DX FREE-COOLING

HEAT RECLAIM

WASTED ENERGY SERIOUSLY HARMS THE ENVIRONMENT

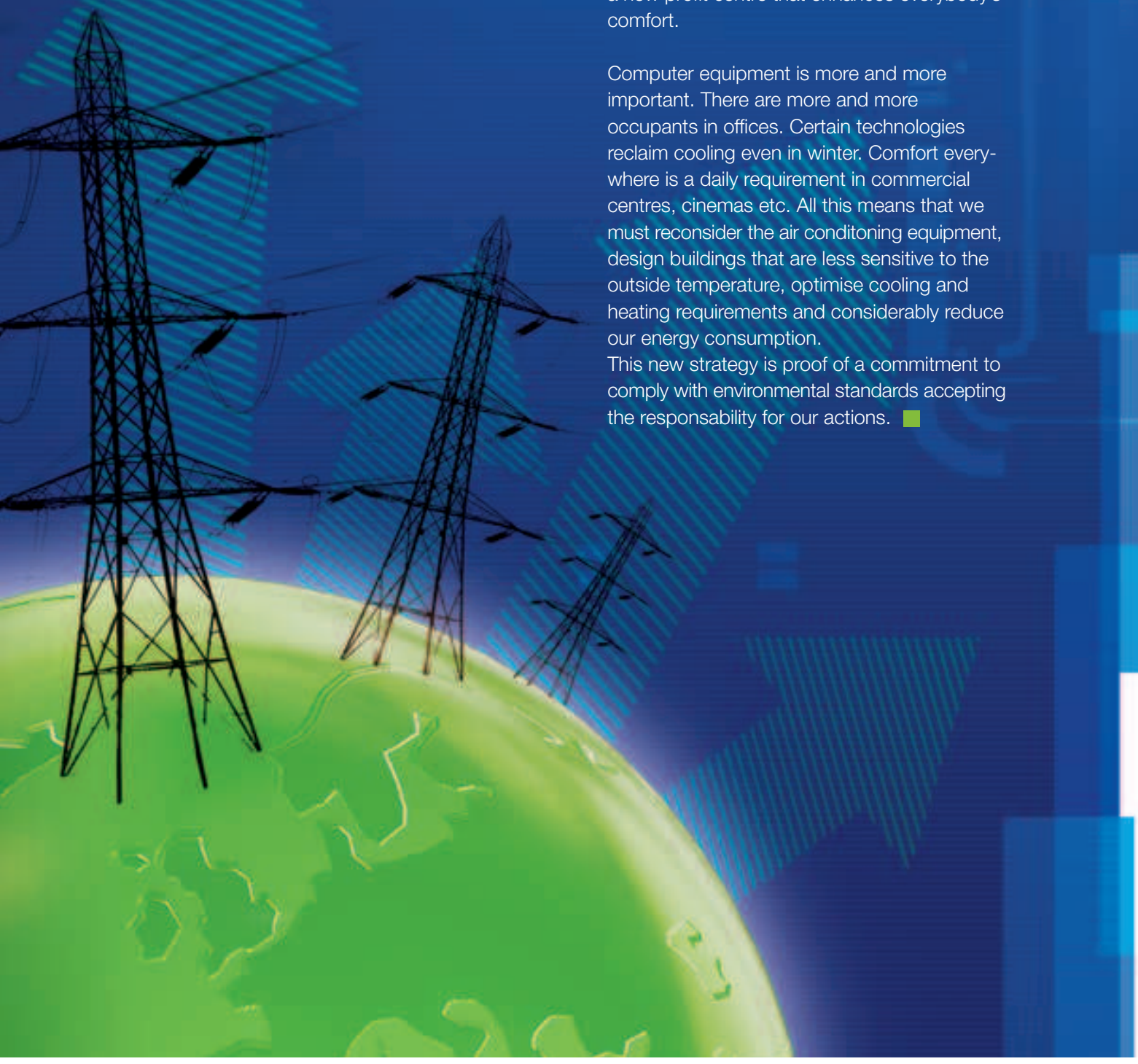
Responsible actions
A lasting strategy

Wasting energy means contributing to the inevitable consequences of the irreversible pollution of our planet, of the environment and of our eco system.
Remembering that electricity production generates greenhouse gases such as CO_2 but also nitrogen oxyde, means understanding the vital necessity to act quickly in order to find carefully considered and lasting solutions.
Better energy use means finding a responsible attitude towards the environment - a simple gesture, a natural reflex for future generations.

Reduced CO_2 emissions to the atmosphere, now it is possible

Using less energy and committing to the dynamics of progress means making savings, a new profit centre that enhances everybody's comfort.

Computer equipment is more and more important. There are more and more occupants in offices. Certain technologies reclaim cooling even in winter. Comfort everywhere is a daily requirement in commercial centres, cinemas etc. All this means that we must reconsider the air conditoning equipment, design buildings that are less sensitive to the outside temperature, optimise cooling and heating requirements and considerably reduce our energy consumption.
This new strategy is proof of a commitment to comply with environmental standards accepting the responsability for our actions.



Why not use the outside temperature to cool the circuit water naturally

Traditional hydronic FREE-COOLING systems are designed for technical applications: IT rooms, telephone exchanges etc. that are characterised by a constant cooling requirement - summer and winter.

These systems that are designed for specific applications are used in commercial buildings and require the use of a water/glycol solution, oversized circulation pumps, reduced energy efficiency outside the free-cooling operating period and increased investment cost.

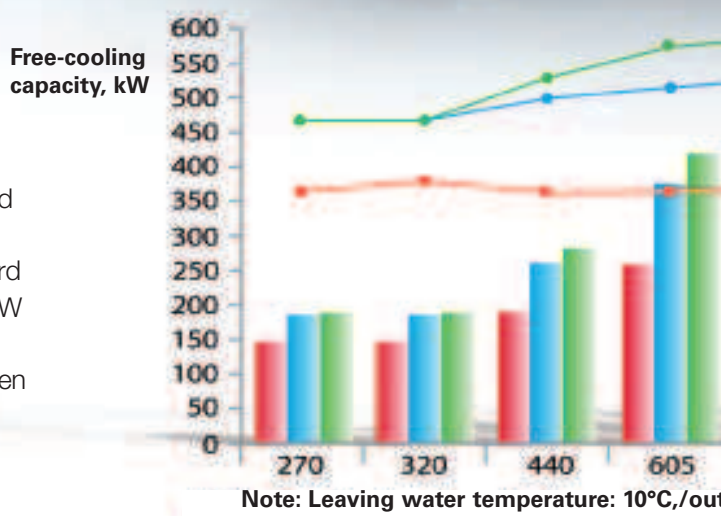
CARRIER REINVENTS COMFORT FREE-COOLING

A simple principle, patented by CARRIER and unique world-wide - a refrigeration cycle without compressors where only a circulation mini-pump and the fans ensure water cooling. In the evaporator, the water circulating in the building gives up its heat to the refrigerant that evaporates. These vapours rejoin the condenser directly without passing through the compressor.
In this heat exchanger the liquid refrigerant gives up its heat to the cold outside air and returns from the vapour status to the liquid status. A circulation mini-pump ensures the return of the liquid refrigerant to the evaporator and allows the refrigeration cycle to repeat.
The cooling capacity is controlled by the opening of the expansion device that regulates the amount of refrigerant entering the evaporator. The PRO-DIALOG control automatically manages the changeover from mechanical cooling to free-cooling and vice versa. The control algorithms continuously compare the cooling capacity available in FREE-COOLING with the thermal load of the building and stop the compressors, if the capacity is sufficient or restart them, if this is not the case.
This guarantees comfort conditions inside the building while realising energy savings.

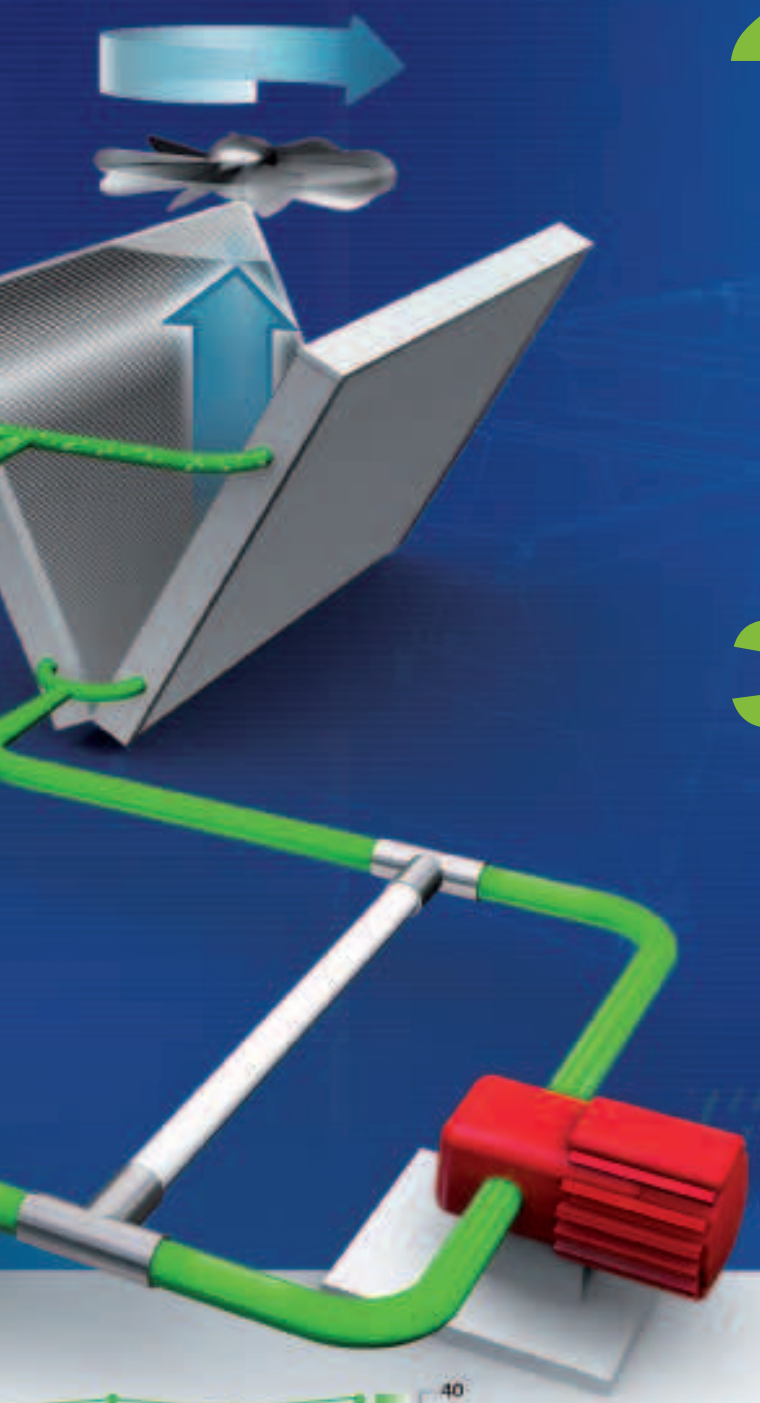
DX FREE-COOLING
A NATURAL INNOVATION TO BENEFIT THE PLANET

1 ENERGY SAVINGS

During DX FREE-COOLING operation, the compressors are stopped, and only the fans and the circuation mini-pump work.
The energy efficiency of the chiller reaches record values: up to 24 kW cooling capacity for only 1 kW power consumption - that is six times more than with the compressors (for a 10 K difference between the ambient air temperature and the leaving chilled-water temperature).



Note: Leaving water temperature: 10°C,/out

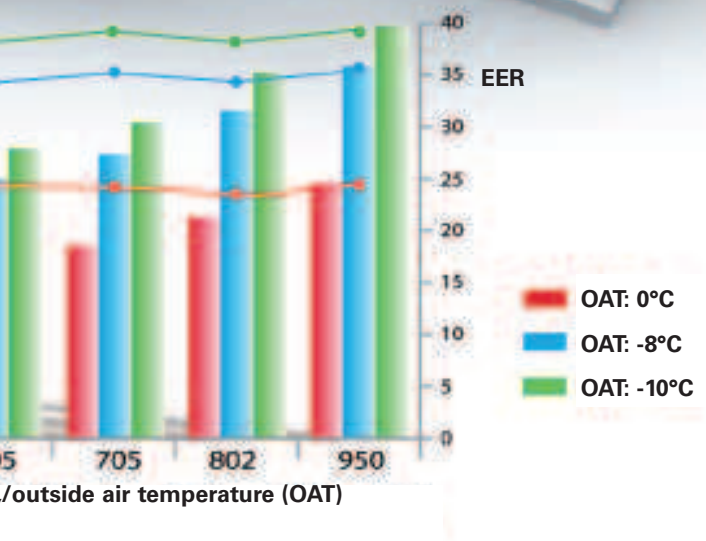


2 OPTIMISED INVESTMENT

Compared to hydronic free-cooling, the investment is lower and the return on investment is faster. Plus: The DX FREE-COOLING system does not require any additional floor space and is factory-assembled and tested to facilitate the assembly for the installer and save time - thus optimising installation cost.

3 MINIMISED MAINTENANCE COST

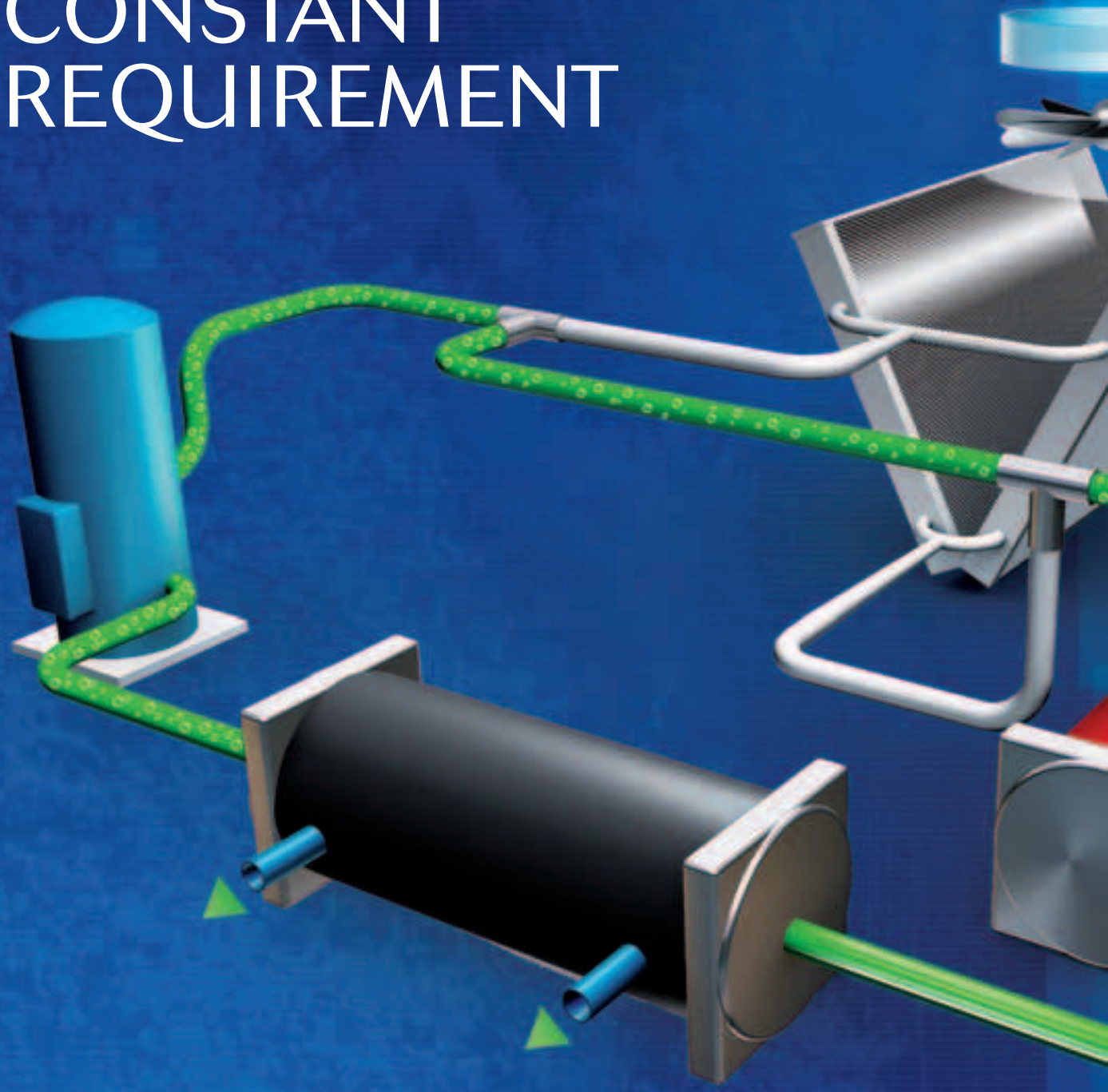
De-energising the compressors during DX FREE-COOLING operation increases equipment life and the interval between maintenance operations.



4 JUST PURE WATER

In contrast to traditional hydronic free-cooling systems requiring the use of a water/glycol solution that is toxic for the environment, the CARRIER chillers operate with pure water.
This saves energy due to the improved heat exchange coefficient of pure water compared to a water/glycol solution. If the system shuts down, an electric resistance heater protects the hydronic circuit against frost.

HEATING - A CONSTANT REQUIREMENT



Why reject and lose the heat generated by the refrigeration system and not benefit from it free-of-charge. In many activity sectors, such as agriculture, the food industry, industrial processes, hospitals and hotels heat reclaim permits a considerable reduction of the energy bill for the heat generation equipment. This controlled optimisation contributes towards a responsible commitment to reduce wasted energy and the harm done to our planet.

FREE HOT WATER, NOTHING IS LOST, EVERYTHING IS RECOVERED

TOTAL HEAT RECLAIM

A simple principle: if there is a demand for heating, the hot gases leaving the compressor are directed towards the heat reclaim condenser, the gases give up their heat to the hot water leaving the condenser at a temperature of up to 60°C. 100% of the heat rejected by the chiller can be used to produce the hot water required by your installation. When the demand for heating is satisfied, the hot gases are automatically directed to the initial air condenser circuit where the heat is rejected to the air by the fans.

PARTIAL HEAT RECLAIM

At a leaving temperature of up to 80°C this system is particularly suited to the production of sanitary hot water. A heat exchanger placed upstream of the condenser ensures the desuperheating of the gases before they enter the condenser. Another advantage, available with the Aquasnap heat pumps: the system guarantees sanitary hot water production all year round, summer and winter.

NATURAL ECONOMICAL HEATING

Heat reclaim is often associated with the generation of solar heat; it offers energy savings and is a significant step forward towards safeguarding our environment.

30XA CHILLER		252	302	352	402	452	502	602	702	752	802	852	902	1002
Nominal cooling capacity	kW	267.7	293.4	319.7	382.2	437.4	491.5	604.9	653	706.4	763.7	802.2	868.8	951.7
Energy efficiency ratio EER	kW/kW	3.2	3.2	3.2	3.4	3.4	3.5	3.5	3.6	3.4	3.5	3.5	3.5	3.4
Free-cooling operation*														
Cooling capacity	kW	146	146	145.6	187.6	190.6	213.8	259.6	280.5	282	280.4	326.4	329.8	369.8
Energy efficiency ratio EER	kW/kW	24	24.6	24.6	23.1	24	24	23.6	23.4	24.1	23.6	23.5	23.9	24.1
Total heat reclaim operation**														
Heating capacity	kW	335.9	372.9	401.2	481.5	554.4	620.4	759.6	832.1	894.1	974.3	1027	1105	1229
Coefficient of performance COP	kW/kW	4.1	4.1	4.1	4.3	4.3	4.5	4.4	4.6	4.4	4.5	4.4	4.4	4.4

30RB CHILLER		262	302	342	372	402	432	462	522
Nominal cooling capacity	kW	257.8	293.4	327.6	358.6	391.1	417.7	446.9	506.4
Energy efficiency ratio EER	kW/kW	2.7	2.6	2.7	2.7	2.5	2.6	2.5	2.4
Free-cooling operation*									
Cooling capacity	kW	116.7	144.7	144.7	172.6	172.6	211	211	247.9
Energy efficiency ratio EER	kW/kW	14.7	14.9	14.9	15.0	15.0	15.9	15.9	16.5
Total heat reclaim operation**									
Heating capacity	kW	328.3	357.9	421.7	453	495.9	530.8	578.4	653.1
Energy efficiency ratio EER	kW/kW	3.6	3.6	3.6	3.6	3.5	3.5	3.5	3.3
Partial heat reclaim operation**									
Heating capacity	kW	41	46	52	56	62	65	71	80

30RQ HEAT PUMP		262	302	342	372	402	432	462	522
Nominal cooling capacity	kW	248.6	277.8	307.2	331.3	366.1	389.4	429.7	465
Energy efficiency ratio EER	kW/kW	2.5	2.7	2.5	2.6	2.5	2.6	2.6	2.4
Mechanical operation									
Nominal heating capacity	kW	274.7	300.6	333	364.1	404.5	442.2	502	548
Coefficient of performance COP	kW/kW	2.8	2.7	2.5	2.6	2.5	2.6	2.6	2.4
Partial heat reclaim operation***									
Heating capacity	kW	60	66	74	78	88	93	102	113

Nominal operating conditions, cooling: air 35°C, water 12/7°C
Nominal operating conditions, heating: air 7°C, water 40/45°C

* With free-cooling option: air 0°C, water 15/10°C
** With total heat reclaim option: cold water 12/7°C, hot water 40/45°C
*** With partial heat reclaim option: cold water 12/7°C, hot water 50/60°C

Quality Management System Approval

Environmental Management System Approval

Order No.: 18359-20, 01.2008. Supersedes order No.: New

Carrier

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