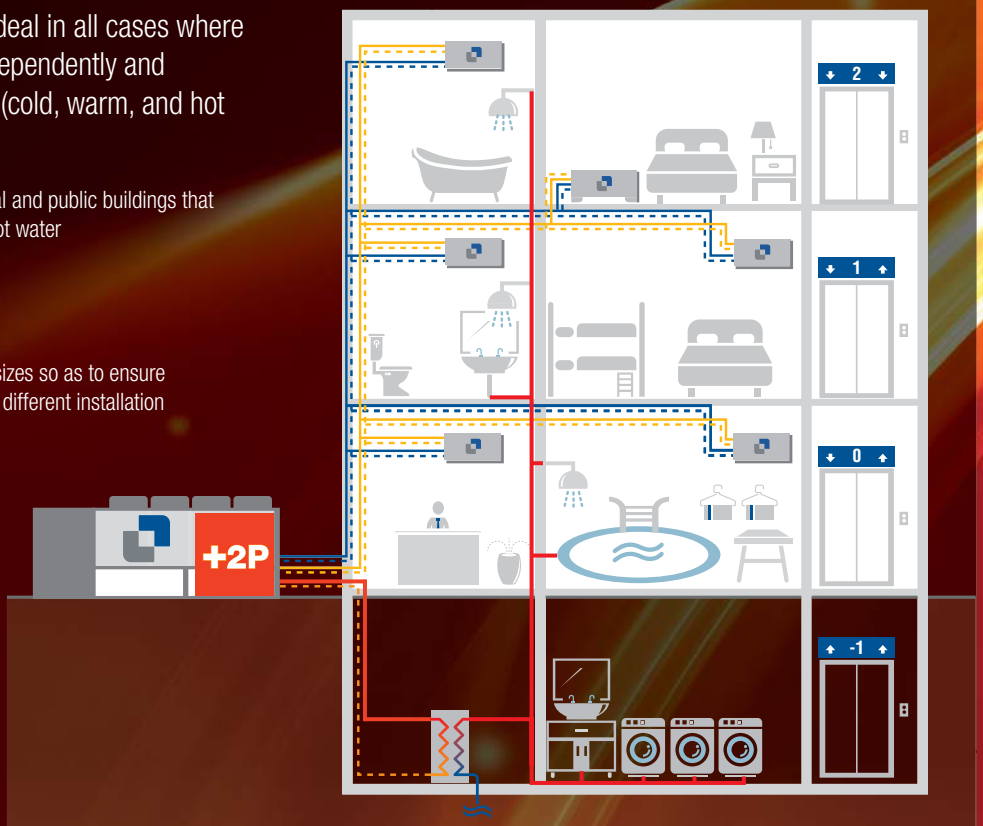
The INTEGRA **+2P** solution is ideal in all cases where there is the need to achieve independently and simultaneously 3 thermic loads (cold, warm, and hot water):

- centralized HVAC systems for residential and public buildings that require cooling, heating and sanitary hot water
- Hospitals/ Healthcare centres
- Hotels with laundry and spa facilities
- Industrial processes

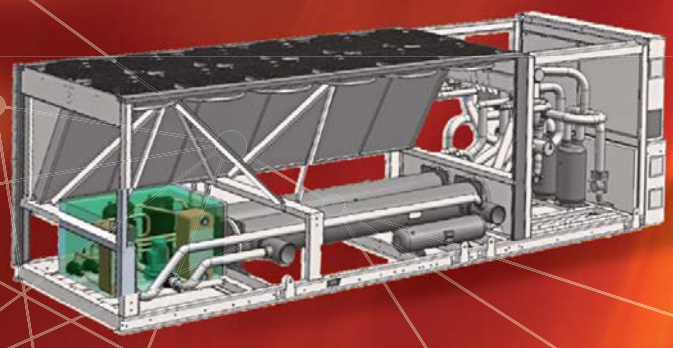
The **+2P** module is available in different sizes so as to ensure maximum flexibility and adaptability to the different installation requirements.

12/7 °C
40/45 °C
70/78 °C

Full independence of thermal flows




+2P MODULE is a two-circuit solution that ensures absolute reliability in operation and continuity of service.



| INTEGRA ERACS2-Q/SL-CA 3222 with **+2P** | COP **+2P** 200 kW | COP **+2P** 285 kW |
|---|---|---|
| Cold 12-7°C<br>Very Hot 65-75°C<br>External air temperature 30°C | 3,79 | 4,08 |
| Hot 40-45°C<br>Very hot 65-75°C<br>External air temperature 7°C | 2,34 | 2,43 |
| Cold 12-7°C<br>Hot 40-45°C<br>Very hot 65-75°C | 4,83 | 4,83 |
| VERY HOT only 65-75°C<br>External air temperature 7°C | 1,83 | 1,95 |

Efficiency values of the +2P module are calculated considering the 200kW size and the 285kW size, combined with a INTEGRA unit ERACS2Q/SL-CA (size 3222, nominal cooling capacity = 790kW, nominal thermal capacity= 815 kW)

# Case study: Retrofit of an Existing Plant

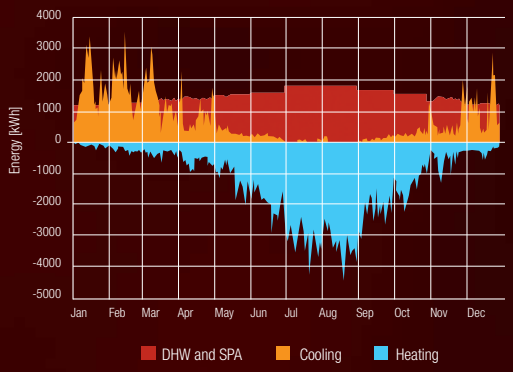
INTEGRA and **+2P**, module, together to improve system performance and increase efficiency.

## Project

Renewal of the thermal plant of an historic building converted into a hotel in the central coastal area of the Mediterranean Sea.

| | Set | Current | Retrofit |
|---|---|---|---|
| Cooling | 12/7°C | Air cooled chiller | INTEGRA +2P MODULE |
| Heating | 40/45°C | Gas Boiler | |
| DHW and SPA | 60/65°C | | |

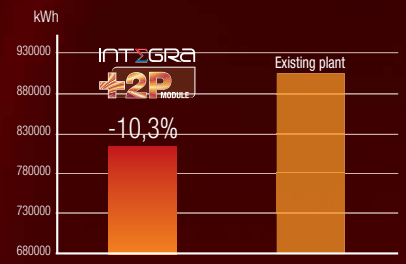
Termal Loads



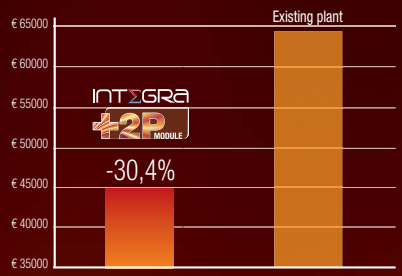

## Results

The use of integrated + 2P module allows you to achieve, with a single unit, 3 different thermal requirements, providing enhanced efficiencies and reduced costs with respect to the current plant, with annual savings of 30.4% and a reduction of 10.3% of primary energy consumption.

Primary energy consumption




Annual operating costs




Terms

| | |
|---|---|
| Seasonal efficiency of gas boiler | 85% |
| Fuel cost | 0,77 €/lt |
| Cost of Electricity Production | 0,12 €/kWh_el |
| Efficiency Electricity | 46% |

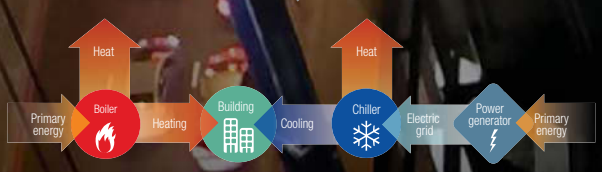
## At a Glance

| Primary Energy Consumption | Annual cost | Annual $CO_2$ emissions |
|---|---|---|
| -10,3% | -30,4% | -42,4% |

# “Experience is by far the best proof”

Sir Francis Bacon
British philosopher
(1561 - 1626)

## Traditional system based on chiller + boiler

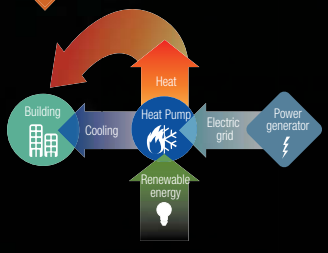



- 3 boilers for heating, total capacity 1380kW
- 2 air-cooled chillers, total capacity 2180 kW

VS

## VS New system based on smart heat pumps with heat recovery

- 1 ERACS2-Q/SL-CA/S air source heat pump providing heating and cooling
- 1x TECS2/SL-CAE/S air cooled chiller with magnetic levitation compressors
- 1x ClimaPRO system



# 350 Euston Road

London - Great Britain
2015

Application: Office buildings
Plant type: Hydronic System
Cooling capacity: 1022 kW
Heating capacity: 541 kW
Installed machines: 1x ERACS2-Q/SL-CA/S 2222, 1x TECS2/SL-CAE/S 0512, 1x ClimaPRO

## Project

350 Euston Road is a grade A seven-storey office building that forms part of Regent's Place, a 13 acre, fully managed estate in the heart of London. Owned by British Land and managed by Broadgate Estates, the building features the latest sustainable design for a lively mix of retail, leisure and public spaces.
In this high-demanding context, the replacement of the previous HVAC system was aimed to be in line with the energy targets established by the property owner.

## Case Study

In order to investigate the advantages of replacing a traditional HVAC system based on existing boilers and chillers with smart heat pumps with heat recovery, an official case study was conducted.
Starting from the energy analysis of the previous system, the data revealed that the building was characterized by a high cooling demand, even during the winter, together with a considerable overlap of heating and cooling requirements, as is frequently the case in office buildings.

## Solution

The units selected to serve the building's requirements were: one ERACS2-Q SLCA 2722 unit, from the INTEGRA range, and one TECS2/SL-CAE/S 0512 chiller with magnetic levitation compressors. The results of the study revealed that replacing existing old chillers and boilers with heat recovery heat pumps would lead to significant enhancements in terms of environmental, economic, and energy related aspects. After one year the new system has resulted in 218 less tons of $CO_2$ emissions and a reduction of primary energy consumption of around 50%, thus leading to an annual cost savings of 56000 €.

-32% Electric energy reduction

-218 tons

$CO_2$ Emissions reduction

56.000 €

Operating cost reduction

-46,8%

Primary energy reduction

-85%

Gas consumption reduction

# Gran Theatre de Rabat

Rabat - Morocco
2015 - 2018

**Application:** Theatres
**Plant type:** Hydronic System
**Cooling capacity:** 2500 kW
**Heating capacity:** 1786 kW
**Installed machines:** 2x NECS-Q 3218, 1x NECS/B 3218
**Architect:** Zaha Hadid


## Project

The futuristic building has been designed by ZahaHadidArchitects and its shape is inspired by the nearby BouregregRiver. The project, part of a national programmeof cultural development, includes a 1800-seat theatre, an open-air amphitheatrewith a capacity of 7,000 people, a second experimental performance / rehearsal spaces and a restaurant for 350 people.

## Challenge

To combine perfect internal comfort and high energy performance of the building, the HVAC system has been designed starting from Climaveneta high efficiency units: 2 multi-purpose heat pumps NECS-Q/B 3218 and 1 air cooled chiller NECS/B 3218.

## Solution

The system is so able to provide the ideal temperature and humidity level inside the building all year round, even producing simultaneous cooling and heating when necessary, thanks to the multi-purpose units installed. The system has a total cooling capacity of 2,500 kW, so granting an ideal temperature even in the Moroccan hot summers.

# AB Medica

Milan - Italy
2014

**Application:** Office buildings
**Cooling capacity:** 1250 kW
**Heating capacity:** 1144 kW
**Installed machines:** 1x ERACS2-WQ 3202 S, 1x ERACS2-Q 1762 XL-CA-E-S, 1x ClimaPRO

## Project

The work is almost finished on the new headquarters for AB MedicaSpA, specialisedin the production and marketing of medical technology, bio-materials and surgical devices.

## Challenge

The particular lot conformation and the constraints imposed by the highway have guided the design towards the triangular frame similar to a nautical hull that slides through artificial hills functioning as thermal and acoustic insulation. The building hasbeen given technologically advanced systems that exploit renewable energy associated with ground source water and air, representing the advantages of a Class A building.

## Solution

The energy analysis conducted on this building's plant system has led to the design of a heating and cooling system with a hybrid heat pump: a multi-purpose water condensed heat pump, ERACS2-WQ 3202 S, that exploits ground source water and a multi-purpose air condensed heat pump, ERACS2-Q 1762 XL-CA-E. Depending on the energy request by the building, the external air temperature and the resulting power plant efficiency, the control system activates one of the two heat pumps. The plant has beencompleted with the installation of ClimaPRO, the new management and optimisationsystem by Climaveneta, designed to minimiseenergy consumption and to simplify the maintenance of the central heating and cooling system.

# The New BNL
# Roma Tiburtina Headquarters

Rome - Italy
2015

**Application:** Office buildings
**Plant type:** Hydronic System
**Cooling capacity:** 5036 kW
**Heating capacity:** 4130 kW
**Installed machines:** 4x ERACS2-Q/SL-CA 3222 +2P MODULE
1x ERACS2-Q/SL-CA 3222, 1x FOCS2/SL-CA 3902
**Architect:** 5+1AA Alfonso Femia Gianluca Peluffo


## Project

The new BNL Headquarters, designed by 5+1AA Alfonso Femia Gianluca Peluffo, is located near the Rome Tiburtina high speed railroad station. The building – 67.000 sqm including 20.000 underground – is centered around employees well-being. It will provide 3.800 ergonomic workplaces and a vast rage of facilities for employees including gym, service center, nursery school, restaurants.

## Challenge

BNL Rome Tiburtina fits well in the urban context where the building is located, and combines the values of environmental, economical and social sustainability.

## Solution

To satisfy with utmost efficiency the heating and cooling needs of the buildings, the HVAC designer selected 5 Climaveneta INTEGRA multiuse ERACS2-Q 3.222 units, 4 of which equipped with +2P MODULE (a patented solution with 2 additional pipes for hot water for domestic usage at temperatures up to 80°C) and 1 Super Low noise version, Class A Efficiency FOCS2/SL-CA chiller.

# Botswana Innovation Hub

Gaborone - Botswana
2015

**Application:** Office Building
**Cooling capacity:** 2803 kW
**Heating capacity:** 2133 kW
**Installed machines:** 3x ERACS2-Q XL-CA 2722, 1x i-FX (1+i) CA 2722, 1x ClimaPRO

## Project

Botswana Innovation Hub is strategically located, near the Sir Seretse Khama International Airport in Gaborone, Botswana's capital city and center of business activities in the country. The new development, an area of 57 hectares, will serve as a magnet for technology and business and will be able to compete on the global market.

## Challenge

The building is designed to conserve energy and be as efficient as possible. The project of the Innovation Hub in Botswana includes large roof overhangs created specifically to bring shade to interior spaces, mechanisms for the collection and reuse of water, and both active and passive solar systems to harness solar energy.

## Solution

The air-conditioning system is based on three INTEGRA units: ERACS2-Q XL-CA 2722 and 1 chiller with high efficiency air condensed air cooled i-FX (1+i) CA 2722. The whole is system is managed and optimized by ClimaPRO, the new Climaveneta controller, able to actively optimize the entire refrigeration system through the management and control of each component directly involved in the production and distribution of thermal loads.

# More than 1000 projects all over the world

Ministry of Science
2016 Buenos Aires – Argentina

**Application:**
Office buildings

**Cooling capacity:** 850 kW

**Heating capacity:** 868 kW

**Installed machines:**
2x ERACS2-Q/CA 1962

Inditex Logistical Platform
2014 Cabanillas del Campo - Spain

**Application:**
Industrial process

**Cooling capacity:** 3030 kW

**Heating capacity:** 1084 kW

**Installed machines:**
1x ERACS2-Q/CA 1162,
1xERACS2-Q/CA 3222, 2xFOCS2/CA 4202

Kinetic
2015 Boulogne – France

**Certifications:**
BREEAM Excellent

**Application:**
Mixed-Use Development

**Cooling capacity:** 1200 kW

**Installed machines:**
2x ERACS-Q/SL 2722

SKF Argentina
2014 Tortuguitas - Argentina

**Application:**
Tools & machinery

**Cooling capacity:** 1042 kW

**Heating capacity:** 1056 kW

**Installed machines:** 2x NECS-Q 1816,
2x AX 26 Close Control Units,
9x WIZARD

Fondazione Prada
2015 Milan - Italy

**Application:**
Museums

**Cooling capacity:** 3625 kW

**Heating capacity:** 3834 kW

**Installed machines:**
4x ERACS2/WQ 3202, 1x ClimaPRO,
1x EW-HT 0152, 2x NECS-W 0262

CDC Canberra Data center
2015 Canberra - Australia

**Application:** Data Center

**Cooling capacity:** 3975 kW

**Heating capacity:** 496 kW

**Machines installed:**
2x FX-FC-NG-SL 5204,
2x ERACS2-Q 1162 SL CA,
1x FX-FC-NG-SL 5402

Every project is characterized by different usage conditions and system specifications for many different latitudes. All these projects share high energy efficiency, maximum integration, and total reliability due to the unique experience of Climaveneta branded solutions.

Shanghai Institute of Technical Physics
2013 Shanghai - China

**Application:** Schools and Universities

**Cooling capacity:** 3880 kW

**Heating capacity:** 4250 kW

**Machines installed:** 3x smart heat pumps for heating and cooling, 3x reversible air cooled heat pumps

Amazon Logistic Hub
2013 Piacenza – Italy

**Investor:** Amazon

**Application:** Industrial process

**Cooling capacity:** 3980 kW

**Heating capacity:** 4126 kW

**Installed machines:** 3x ERACS2-Q 3222, 2x FOCS-N/CA 3222, 1x ClimaPRO

IBM Headquarters - Chile
2009 Santiago - Chile

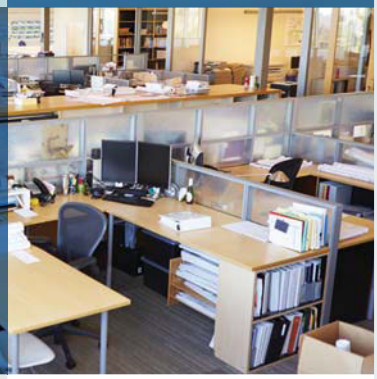
**Investor:** IBM

**Application:** Offices

**Cooling capacity:** 1687 kW

**Heating capacity:** 1821 kW

**Installed machines:** 2x ERACS-Q/B 1762, 3x ERACS-Q/B 1562



Palais de l'Europe
2013 Strasbourg - France

**Application:** Institutions

**Plant type:** Hydronic System

**Cooling capacity:** 9952 kW

**Heating capacity:** 3764 kW

**Installed machines:** 4x ERACS2-WQ 3202, 4x TECS2-W/HC H 1614

Universo Group
2014 Neuchatel - Switzerland

**Investor:** Universo - Swatch Group
**Application:** Office building
**Cooling capacity:** 1208 kW
**Heating capacity:** 1230 kW
**Installed machines:** 3x ERACS2-WQ 2152 with VPF-D system, 3x ERACS2-WQ 1902 with VPF-D system, 2x Manager 3000

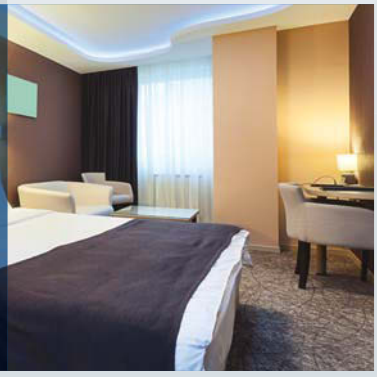
PCC Marriott Hotel
2015 Austria

**Application:** Hotel

**Cooling capacity:** 1672 kW

**Heating capacity:** 1175 kW

**Machines installed:** 1x ERACS2-WQ 2702, 1x NECS-WQ 1204, 1x FOCS3-W 2101



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