

ROOFTOP UNITS



VECTIOS™

THE ALL-IN-ONE AIR CONDITIONING SOLUTION
SUPERMARKETS & HYPERMARKETS



A Carrier Company



WHY VECTIOS ROOFTOP UNITS FOR SUPERMARKETS?

Supermarkets are complex environments to manage from a temperature and humidity control perspective. Large volumes of human traffic, doors that are regularly opened and closed, and refrigerated aisles are only some of the challenges that must be managed. These constant changes in temperature and air condition do not only affect food spoilage, but also customer comfort, and potentially even sales.

This is why it is so important for Supermarkets to:

- Ensure adequate temperature and humidity levels, essential to reducing spoilage and to keep food fresher for longer
- Provide the best possible temperature and air quality and comfort for all customers, irrespective of the volume of customers in the supermarket at any one given moment
- Reduce costs and increase efficiencies where possible by using alternative energy sources (such as residual energy coming from food refrigeration equipment)

The VECTIOS rooftop range offers the perfect solution:



Multizone control of temperature and humidity by zone



Best in class air quality control with the latest technologies in filtration and CO₂ detection



Free cooling management



Energy recovery solutions



Compliance with the latest Ecodesign regulations. With a SEER up to 4.91 and a SCOP up to 3.68

At your side for over 80 years.

With over 80 years of experience, CIAT is committed to ensuring maximum comfort, every day. The fact that it has obtained ISO 14001 and OHSAS 18001 certification validates the high environmental standards of its products, services and manufacturing processes.

More than just a wide range of equipment, CIAT offers you expert support for sustainable solutions to guarantee comfort, air quality and energy optimization. The group can also advise you as your environmental policy develops and help you meet the challenge of new regulations.





HOW TO MAKE THE BEST ROOFTOP CHOICE

SINGLE FLOW INSTALLATIONS

Single flow rooftop configurations (without extraction) are the most commonly used solution by supermarkets.

Due to fresh air being brought into the building without extraction, single flow mountings can often generate overpressure. However due to the large volumes of air in most supermarkets the effect of this is minimised due to areas of weakness in terms of air tightness and doors being regularly opened.

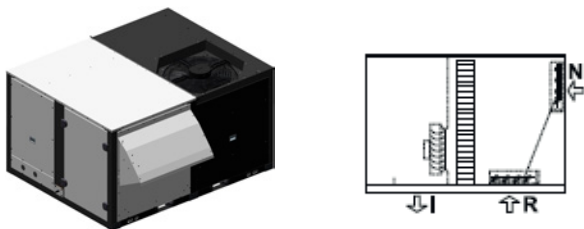
DOUBLE FLOW INSTALLATIONS

If you are looking for an installation that offers the opportunity for energy recovery, then a potential solution is to combine single flow units with double flow units and heat recovery units.

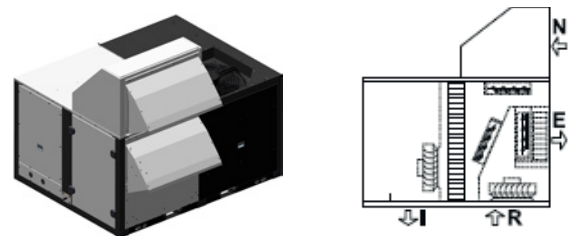
When used in combination with active heat recovery options VECTIOS rooftop units can offer higher performance within the same footprint, and is able to handle overpressure as standard.

Flow	Mounting	Fresh air and free cooling	Energy recovery	Overpressure control	Recommendations
SINGLE	CS, TS	YES	NO	Big volume surfaces with medium air tightness conditions and doors frequently opened. No overpressure control required.	Best solution when energy recovery of extracted air is not required
	CK			Medium overpressure control. Equivalent to the pressure drop in the return air installation.	Recommended for installations with very low pressure drop in return ducts
DOUBLE	CR, CT		YES, ACTIVE	Total control	Active thermodynamic system for energy recovery. Moderate winter climates and/or moderate extraction air flow rates
	CW		YES, PASSIVE: WHEEL	Pressure balance	Rotary heat exchanger Ideal solution for extreme winter conditions or high extraction air flow rates

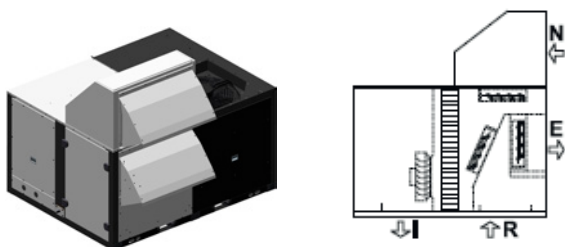
CS SINGLE FLOW CONFIGURATION (2 DAMPERS)



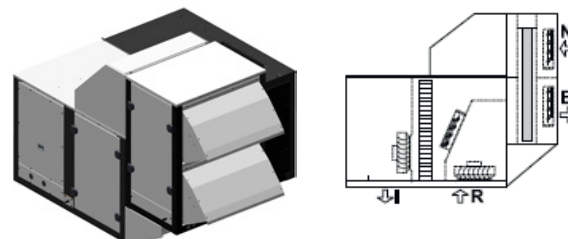
CR DOUBLE FLOW CONFIGURATION (3 DAMPERS, RETURN FAN AND ACTIVE RECOVERY)



CK DOUBLE FLOW CONFIGURATION (3 DAMPERS)



CW DOUBLE FLOW CONFIGURATION (3 DAMPERS, RETURN FAN AND PASSIVE RECOVERY)





MAXIMUM COMFORT, ENERGY EFFICIENCY AND INDOOR AIR QUALITY LEVELS

AIRFLOW MANAGEMENT

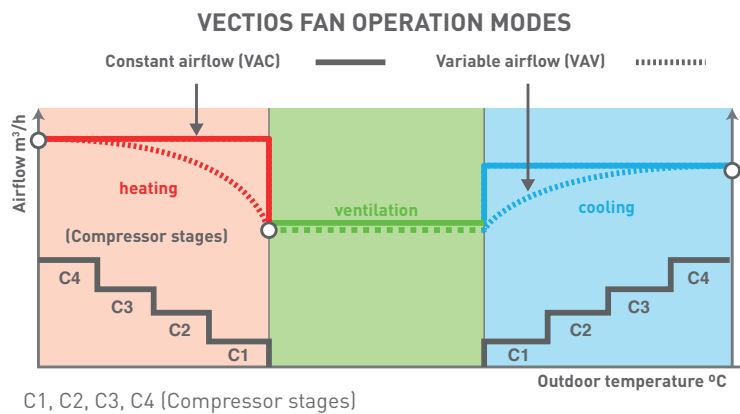
EC plug fans (which come as standard in the Vectios range) are used with a differential pressure sensor to measure airflow in all conditions. This technology allows **accurate monitoring and precise control**. VECTIOS rooftop units offer the following functionalities:

- Soft start for flexible ducts
- Constant airflow rate independent from filters clogging level
- Constant airflow volume (CAV) or variable airflow volume (VAV)
- 3 set-points (Heating / Cooling / Ventilation)
- Fan standby mode when there are no heating, cooling or ventilation demands



EC motor fans in VECTIOS rooftop units

The Fan is one of the highest energy consuming components of a Supermarket ventilation system. To achieve the best energy efficiencies, VECTIOS rooftop units offer a **wide control of airflow rates depending the operation mode**:



HIGH SEASONAL ENERGY EFFICIENCY

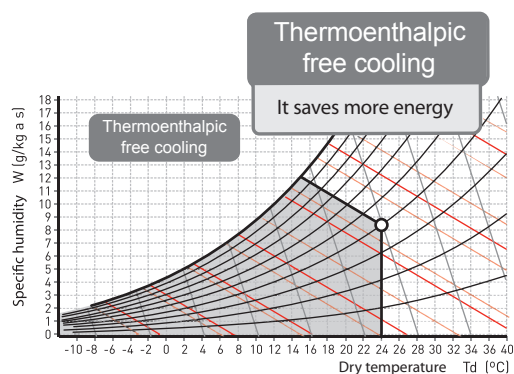
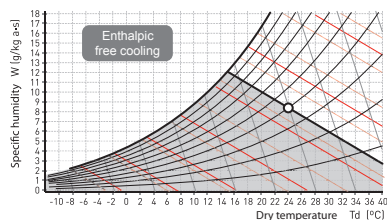
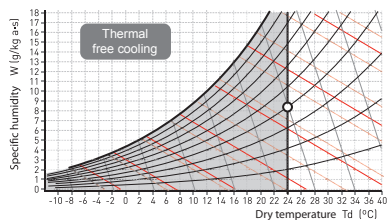
VECTIOS performances **exceed the demands of Ecodesign for 2021** (SEER over to 3.53 and SCOP over to 3.20), using multiscroll compressors technology, EC fan motors, and electronic expansion valves, together with an optimized control platform.

VECTIOS MODEL	90	120	140	160	180	190	200	220	240	280	320	360	380
Cooling capacity (kW)	22,51	28,04	33,83	37,32	41,97	44,42	53,71	58,34	60,95	69,04	73,04	81,58	91,20
Heating capacity (kW)	21,99	27,86	33,21	36,79	42,03	44,78	50,96	56,07	58,86	68,01	72,12	80,77	90,10
SEER	4,91	4,89	4,6	4,46	4,35	4,4	4,83	4,85	4,9	4,66	4,57	4,47	4,47
SCOP	3,48	3,45	3,45	3,45	3,47	3,45	3,6	3,68	3,5	3,43	3,59	3,56	3,58



FREE COOLING

Amongst the varied free cooling options of the VECTIOS range, thermoenthalpic free cooling is the one that offers Supermarkets the highest energy savings and levels of comfort.



FILTRATION REQUIREMENTS

Air quality is a key factor in a supermarket.

For these types of installations, CIAT recommend the following **filtration systems**:

- G4+F7 when outdoor air quality is good quality
- M6+F7 in all other cases

Higher pressure filters often increase energy consumption, so for this reason in order for Supermarkets to remain efficient and keep energy costs down, we recommend the use of low pressure filters.

Supermarkets are extremely busy places and the occupancy rates often vary wildly by the minute, or hour. Basing ventilation on fixed maximum occupancy can increase unnecessary costs. The alternative is a variable fresh air control system, using an **air quality CO₂ sensor**:

- Double quality sensor (CO₂). This technology compares the indoor quality levels with the outdoor quality (CO₂ rates), to control the differential values and regulate the air renovation rates.



Filtration system G4+F7



Air quality sensor (CO₂)



BECAUSE EVERY ZONE HAS SPECIFIC NEEDS: MULTIZONE CONTROL AND TAILOR-MADE OPTIONS

MULTI ZONE CONTROL AND FOOD RETAIL OPTIONS

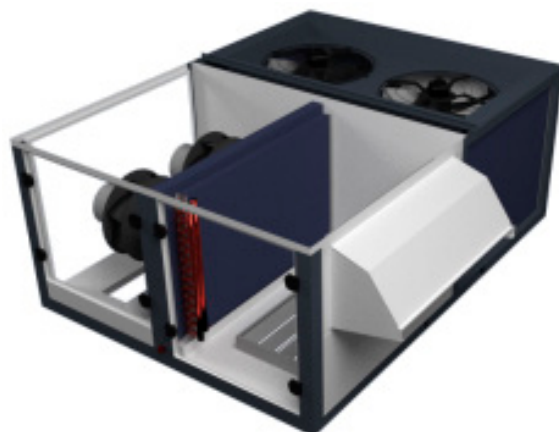
In supermarkets which have large open areas, it is much more difficult to estimate cooling and heating needs. VECTIOS units can work with a **combination of up to 4 sensors**, and adjust capacity based on the lowest, highest or average value measured.

With the specific **CIAT air zoning** (up to 4 zones) the VECTIOS range can control multiple zones and large surfaces with high thermal dispersion (refrigerant cabinets).

SPECIFIC SUPERMARKET APPLICATIONS

HEAT RECOVERY WATER COIL

This is a highly efficient option that is specially designed for supermarkets and hypermarkets and allows for the **recovery of the energy rejected by the food refrigeration systems**, generating **high energy efficiency and saving cost**. Thermal energy dissipated in these systems is recovered in the installation through a plate heat exchanger that heats up the water sent to the preheating water coil in the rooftop.

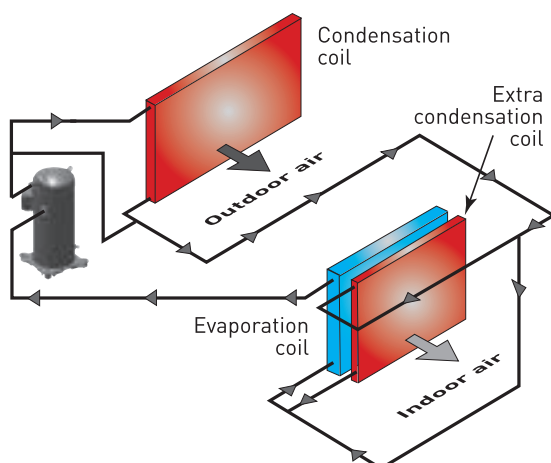


Heat recovery water coil

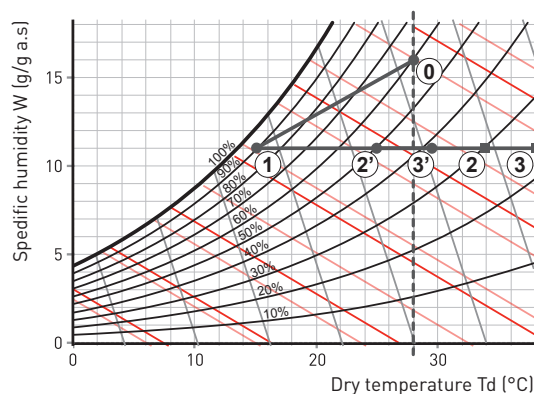
ACTIVE DEHUMIDIFICATION WITH CONDENSATION COIL

This technology allows dehumidification and recovery the condensation energy to reheat the air. It consists of a refrigerant circuit with 3-way proportional regulation for a complete adaptation to the dehumidification needs of the installation.

With VECTIOS dehumidification, condensation disappears and cabinet glass doors are clean and products are perfectly displayed.



DEHUMIDIFICATION OPERATION



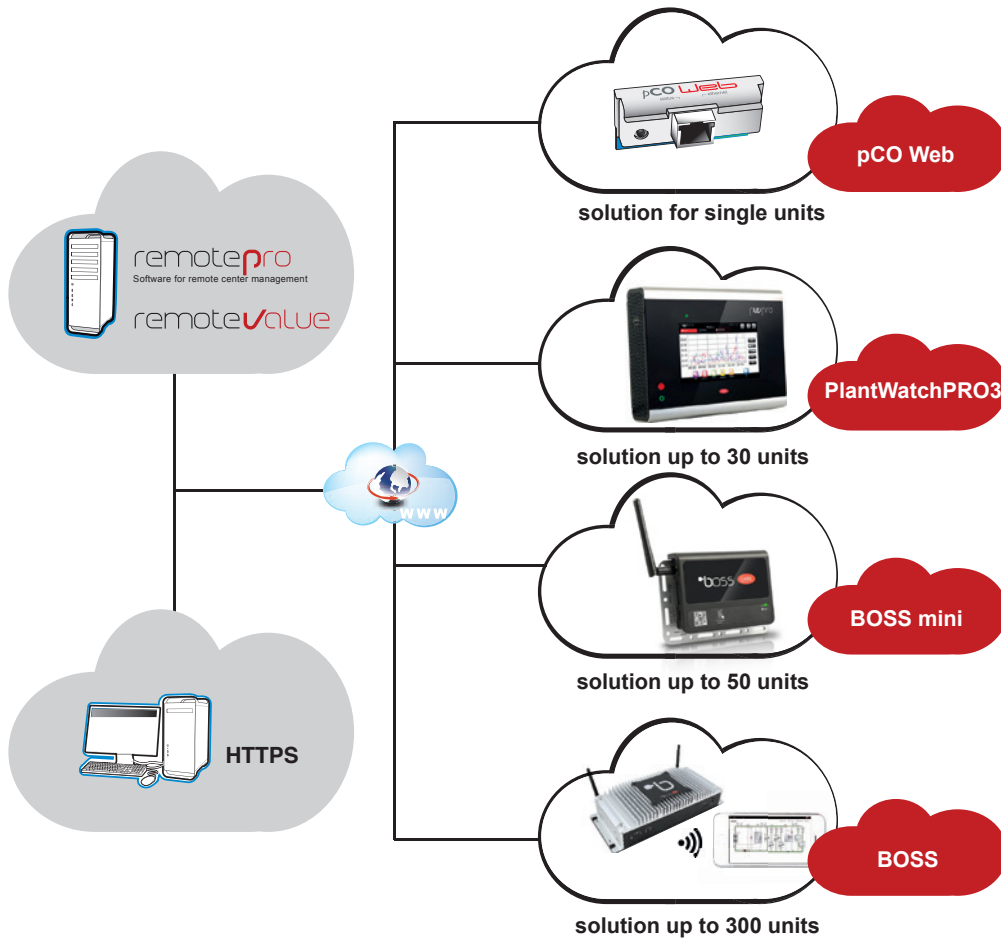
- 0 → 1: Normal evolution in the evaporator without using extra condensation coil.
- 1 → 2 or 2': Reheating using extra condensation coil in units with 1 or 2 frigorific circuits.
- 2 or 2' → 3 or 3': Additional reheating using the auxiliary electrical heaters in units with 1 or 2 frigorific circuits.

Source: CIAT estimates based on calculations

CONTROL AS GUARANTEE OF EFFICIENCY

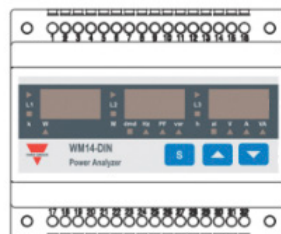
SUPERVISION AND COMMUNICATION

Supermarkets are typically fitted with more than a single air conditioner. This is why it is important to monitor how well all those units are functioning. The VECTIOS range offers different monitoring options, starting from the single control of the rooftop, up to supervision systems for more than 300 units.



ENERGY AND CALCULATION OF CAPACITIES

The VECTIOS range monitors electric energy consumption and also evaluates cooling and heating capacities of the compressors. For this calculation, the unit includes mixing and supply enthalpy sensors. This option displays EER/COP values to monitor the rooftop energy consumption, and makes it easier for the end user to carry out regular maintenance revisions straight from the service terminal.





CIAT AT YOUR SERVICE

At CIAT, our objective is to provide a high quality service in Partnership with you throughout the lifecycle of your HVAC system. We understand your changing needs, and that's why we have developed smart services and energy solutions that optimise energy performance and enable your business to make savings.

We provide the support you need to get the most out of your solution:

- Preventive and corrective service maintenance.
- On-site inspection by experts close at hand
- Online parts shop.
- Dedicated hotline for off-site technical support.

We also offer you a comprehensive range of smart services:

- Consultancy service on energy performance upgrades.
- Advanced monitoring and plant system management solutions.
- Equipment and system modernization.

PRESENT IN
OVER **50**
countries

over
80
years
OF EXPERIENCE

AVAILABLE
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