

50FC R-454C

Air-air packaged rooftop units

WEATHERFLEX™

Nominal cooling capacity

23 - 49 kW

Nominal heating capacity

22 - 50 kW

Airflow

2.880 - 13.000 m³/h



- Now available with R-454C (GWP<150, A2L)
- Compact plug&play solution
- Full inverter
- High seasonal efficiency
- Extended airflow
- Superior quality and reliability



Product Selection Data

50FC R-454C is the new generation of compact and autonomous rooftop units, designed to help customers meet future sustainability requirements without compromising performance, flexibility or reliability.

Available as 50FC series for reversible heat pump operation, with models from 023 to 051, the range combines low-GWP R-454C refrigerant (GWP <150, A2L class) with an advanced design featuring variable-speed compressors, variable-speed indoor and outdoor fans, and a suction line heat exchanger (SLHX) to deliver higher seasonal efficiency, lower energy consumption and reduced environmental impact.

Designed for both new-build and replacement projects, **50FC R-454C** retains the ease of installation, reliability and application flexibility that have made 50FC a proven rooftop solution, while introducing extended airflow capabilities, wider operating limits and enhanced energy performance.

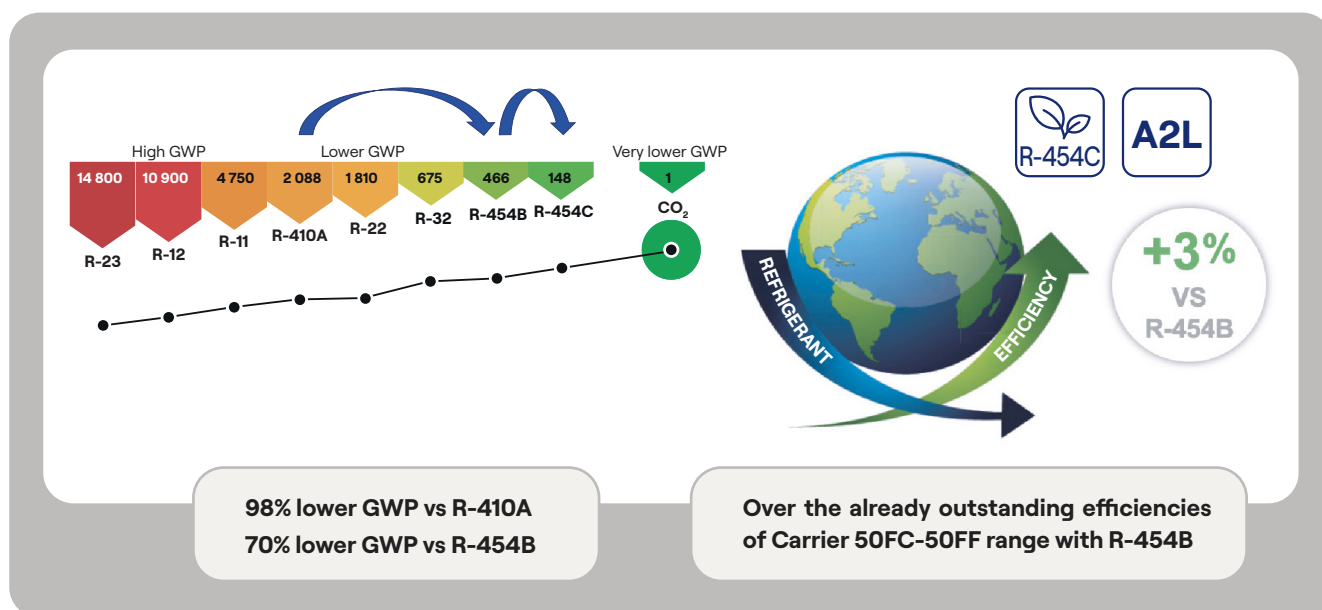
As a complete plug-and-play solution, **50FC R-454C** provides heating, cooling, ventilation and indoor air quality management in a single compact unit, helping customers reduce the carbon footprint of their buildings while maintaining comfort, operational continuity and long-term peace of mind.

A wide portfolio of configurations and options — including free cooling, heat recovery, fresh air management, zoning, advanced filtration and connectivity solutions — allows the unit to be tailored to the requirements of commercial and industrial applications.

All units are fully tested and factory-commissioned before delivery.



CA REFRIGERANT STRATEGY FOR ROOFTOPS



CUSTOMER BENEFITS



Low-impact solution you can rely on

- Stay ahead of F-Gas regulation compliance with R-454C low refrigerant (GWP <150)*
- Reduce your environmental footprint thanks to designed to support the reduction of direct and indirect CO₂ emissions through low GWP refrigerant and optimised efficiency.
- Rely on a solution designed for today and tomorrow, offering the right balance of safety and compliance with an A2L classified refrigerant.



Flexible design to fit your project needs

- Adapt the solution to your requirements with a wider range of configurations and options (airflow, free cooling, heat recovery...).
- Rely on a scalable solution that fits a variety of project application types.
- Simplify your projects with a system designed for easy integration in both new and retrofit installations.



Optimised performance to reduce your operating costs

- Cut your energy bills with optimised part-load performance, enabled by variable-speed compressors.
- Benefit from enhanced seasonal efficiency (SEER / SCOP) thanks to advanced system design.
- Lower your energy consumption and reduce your total cost of ownership (TCO).



Reliable performance with fast and easy installation

- Save time on installation with a plug-and-play solution and factory-programmed controls.
- Ensure long-term peace of mind thanks to a robust design using high-end components.
- Maintain reliable operation even in demanding environments, from -18°C** up to +50°C.

* GWP <150 required for rooftops up to 50 kW from 2027

** At partial load (-15°C at full load)

ECOPASSPORT®

The PEP ecopassport® programme provides an international reference framework for procedures enabling manufacturers to communicate the environmental specifications of their products in the form of an eco-declaration, known as the Product Environmental Profile (PEP).

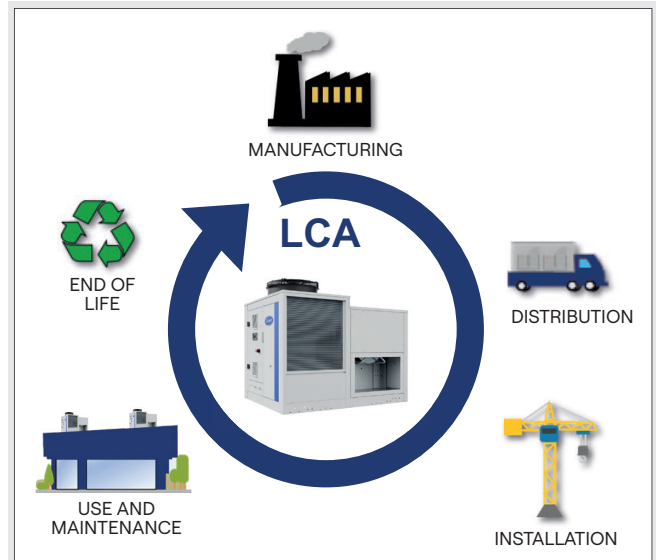
The PEP ecopassport® programme guarantees that PEPs are created, checked and communicated correctly according to the requirements of standard ISO 14025 and standard IEC/PAS 62545.



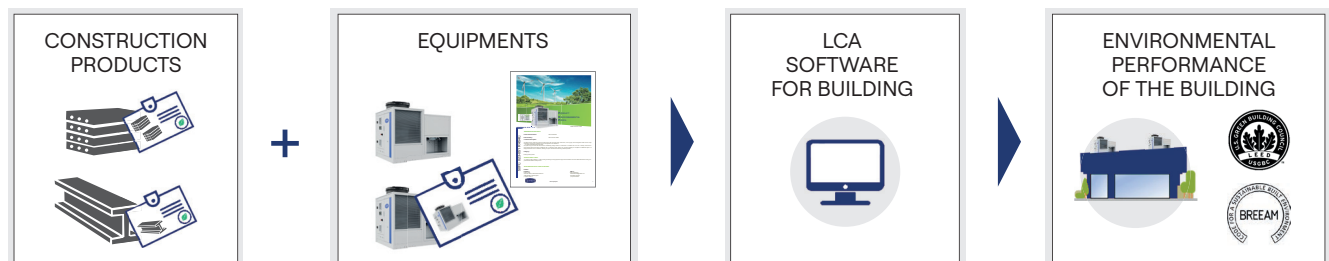
The Life Cycle Analysis (LCA) PEP is the environmental identity card for an item of equipment which details the environmental impacts of the product during its life cycle according to **eight mandatory indicators**:

1. Global Warming Potential
2. Impact on the ozone layer
3. Acidification of soil and water
4. Eutrophication of water
5. Photochemical ozone creation
6. Abiotic resource depletion
7. Fresh water consumption
8. Total use of primary energy during the life cycle

CARRIER is providing PEPs for rooftops, not only the 8 mandatory indicators, but all **27 indicators**.



Products with certified environmental profiles are used to support methods to assess building sustainability such as BREEAM or LEED. They give additional recognition for materials with robust environmental product declaration types using manufacturer data.



The PEP of can be downloaded from the PEP ecopassport® website:



TECHNICAL INSIGHTS



COMPLIANCE

- Machinery Regulation (EU) 2023/1230
- Electromagnetic Compatibility Directive 2014/30/EU (EMC)
- Pressure Equipment Directive 2014/68/EU (Category III) (PED)
- Ecodesign for Sustainable Products Regulation (EU) 2024/1781 (ESPR)
- SEER/SCOP Regulation (EU) 2016/2281
- Harmonised Standard: EN 378-2:2016 (Refrigerating systems and heat pumps - Safety and environmental requirements. Part 2: Design, construction, testing, marking and documentation)

UNIT COMPONENTS

Casing

- Self-supporting frame. Removable lifting and handling accessories supplied as standard for easy transportation and installation.
- Casing constructed from galvanized steel sheet, with most components protected by a polyester coating finished in light grey (RAL 7035).
- Removable access panels ensure quick and easy access to all key components: electrical cabinet, compressors, fans, filters, etc.
- Possibility of transport in a closed container.

Outdoor circuit

- Coil with copper pipes and aluminium fins.
- High-efficiency EC axial fan automatically adapt their operating speed to the installation requirements, minimizing energy consumption, reducing part-load noise levels, and enhancing the unit's average seasonal efficiency.

Indoor circuit

- Thermal and acoustic insulation, in double wall panels and registers, with Euroclass A2-s1, d0 (M0) fire classification.
- Coil with copper pipes and aluminium fins.
- EC electronic supply plug fans with variable control speed and flow rate controller.

The fans are factory configured with nominal airflow. Consult for any special configuration.

In tertiary sector installation, a high percentage of the annual air conditioning energy consumption comes from the use of fans for transporting air. Using fans which are more efficient has a direct impact on reducing consumption.

- Reusable G4 air filters with low pressure drop, mounted on frames. Access panel equipped with a dual-locking system.
- Insulated condensate drain pan, sloped toward the drain connection to ensure proper water evacuation.

Cooling circuit

- Inverter scroll compressor with variable frequency drives (VFD), operating at variable speeds to continuously modulate cooling capacity according to system demand. This provides accurate temperature and humidity control, optimizes energy consumption, and significantly improves overall system efficiency.
 - Installed on anti-vibration mounts.
 - Crankcase heater.
- Electronic expansion valve.



- Suction line heat exchanger (SLHX) to improve circuit efficiency.
- Four-way cycle reversing valve.
- Acid-resistant filter dryer.
- Cooling design with a single air volume: models 023 to 051.

Electrical cabinet

- Complete and fully wired electrical cabinet. Insulated access door to prevent condensation. Forced ventilation of the electrical cabinet. Protection IP54.
- Numeration of wired and identification of components in the electrical cabinet. It permits easy tracing and diagnostics.
- Hinges + quarter-turn latches on the removable access door.
- Electrical power supply with neutral.
- Main ground connection.
- Compressor and fan motor contacts.

Protections

- High pressure switch.
- High and low pressure transducers.
- Relief safety valve.
- Refrigerant leak control (by low-pressure alarm).
- Refrigerant leak detector. Due to the A2L classification of R-454C refrigerant (lightly flammable), the installation of this detector is required.

This detector uses infrared technology rather than semiconductor technology, requiring no manual calibration thanks to its self-calibration capability. It provides a fast response time and extended service life.

The detector is installed on a panel next to the supply fans of the indoor circuit. This location ensures accurate monitoring of the refrigerant concentration in the indoor coil.

If the unit is connected to a Building Management System (BMS), the electronic control is capable of transmitting an alarm signal whenever a refrigerant leak is detected.

Note: These units are designed for outdoor installation in well-ventilated areas. However, if deemed necessary due to site-specific conditions or risk assessments, an additional leak detector can be installed in the outdoor refrigerant circuit. This option is available upon request.

Recommendation: Please refer to the "Installation_guide_A2L_refrigerant fluid" (Doc. No 10687).

- Compressor discharge temperature control.
- Main door switch.
- Protection for power lines of compressors and fan motors with manual motor starters (MMS). These devices provide protection against overload, short circuit, phase failure and undervoltage.
- Automatic switch in the control circuit.
- Differential pressure switch to detect clogged filters.

UNIT COMPONENTS

"50FC" electronic control

This control system basically consists of a control board, sensors, and a Graphic terminal. It also includes the C.FIELD web-based commissioning and monitoring tool. Optionally, a room-mounted user terminal or an intuitive touch-screen panel can be added for enhanced navigation and operation, available in 4.3" and 7" versions.

The controller is equipped with RS485 and Ethernet communication interfaces, enabling integration with Building Management Systems (BMS) via Modbus and BACnet protocols. It also supports connection to our local supervision solutions: **BOSSmini** (up to 50 units) and **BOSS** (up to 300 units), as well as to our remote monitoring platform **ABOUD HVAC Performance**.

The control system also supports connection to an SHRD shared network comprising up to 15 units, with one unit configured as the "Lead" unit and the remaining units operating as "Lag" units. This network enables the exchange of data and operating information between units for coordinated system management. Two units can also be configured as "Backup" system, with one unit taking over operation in the event of a fault in the other.

- Selection of setpoint and operating mode: HEATING / COOLING / AUTO / VENTILATION.
- Continuous control of the operating parameters.
- Display of the values measured by the sensors.
- Defrosting management.
- All-seasons operation via the condensation and evaporation pressure control.

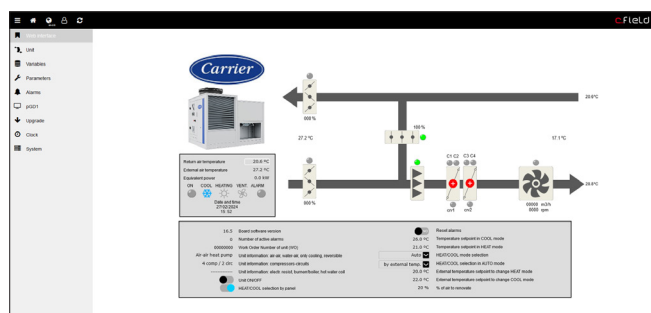
The management of the unit in cooling mode is based on the principle of a high floating pressure. The condensation pressure setpoint is continually calculated depending on the outdoor temperature. This pressure is regulated by adjusting the airflow on the outdoor fans.

- Setpoint compensation based on the outdoor temperature.
- Hourly and weekly schedule.
- Diagnosis of faults and general alarm.
- Management of all the optional components available for the unit: dampers and mixing boxes, Backup heating, air quality sensors, air zoning, energy recovery,...

User interfaces

C.FIELD web tool (standard)

The control board comes equipped with a web tool, **C.FIELD**, which enables users to monitor the status of the unit at all times. By navigating through various menus, users can view the variables that are controlled by the "50FC" control.



Graphic terminal (standard)

This terminal, fitted as standard on the electrical cabinet, is very easy to use. It provides clear, user-friendly descriptions of all control functions and operating parameters.

Only 6, large, easy-to-use buttons are required to maneuver through the entire menus.

This terminal is used for unit commissioning, operating parameter adjustment, ON/OFF control, operating mode and setpoint selection, real-time monitoring of system variables and sensor readings, and alarm management including alarm history.

Note: multiple units can share a single terminal, if they are integrated into a pLAN local network (for up to 15 units).



User terminal (optional)

In addition to the standard Graphic terminal, a User terminal can be installed remotely up to 100 m from the unit.

This room thermostat has an elegant and modern design, with a large LCD display that shows the current temperature, humidity (if available) and the main parameters.

Simple and intuitive logic make it easy to use.



4.3-inch Touch panel (optional)

The Graphic terminal installed on the electrical cabinet can be replaced with a 4.3-inch touchscreen panel (65K colour display), providing a more intuitive user experience and simplifying navigation across all operating and monitoring screens.

7-inch Touch panel (optional)

In addition to the standard Graphic terminal, the unit can be fitted with a remote 7-inch touchscreen panel (16.7M colour display). Featuring the same functions as the Graphic terminal, it enhances user interaction through an intuitive interface and easy navigation across all operating and monitoring screens.

Note: A 7-inch touchscreen panel can be shared by up to six units.



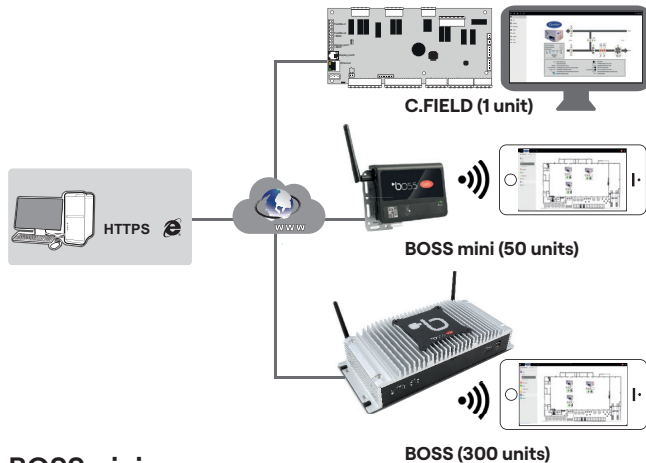
4.3-inch

7-inch

CONNECTIVITY

BOSSmini and BOSS

Different solutions of supervision are available based on the dimensions of the installation:



BOSSmini

It is the solution for the management and supervision of small or medium-sized air conditioning installations. Up to 10 units with 50 variables per unit or 50 units with 10 variables maximum per unit.

The control board allows for communication through its built-in Ethernet port.

Its main advantages are:

- Integrated WIFI Hotspot for direct access without any extra infrastructure.
- Smartphone compatibility.
- Secure supervisor control from remote through a simple browser.

BOSSmini allows commissioning and daily access for system maintenance. It also includes advanced monitoring functions and allows for the creation of areas and groups to simplify installation management.

This solution also allows the integration of energy meters for monitoring the electrical consumption of the installation.

BOSSmini is shipped from the factory with pre-configured settings and customizations that are based on the specific needs and specifications of each customer.

Available in two versions:

- CPU device.
- CPU device, monitor, mouse and keyboard.

BOSS

It is the solution for the management and supervision of large air conditioning installations, up to 300 units and 3500 variables.

The control board also allows for communication through its built-in Ethernet port. It has the same features as BOSSmini.

BOSSmini and BOSS enable remote system management. A simple Internet connection provides access to all the information on the system (Router LAN or 3G/4G). The Web interface, the same that is available to the local user, allows the monitoring and complete configuration of the installation: from the office or any other current location of the user.

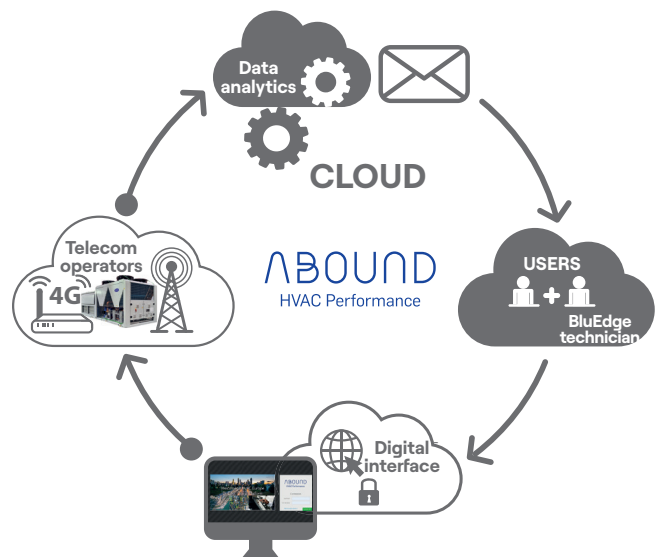
ABOUND HVAC Performance

This is the remote supervision solution dedicated to monitoring and controlling several CARRIER machines in real time.

The control board is equipped with an RS485 interface for Modbus communication.

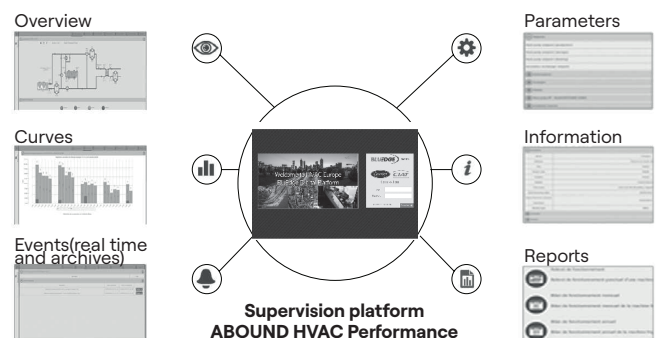
Advantages

- Improved energy performance. European regulations encourage buildings to install control and supervision systems to achieve the energy efficiency target.
- Access to the operating trend curves for analysis.
- Improved availability rate for the machines.



Features

ABOUND HVAC Performance will send data in real time to the supervision website. The machine operating data can be accessed from any PC, smartphone or tablet. Any event can be configured to trigger an email alert.



Maintenance service

With your **BluEdge** service agreement, enabled by Abound HVAC Performance supervision solution, both you and our highly trained team will gain visibility, access expert advice and effectively optimise the lifecycle outcomes of your installation.

NOMENCLATURE OF THE UNIT FOR CONFIGURATION

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
50FC	0023	A	A	C	B1	LL	000	S	M	C	H	S	000	0000	0000	0	0	AA00	00	000	000	BA00	0000	0000

A: Unit type

50FC: air/air heat pump

B: Unit model

1 circuit: 0023 / 0029 / 0038 / 0044 / 0048 / 0051

C: Version of the series

D: Electrical power

A: 400V / 3ph + N / 50Hz
B: 400V / 3ph / 50Hz

E: Type of refrigerant

C: R-454C

F: Assembly

B1: Without mixing box
B2: Mixing box with 2 dampers
B3: Mixing box with 3 dampers
BP: Plug fan in bottom return section
BA: Plug fan in bottom return section and active recovery
BT: Plug fan in top return box
BB: Plug fan in top return box and active recovery
BW: Plug fan in bottom return section and passive recovery
BL: Plug fan in top return box and passive recovery

G: Coil coating : Indoor - Outdoor

LL – Indoor coil	– Outdoor coil
L: Aluminium	L: Aluminium
P: Polyurethane	N: Inera®
N: Inera®	N: Inera®

H: Heating

000: Without auxiliary heating
BAx: Gas burner, 3 power outputs:
x = F (Low) / M (Nominal) / S (High)
RAx: Electrical heaters, 3 power outputs:
x = F (Low) / M (Nominal) / S (High)
HAx: Hot water coil

I: Protection for low outdoor temperature

S: Without protection
A: Kit 1: outdoor temperature < -10.2°C
B: Kit 2: outdoor temperature < -14°C

J: Available pressure of the indoor fan

F: Low available pressure
M: Nominal available pressure
S: High available pressure

K: Air filtration + stop-drop

C: G4 low pressure drop (l.p.d.)
D: G4 l.p.d. + stop-drop
K: G4 l.p.d. + F7
L: G4 l.p.d. + F7 + stop-drop
O: M6 + F7
P: M6 + F7 + stop-drop
S: F7 + F9
T: F7 + F9 + stop-drop

L: Type of outdoor fan

S: AC (2-speed)
H: EC (electronic)

M: Insulation

S: Standard insulation
M: Euroclass A2-s1, d0 (M0) insulation

N: Indoor circuit configuration

000 – Without optional accessories
A: Stainless steel condensate pan
A: Overpressure control
A: Clogged filters switch (standard)

O: Outdoor circuit configuration

0000 – Without optional accessories
A: Fresh air intake protective grille
A: Outdoor coil protective grille
A: Antivibration mounts
A: Stop-drop at the fresh air intake

P: Heat recovery wheel

0000 – Without optional accessories
B: G4 low pressure drop
A: Wheel speed with on/off control
B: Wheel speed with variable control
A: Channel spacing of 2,0 mm
B: Channel spacing of 2,5 mm
A: Material: Aluminium
B: Material: Aluminium with epoxy
C: Material: Hybrid wheel
E: Material: Molecular sieve

Q: Extra heating

0: Without extra heating
3: Heat recovery coil

R: Special applications

0: Without special applications
C: Air zoning
D: Low return temperature application
E: Signal control for discharge damper
F: Signal control for D. D. + Air zoning
G: Signal control for D. D. + Low T application
R: Constant supply pressure
T: Constant supply pressure + Signal control for D. D.

S: Sensors

0000 – Without options
A: Smoke detector sensor
A: Air quality sensor for environment
B: Air quality sensor duct-mounted
C: Air quality sensor on SHRD network
D: Double quality sensor: environment + environment (coming soon)
E: Double quality sensor: environment + outdoor (coming soon)
F: Double quality sensor: duct-mounted + outdoor (coming soon)
A: 1 sensor RS485
B: 2 sensors RS485
C: 3 sensors RS485
D: 4 sensors RS485
E: 1 sensor NTC
A: Ambient temperature sensor
B: Ambient temp. + humidity sensor
C: Ambient sensor on SHRD network

T: Free-cooling + Outdoor humidity

00 – Without free-cooling + without sensor
A: Outdoor humidity sensor on the unit
B: Outdoor humidity sensor on SHRD network
A: Thermal free-cooling
B: Thermoenthalpic free-cooling
C: Enthalpic free-cooling

U: Terminal + Unit communication

000 – Without terminal + stand-alone unit
Unused
O: Stand-alone unit
A: Lead unit
B: Lag unit
A: Graphic terminal in electrical cabinet
C: Graphic terminal in the cabinet + remote User terminal
E: Graphic terminal in the cabinet + remote Graphic terminal
F: 4.3-inch Touch panel in electrical cabinet
I: Graphic terminal in electrical cabinet + remote 7-inch Touch panel

V: Miscellaneous item 1

000 – Without options
A: Control of an on/off humidifier
B: Control of a proportional humidifier
A: Energy meter
B: Energy meter and calculation of cooling and heating capacities
Unused

W: Miscellaneous item 2

BA00 – Without options
A: Tropicalization
A: Standard phase relay (BA and BB assemblies)
B: High performance phase relay (BA and BB assemblies)
Unused

X: Return fan

0000 – Unused

Y: Indoor air direction

0000 – Bottom direction
0: Bottom supply and bottom return
1: Side supply and bottom return
2: Bottom supply and side return
3: Side supply and side return
4: Top supply and bottom return
5: Side supply and top return
6: Top supply and side return
7: Bottom supply and top return
8: Top supply and top return
Unused
0: Without pre-assembly roof curbs
1: With pre-assembly roof curbs
Unused

NOMENCLATURE OF ROOF CURB / BURNER (OPTIONS)

A	B	C	D	E	F	G	H	I	J	K
CU0_50	023_051	A	B1	00A	000	00000	S	000	000	00

A: Unit type

CU0_50: Roof curb
CUQ_50: Roof curb + Gas burner

B: Unit model

023_051

C: Version of the series

D: Assembly

B1: Without mixing box
B2: mixing box with 2 dampers
B3: mixing box with 3 dampers
BP: Plug fan in bottom return section
BA: Plug fan in bottom return section and active recovery
BT: Plug fan in top return box
BB: Plug fan in top return box and active recovery
BW: Plug fan in bottom return section and passive recovery
BL: Plug fan in top return box and passive recovery

E: Roof curb type

00A: Pre-assembly roof curb

F: Gas burner

000: Without burner
BAx: Gas burner, 3 power outputs:
x = F (Low) / M (Nominal) / S (High)

G: Country + Type of gas

00000 Without burner
IT__A Italy G20
IT__B Italy G30
IT__C Italy G31
ES__A Spain G20
ES__C Spain G31
RO__A Romania G20
RO__B Romania G30
RO__C Romania G31
IE__A Ireland G20
IE__C Ireland G31
GB__A United Kingdom G20
GB__C United Kingdom G31
BE__A Belgium G20
BE__D Belgium G25

BE__C Belgium G31
HU__A Hungary G20
HU__E Hungary G25.1
HU__B Hungary G30
HU__C Hungary G31
FR__A France G20
FR__D France G25
FR__C France G31
PL__A Poland G20
PL__F Poland G2.350
PL__B Poland G30
PL__C Poland G31
PT__A Portugal G20
PT__C Portugal G31
HR__A Croatia G20
HR__B Croatia G30
HR__C Croatia G31
SI__A Slovenia G20
SI__B Slovenia G30
SI__C Slovenia G31
BG__A Bulgaria G20
BG__B Bulgaria G30
BG__C Bulgaria G31
MT__B Malta G30
MT__C Malta G31
DK__A Denmark G20
DK__B Denmark G30
DK__C Denmark G31
SK__A Slovakia G20
SK__C Slovakia G31
EE__A Estonia G20
EE__B Estonia G30
EE__C Estonia G31
NL__D Netherlands G25
NL__B Netherlands G30
NL__C Netherlands G31
CZ__A Czech Rep. G20
CZ__B Czech Rep. G30
CZ__C Czech Rep. G31
SE__A Sweden G20
SE__B Sweden G30
SE__C Sweden G31
NO__A Norway G20
NO__B Norway G30
NO__C Norway G31
LV__A Latvia G20
LT__A Lithuania G20
LT__B Lithuania G30
LT__C Lithuania G31

FI__A Finland G20
FI__B Finland G30
FI__C Finland G31
GR__A Greece G20
GR__B Greece G30
GR__C Greece G31
DE__A Germany G20
DE__D Germany G25
DE__B Germany G30
DE__C Germany G31
LU__A Luxembourg G20
LU__D Luxembourg G25
LU__C Luxembourg G31
CY__B Cyprus G30
CY__C Cyprus G31
IS__C Iceland G31
AT__A Austria G20
AT__B Austria G30
AT__C Austria G31
TR__A Turkey G20
TR__B Turkey G30
TR__C Turkey G31
CH__A Switzerland G20
CH__B Switzerland G30
CH__C Switzerland G31
RU__A Russia G20
RU__B Russia G30
RU__C Russia G31
AL__A Albania G20
AL__B Albania G30
AL__C Albania G31
MK__A Macedonia G20
MK__B Macedonia G30
MK__C Macedonia G31

H: Protection for low outdoor temperature

S: Without protection
A: Kit 1: outdoor temperature < -10.2°C
B: Kit 2: outdoor temperature < -14°C

I: Insulation

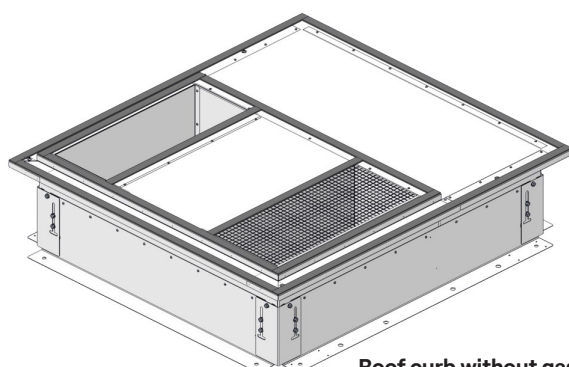
000: Standard insulation

J: Special height

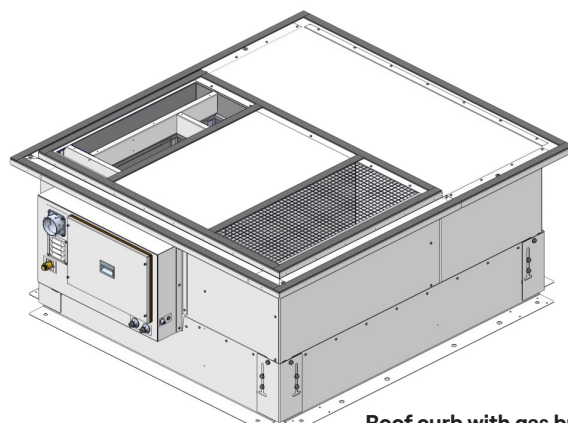
000: Unused

K: Special manufacturing

00: Unused



Roof curb without gas burner



Roof curb with gas burner

FACTORY OPTIONS AND ACCESSORIES (SUMMARY)

Category	Group	Description	Factory installed option	Field installed accessory
Electrical power	D	400 V / 3 ph / 50 Hz (without neutral)	✓	
Assembly	F	B2: Mixing box with 2 dampers	✓	
		B3: Mixing box with 3 dampers	✓	
		BP: Plug fan in bottom return section	✓ (*)	
		BA: Plug fan in bottom return section and cooling recovery circuit (active recovery)	✓ (*)	
		BT: Plug fan in top return box	✓	
		BB: Plug fan in top return box and cooling recovery circuit (active recovery)	✓	
		BW: Plug fan in bottom return section and rotary heat exchanger (passive recovery)	✓ (*)	
		BL: Plug fan in top return box and rotary heat exchanger (passive recovery)	✓ (*)	
Coil coating	G	Coil with copper pipes and fins of an aluminium alloy (INERA®)	✓	
Heating	H	Auxiliary hot water coil	✓ (*)	
		Auxiliary electrical heaters	✓	
		Natural or propane gas burner (supplied installed into a pre-assembly roof curb)		✓
Protection low temperature	I	Kit 1: Antifreeze protection kit for low temperature (≤-10.2°C)	✓	
		Kit 2: Antifreeze protection kit for low temperature (≤-14°C)	✓	
Indoor fan	J	Indoor plug fan with low or high available pressure	✓	
Air filtration + stop-drop	K	Stop-drop in the indoor air coil	✓	✓
		G4 low-pressure-drop gravimetric filters + F7 pleated opacimetric filters	✓	✓
		Double stage of pleated opacimetric filters (M6+F7, F7+F9)	✓	✓
Outdoor fan	L	Axial 2-speed outdoor fan(s) directly coupled to the motor	✓	
Insulation	M	Ceramic fibre for thermal and acoustic insulation, Euroclass A2-s1, d0 (M0)	✓	
Indoor circuit	N	Condensate drain pan in stainless steel	✓	✓
		Overpressure control (up to 20% differential between supply and return airflow)	✓	
Outdoor circuit	O	Fresh air intake protective grille	✓	✓
		Outdoor coil protective grille	✓	✓
		Stop-drop at the fresh air intake		✓
		Antivibration mounts made of rubber		✓
Passive recov.	P	Recovery wheel characteristics: diameter, channel pitch, material, type of speed control	✓	
Extra heating	Q	Heat recovery coil	✓ (*)	
Special applications	R	Air zoning	✓ (*)	
		Low return temperature application	✓	
		Signal control for external discharge damper	✓	
		Signal control for external discharge damper + Air zoning	✓ (*)	
		Signal control for external discharge damper + Low return temperature application	✓	
		Constant supply pressure	✓	
		Constant supply pressure + Signal control for external discharge damper	✓	
Sensors	S	Ambient temperature sensor: one NTC sensor connected to the control board or 1 to 4 RS485 sensors	✓	✓
		Ambient temperature + humidity sensor: one to four sensors with RS485 communication	✓	✓
		Air quality sensor environment installed, duct-mounted, on shared network (SHRD) or double sensor (environment + environment; environment + outdoor; duct-mounted + outdoor)	✓	✓
		Smoke detecting station in accordance with the NF S 61-961 standard	✓	✓
Free-cooling + Outd. humidity	T	Type of free-cooling: thermal, enthalpic or thermoenthalpic	✓	✓
		Outdoor air humidity sensor: supplied with the unit or installed on a shared network (SHRD)	✓	✓
Terminal + Unit communication	U	Graphic terminal installed in the electrical cabinet + remote User terminal (up to 100 m)	✓	✓
		Graphic terminal installed in the electrical cabinet + remote Graphic terminal (up to 200 m)	✓	✓
		Graphic terminal installed in the electrical cabinet + remote 7-inch Touch panel (up to 500 m)	✓	✓
		4.3-inch Touch panel installed in the electrical cabinet	✓	
		Unit configuration: Stand-alone, Lead or Lag unit	✓	✓
Miscellaneous item 1	V	Management of an humidifier with proportional or on/off control	✓	
		Energy meter	✓	
		Energy meter and calculation of the cooling and heating capacities	✓	
Miscellaneous item 2	W	Phase monitoring relay with recovery circuit: standard (mandatory) or high performance	✓	
		Tropicalised components on the electrical cabinet: control board, cards and terminals	✓	
Return fan	X	Unused	✓	
Air direction	Y	Nine airflow configurations, based on the combination of supply and return air connections: - Supply: bottom, side and top - Return: bottom, side and top	✓	
Roof curb	Y	Standardised pre-assembly roof curbs with adjustable height		✓
	--	Adaptation roof curbs for replacing units on site		✓

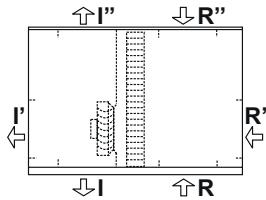
(*) Part of this option must be installed on-site.

FACTORY OPTIONS AND ACCESSORIES

Assembly + Indoor airflow direction

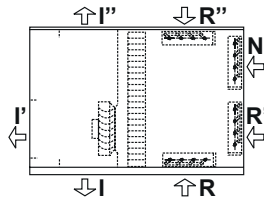
B1 assembly

Without mixing box



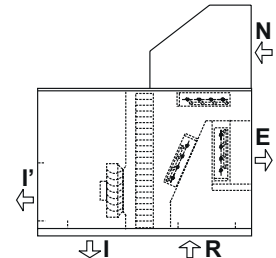
B2 assembly

Mixing box with 2 dampers:
fresh air damper interlocked with return damper



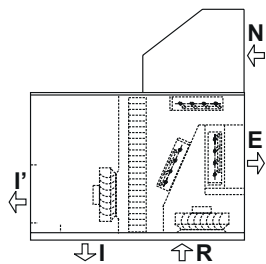
B3 assembly

Mixing box with 3 dampers:
fresh air damper and exhaust air damper



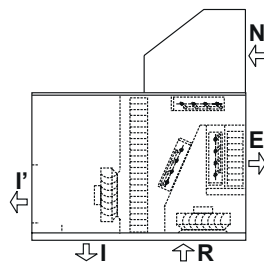
BP assembly

Plug fan in bottom return section



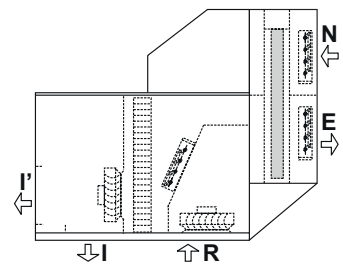
BA assembly

Plug fan in bottom return section +
Cooling recovery circuit (active recovery)



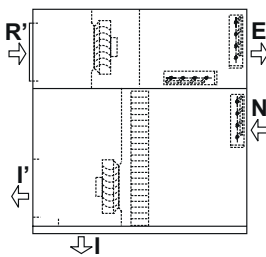
BW assembly

Plug fan in return section +
Heat recovery wheel module (passive recovery)



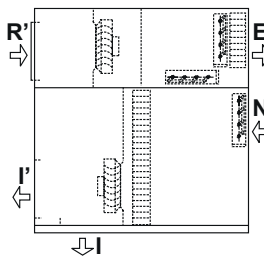
BT assembly

Plug fan in top return box



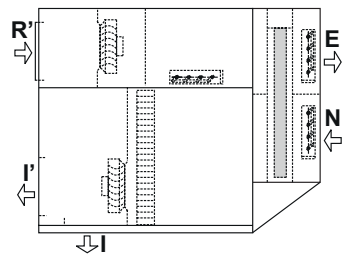
BB assembly

Plug fan in top return box +
Cooling recovery circuit (active recovery)



BL assembly

Plug fan in top return box +
Heat recovery wheel module (passive recovery)



Legend

S Bottom air supply	S'' Top air supply	R Bottom air return	R'' Top air return
S' Side air supply	F Fresh air intake	R' Side air return	E Exhaust air outlet

Note: only one of the three possible options (bottom, side or top) can be selected for both, supply and return.

Indoor airflow direction

0 Bottom supply and bottom return	3 Side supply and side return	6 Top supply and side return
1 Side supply and bottom return	4 Top supply and bottom return	7 Bottom supply and top return
2 Bottom supply and side return	5 Side supply and top return	8 Top supply and top return

FACTORY OPTIONS AND ACCESSORIES

Air pressure control in different assemblies

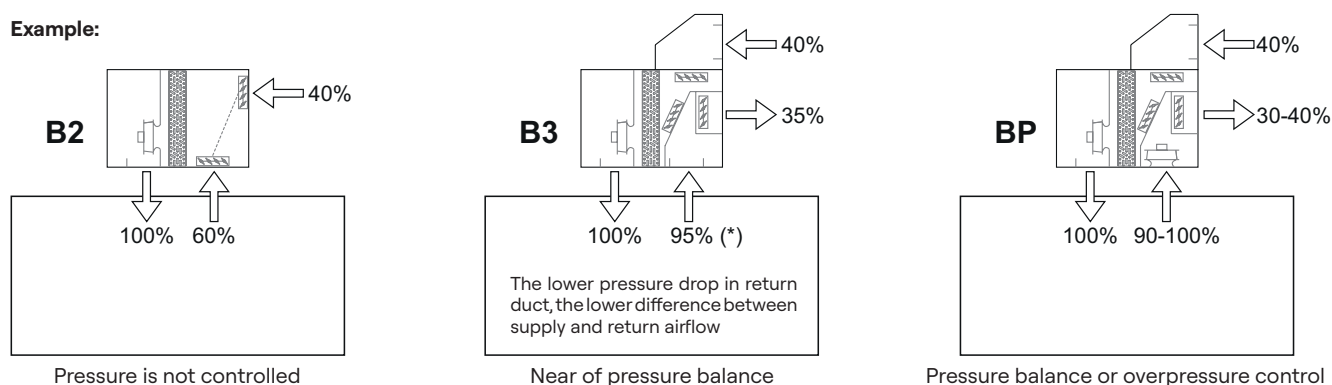
In case of assemblies with fresh air (ventilation) but without extraction air, overpressure will be generated in the building, higher with higher fresh air ratios or in free-cooling mode. It will not generate any issue in buildings with low air tightness and/or with doors frequently opened, but we should prevent in other applications. In assemblies with extraction damper and return fans, this overpressure can be completely avoided (pressure balance), or even controlled with a certain value to prevent infiltrations.

50FC R-454C is the rooftop with the largest offer in airflow configurations to be able to adapt the unit to any kind of application or request. Please, find below comments and recommendations for each assembly.

Assembly		Fresh air and free-cooling	Return fans	Energy recovery (extraction)	Pressure control	Comments and recommendations
B1		No	No	No	No control required	Only for building with no need of fresh air . Pressure balance by default. Same return and supply airflow.
B2		Yes	No	No	No control	Adequate just for buildings with medium or low air tightness and/or doors frequently opened.
B2 + gravity dampers in the building		Yes	No	No	High control	Building overpressure is maintained at the same level than pressure drop before the gravity damper. No limitations in the return pressure drop.
B3		Yes	No	No	Medium control	Recommended only with low pressure drop in the return ductwork (maximum 50 Pa). The maximum building overpressure is at the same level than pressure drop in the return ductwork.
BA, BB		Yes	Yes	Yes, Active recovery	High control	Return and supply EC plug fan(s) are always supplied with pressure sensor to adjust the airflow. To manage pressure balance , supply and return are configured with same airflow. In case overpressure want to be managed (to avoid infiltration), the return airflow need to be lower than the supply. Differences up to 10% can be always being configured.
BP, BT		Yes	Yes	No	Total control	Additional overpressure with airflow differences up to 20% are possible adding the option "overpressure control" (*) which manages fresh and exhaust dampers independently.
BW, BL		Yes	Yes	Yes, Passive recovery (wheel)	Total control	To maintain overpressure in case of variable fresh air management (with CO ₂ sensor option), minimum fresh air ratio need to be configured.

(*) This overpressure option is not available on BA and BB assemblies because this type of control of the dampers penalizes cooling recovery.

Example:



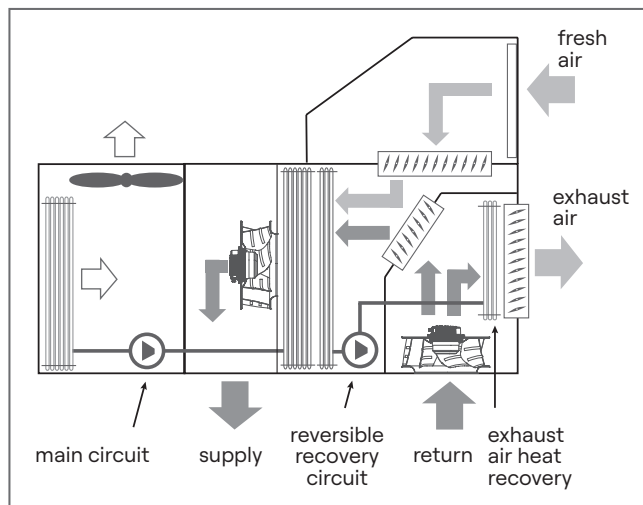
FACTORY OPTIONS AND ACCESSORIES

Energy recovery in different assemblies

We develop energy-efficient solutions that provide substantial energy savings.

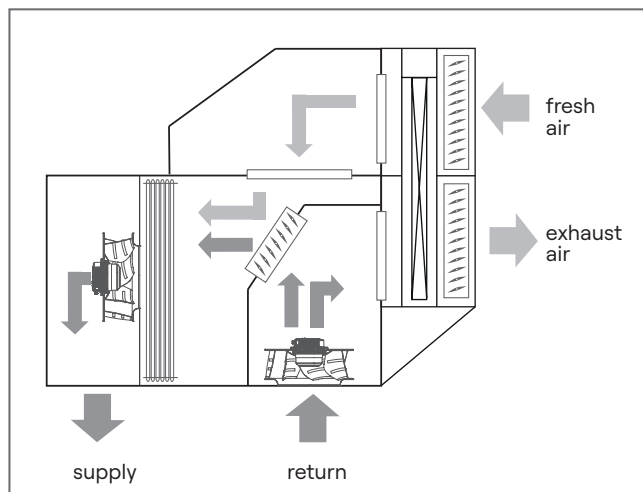
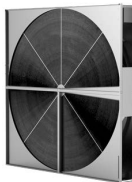
Active recovery (BA and BB assemblies):

- Dedicated thermodynamic recovery circuit that recovers energy from the exhaust air stream.
- The circuit features independent proportional control and automatically adapts to fresh air renewal requirements, maximizing the unit's COP, EER, and seasonal efficiency.
- High performances in mild weather.



Passive recovery (BW and BL assemblies):

- Energy recovery from exhaust air using a rotary heat wheel exchanger.
- A wheel exchanger, coupled to the machine, transfers heat and humidity from the air-conditioned room's return air to the fresh air used for ventilation, before its discharged outdoors.
- This recovery module is fully powered and controlled by the unit.
- Recommended with low outdoor temperatures in winter, and high fresh air ratios.



Electrical power

These units can be supplied for the following power supply voltages:

- 400 V / 3 ph + N / 50 Hz (standard)
- 400 V / 3 ph / 50 Hz (optional)

Coils coating

- Coils with copper pipes and fins of an aluminium alloy **INERA®**. Level of corrosion protection: basic - medium. This treatment offers a resistance of more than 1000 hours (ASTM B117 NSST).
- **Blygold®** coating (**upon request**). Level of corrosion protection: medium. This treatment offers more protection than 11000 hours in salt spray test (ASTM B117 NSST) and 4000 hours in acid salt spray test.

For further detailed information, please contact our Customer Service Department.

Note: These coating can be applied to various coils (outdoor, indoor, hot water coil and heat recovery coil) according to the combinations available in our "Selection Software".

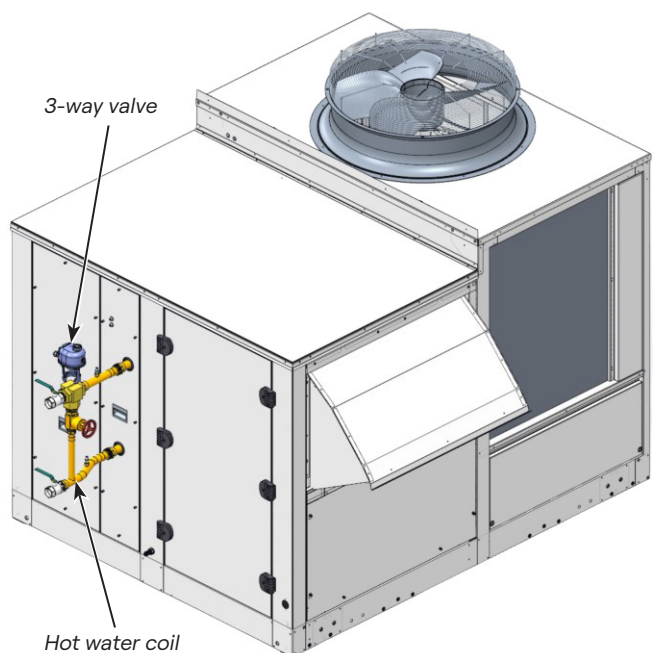
Heating

Only one of these auxiliary heating systems can be selected:

- **Auxiliary hot water coil**, factory-installed inside the unit. The coil is supplied with a 3-way modulating valve featuring proportional control, provided loose for field installation outside the unit.

The unit is equipped with an anti-freeze thermostat to protect the coil against freezing conditions.

Note: The hot water coil is not available in units equipped with stop-drop in the indoor coil or a heat recovery coil.



FACTORY OPTIONS AND ACCESSORIES

- **Auxiliary electrical heaters**, with two heating stages and on/off control, factory-installed and wired inside the unit. Up to 3 heating capacity options are available for each model:

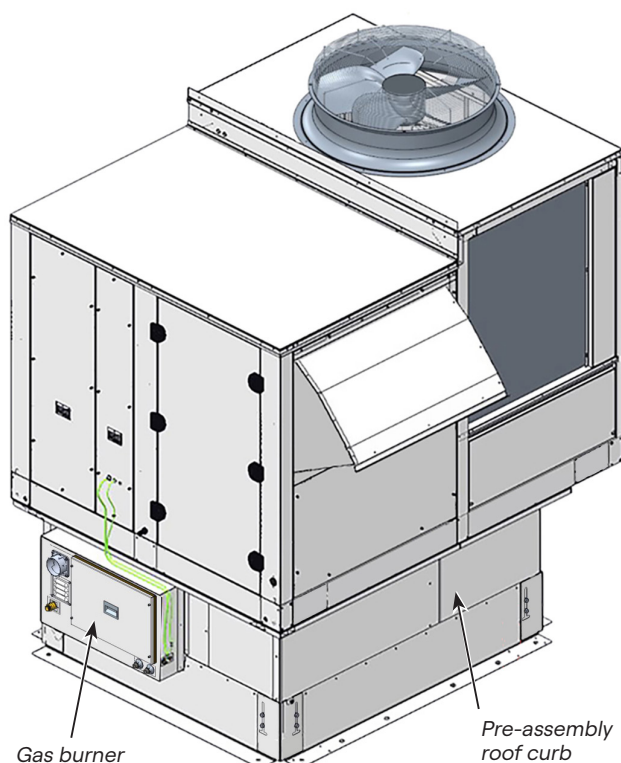
50FC series	RAF (Low)	RAM (Nominal)	RAS (High)
023 to 029	12 kW	18 kW	unavailable
038 to 051	12 kW	18 kW	27 kW

- Electrical heater with proportional control (upon request).

- Natural gas or propane **gas burner** equipped with a modulating actuator, compliant with Regulation (EU) 2016/426, and integrated into a pre-assembly roof curb. The 50FC unit with bottom air supply is designed for installation on this roof curb.

Up to 3 heating capacity options are available for each model:

50FC series	BAF (Low)	BAM (Nominal)	BAS (High)
023 to 051	PCH020	PCH034	PCH045



Protection for low outdoor temperature

- **Kit 1:** Antifreeze protective kit (< -10.2°C). Mandatory for an outdoor temperature lower than -10.2°C WB.

This kit includes:

- Electrical heater for protection of the components of the electrical cabinet.
- Compressor with protection for low temperature.

- **Kit 2:** Antifreeze protective kit (< -14°C). Mandatory for an outdoor temperature lower than -14°C WB.

In addition to the options of -10.2°C, this kit includes:

- Reinforced electrical heater for protection of the components of the electrical cabinet.
- Electrical heater for anti-freeze protection of dampers of the mixing box (if applicable).
- Protective kit of the gas burner for low temperature (if applicable).

- Upon request, the mixing box dampers can be equipped with spring-return actuators, ensuring automatic closure in the event of a power failure, in combination with the above kits.

Available pressure of the indoor fan

- By default, these units are fitted with plug fans for a nominal **available pressure** (M).

The following fans can optionally be supplied:

- F: Low available pressure,
- S: High available pressure.

Note: The fans are factory configured with nominal airflow. Consult for any special configuration.

Important: the "Selection Software" will choose the supply fan with lower consumption for the available pressure required.

Important: For public buildings in France, local regulations may require the installation of an external discharge damper. To support compliance with these requirements, a control signal for the discharge damper is available as an option.

Air filtration + stop-drop

Options to improve indoor air quality:

- **Air filtration.** It is an efficient way to reduce particles that can harm our health. The clogged filters detector, included as standard, determines when the filters need to be replaced.

The unit is supplied as standard with low pressure drop G4 gravimetric filters, however, other filter combinations are available to suit different application requirements:

- Low pressure drop G4 gravimetric filters + F7 pleated opacimetric filters.
- Dual-stage of pleated opacimetric filters: M6 + F7 or F7 + F9.

Classification of the filters according to the **ISO 16890 Standard**:

- G4 → ISO Coarse 60%
- M6 → ISO ePM10 70%
- F7 → ISO ePM1 55%
- F9 → ISO ePM1 80%

- **Stop-drop** fitted to the indoor air coil. Recommended for applications with high air humidity levels and/or elevated airflow rates, preventing water carry-over downstream of the coil.

Note: The stop-drop is not available in units equipped with a hot water coil.

FACTORY OPTIONS AND ACCESSORIES

External insulation

- Ceramic panel for thermal and acoustic **insulation**, with Euroclass fire classification A2-s1, d0 (M0), used in non-removable panels in contact with the indoor airstream (top and bottom panels).

Note: All other panels and access doors of the indoor circuit are fitted with thermal and acoustic insulation featuring a Euroclass A2-s1, d0 (M0) fire classification as standard.

Indoor circuit configuration

- **Stainless steel** condensate drain **pan** for enhanced corrosion resistance and extended service life.
- **Overpressure control**. Assemblies equipped with a return fan allow independent control of the supply and return airflow rates, supporting airflow differentials of up to 10% through adjustable airflow setpoints.

For larger airflow differentials, the fresh air and exhaust air dampers can be controlled independently as an option. This feature may be required to maintain positive building pressure and prevent the infiltration of outdoor air.

Applicable to BP, BT, BW and BL assemblies.

Note: This option is not available on BB and BA assemblies because this type of control of the dampers penalizes the performance of the cooling recovery circuit.

Outdoor circuit configuration

- Fresh air intake **protective grille** (mesh of 20 × 20 mm).
- Outdoor coil **protective grille**.
- Rubber **anti-vibration mounts** to reduce the transmission of vibrations and noise to the supporting structure.
- **Stop-drop** at the fresh air intake. Recommended for installations exposed to high outdoor humidity levels, to prevent water carry-over through the fresh air intake. This accessory is especially advisable when thermoenthalpic free cooling is incorporated, as both features contribute to maintaining stable and efficient operation in humid environments.

Passive recovery

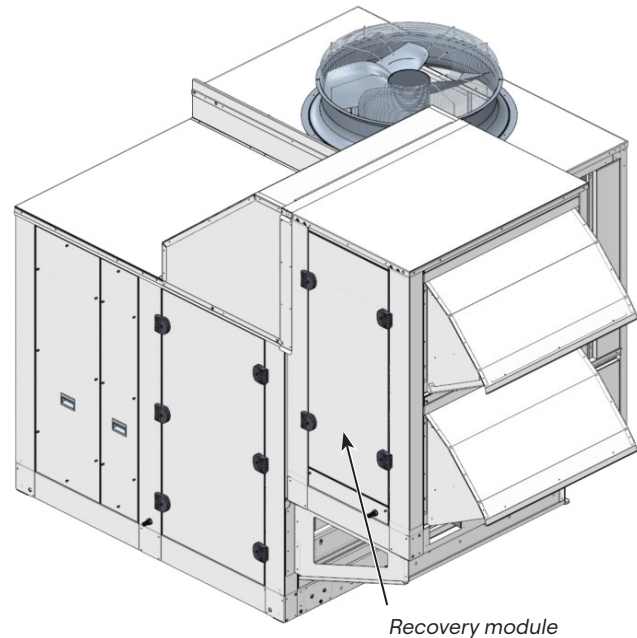
- **Rotary heat exchanger** housed in a dedicated module mounted on the side of the unit. To facilitate transport and handling, the module is supplied disassembled and must be assembled on site.

Available with BW and BL assemblies.

This rotary recovery unit is used to transfer the sensible and latent heat from the conditioned room's return air to the incoming fresh air, before the exhaust air is discharged outdoors. This option reduces the compressors runtime, ensuring energy saving and benefiting the environment.

The efficiency of energy recovery depends on the wheel selected: material, wheel diameters, channel pitch and type of speed control.

Note: It's recommended to use a CO₂ air quality sensor (optional) in units with rotary heat exchanger.



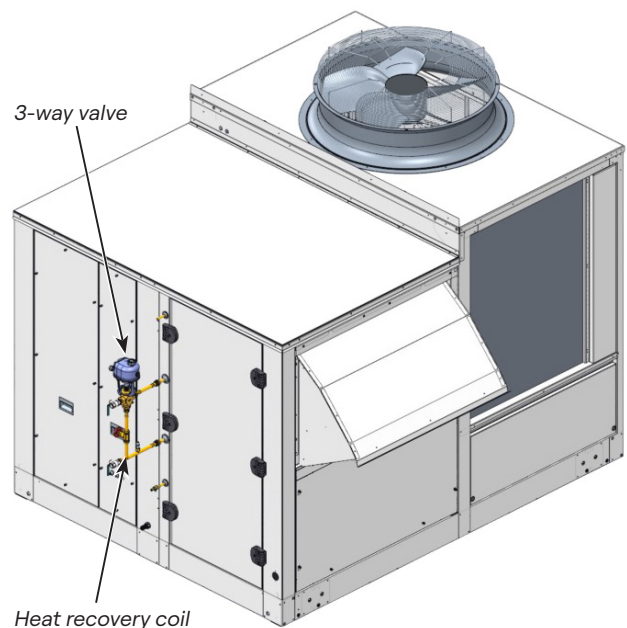
Extra heating

- **Heat recovery coil (HRC)**, factory-installed inside the unit. The coil is supplied with a 3-way modulating valve featuring proportional control, provided loose for field installation outside the unit.

The coil function is to pre-heat the air that will pass through the main indoor coil. For this, it uses the temperature of an outdoor water installation.

This option is compatible with B1, B2, BT, BB and BL assemblies.

Note: The heat recovery coil is not available in units equipped with a gas burner or a hot water coil.



FACTORY OPTIONS AND ACCESSORIES

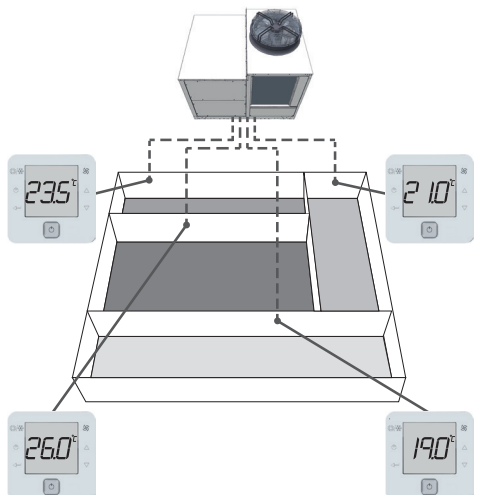
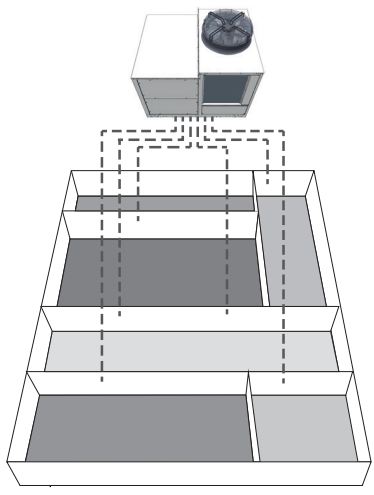
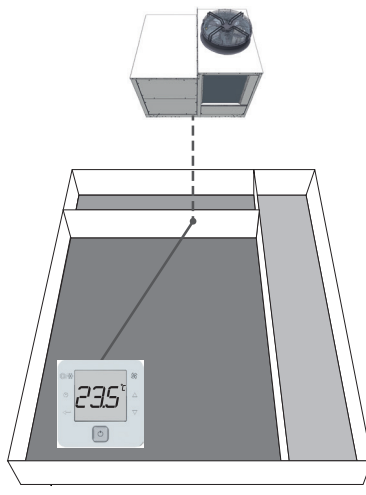
Special applications

• Air zoning and constant supply pressure

This unit provides the greatest choice in terms of multi-zone management with two different solutions:

- Airflow zoning up to 4 zones. This option allows the management of the airflow of the unit to condition up to 4 different zones with a minimum airflow of 35% (all of them in same operating mode: heating or cooling).
- Constant supply pressure. This function allows to control the airflow to maintain constant pressure in the supply duct, with the setpoint value set by parameter.

The following table provides the comparison of these two solutions to facilitate the correct selection according to the customer's needs:

Configurations		
Zoning up to 4 zones	Constant supply pressure	
Up to 4 zones	Several zones	Several zones (one main zone)
Based on the ambient temperature conditions of each zone terminal (by default) or the return temperature (optional)	Capacity control based on the return conditions (by default)	Capacity control based on the environment conditions (configurable)
Same comfort priority by zone	Same comfort priority by zone	One main zone. Comfort of all zones depends on the demand of the main zone
  		

Characteristics	Zoning up to 4 zones	Constant supply pressure
Number of zones	up to 4	unlimited
Components included	4 zone terminals and a control box	differential pressure sensor (range 0 - 1000 Pa)
Dampers and servos per zone	not supplied	not supplied
Control signal for dampers / servos	supplied	not supplied (external control required)
Control of the damper for each zone	yes, control carried out by the electronic control	no (at customer level)
Terminal in each zone	yes	No or just one for the main zone
Minimum airflow	35%	35% or 10% in ventilation mode (operating only the fans). There is an associated alarm in case of lower airflow. It is necessary to set the minimum damper opening per zone or provide remote stop control in case all dampers are closed
Capacity control	Based on the ambient temperature conditions of each zone terminal (by default) or the return temperature (optional)	- Based on the return conditions (by default) - Based on the ambient conditions (configurable), in case of a main zone

Note: For more information about multizone management, please refer to the "50FC" control IOM manual (No. 10186) or to the specific Annex dedicated to these solutions (No. 10737).

FACTORY OPTIONS AND ACCESSORIES

- **Low return temperature application.** This option is mainly focused to food storage, and can be applied to large warehouses installations.

With this option, the unit adapts all its devices to manage low return temperature (15°C) in cooling mode. This is possible due to some changes in the control operation parameters.

The "Selection Software" includes the option as mandatory when return temperature is lower than 20°C (with 15°C as the minimum allowed value).

- **Control signal for discharge damper.** This option provides an ON/OFF control signal to actuate an external discharge damper (damper not included) in coordination with the unit operation.

This functionality can be used for two rooftop units supplying the same duct, or for premises (ERP France) to prevent smoke ingress into the occupied space due to the chimney effect (in the event of a fire on the rooftop) when the rooftop unit is installed below the supply duct level.

The compatible ON/OFF damper must be equipped with a 24 V AC actuator with open/close limit switches and without spring return.

Sensors

- Sensor(s) of **ambient temperature**. There are 3 options:
 - One NTC sensor connected to the control board.
Note: An ambient sensor with RS485 communication is required for installation at more than 30 meters.
 - One to four sensors with RS485 communication.
 - Sensor(s) installed on the "Lead" unit of the shared network (SHRD).
- One to four sensors of **ambient temperature + humidity**, with RS485 communication or installed on the shared network (SHRD). This sensor is compulsory with enthalpic or thermoenthalpic free-cooling (optional). The outdoor air humidity sensor is also added with these types of free-cooling.
- **Smoke detecting** sensor. Smoke detecting station in accordance with the NF S 61-961 standard, 961, that uses a LED to indicate the installation status, and if the probe detects the presence of smoke in the installation, it stops the operation of the unit and gives the order to open or close the outdoor damper (configured by parameter).
To ensure compliance with the French regulations on Fire safety (ERP), it's possible to configure the opening of the fresh air damper and the exhaust air damper to 100% (return air damper closed).
- **Air quality** sensor to enable measuring CO₂. There are different options:
 - Ambient air quality sensor.
 - Return air quality sensor (duct-mounted).
 - Sensor installed on the "Lead" unit of the shared network (SHRD).
 - Double quality sensor (**coming soon**): two ambient air sensors; one ambient air sensor and one outdoor air sensor; one return air sensor (duct-mounted) and one outdoor air sensor.

Advantages of installing two ambient air quality sensor:

This installation is interesting in large premises, so that ventilation can be done based on the maximum, minimum or average value measured by the two sensors.

Advantages of installing an outdoor CO₂ air quality sensor:

This sensor gives the option to manage fresh air depending on real difference of CO₂ concentration indoor and outdoor^①. It gives the chance to really answer to the request of indirect method for ventilation, without need of estimating outdoor air quality, but measuring it.

① Outdoor sensor will be supplied not mounted. It has to be located outdoor, but protected from rain and external agents. For any doubt, please ask.

Options recommended for fresh air management:

Room	Outdoor	Recommendation
Constant occupation	Applied to all locations	Constant fresh air (fresh air % fixed by regulation). No additional option required.
Variable occupation	Locations where outdoor CO ₂ is well known	Variable fresh air (considering indoor CO ₂ concentration): • Ambient air quality sensor • Return air quality sensor • Double ambient sensor (in large scale premises)
	Locations where outdoor CO ₂ is not well known or variable	Variable fresh air (considering indoor and outdoor CO ₂ concentration): • Double air quality sensor: ambient and outdoor • Double air quality sensor: return and outdoor

Methodologies fresh air ratio calculation:

The categories of indoor air quality (IEQ) are defined in EN16798:1 based on the level of expectation that the occupants may have.

- A normal level would be a "medium" level.
- A higher level can be selected by occupants with special needs (children, elderly, people with disabilities, etc).
- A lower level does not mean any risk for health, but it can affect the comfort level.

Category IEQ	DIRECT METHOD: Fresh air ratio by person	INDIRECT METHOD: CO ₂ concentration above outdoor CO ₂ concentration
	dm ³ /s by person	ppm
I: High level of expectation	20	550
II: Medium level of expectation	12,5	800
III: Moderate level of expectation	8	1.350
IV: Low level of expectation	5	1.350

References: EN 16798-3:2017 and EN 16798-1:2019: Energy performance of buildings - Ventilation for buildings, replacing EN 13779:2007.

FACTORY OPTIONS AND ACCESSORIES

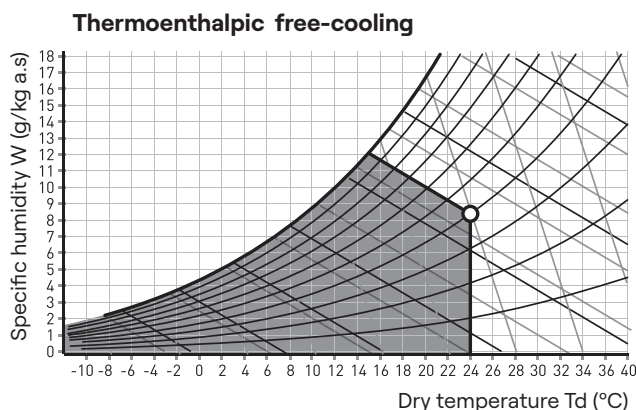
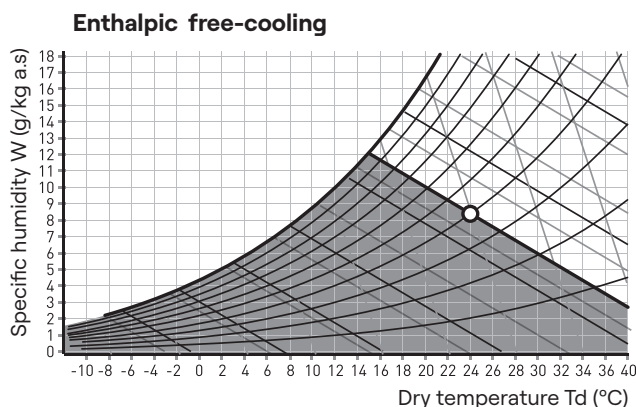
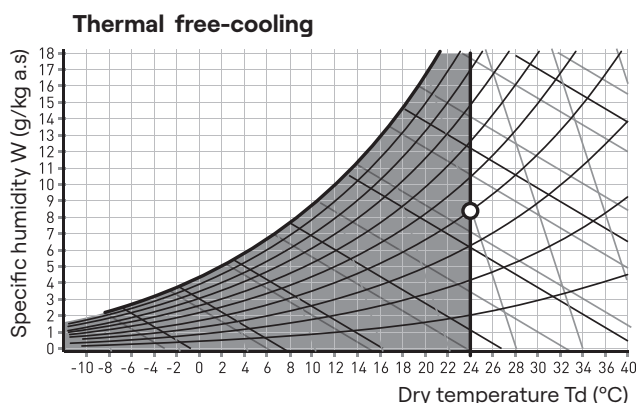
Free-cooling + Outdoor humidity control

- Thermal **free-cooling** control is provided as standard on all units with fresh air intake (all assemblies except B1). When operating in free-cooling mode, the unit maximizes the use of outdoor air whenever outdoor conditions are more favourable than return air conditions, reducing the cooling demand.

The percentage of outdoor air can be modulated from 0% to 100%.

Three free-cooling control strategies are available:

- Thermal: based on temperature comparison.
- Enthalpic: based on enthalpy comparison. Recommended where high humidity levels are expected.
- Thermoenthalpic: based on enthalpy comparison with temperature correction. This is the optimum solution, as it takes climatic variations into account.



Nocturnal free-cooling is an energy-saving function that allows the compressors to be disabled during summer according to a programmed schedule. The unit then operates in free-cooling mode at night when outdoor conditions are favourable, reducing the cooling demand during the first hours of the day.

- Outdoor air humidity sensor** (compulsory in units with optional enthalpic or thermoenthalpic free-cooling). There are 2 options:
 - Sensor supplied with the unit.
 - Sensor installed on the "Lead" unit of the shared network (SHRD).

Terminal + unit communication

- Terminal for "50FC" electronic control**

By default, the electronic control "50FC" is supplied with a Graphic terminal installed in the electrical cabinet of the unit, but these other configurations are also available:

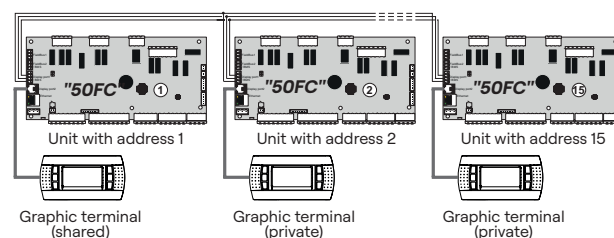
- Graphic terminal installed in the electrical cabinet and a remote User terminal located up to 100 m from the unit.
- Graphic terminal installed in the electrical cabinet and a remote Graphic terminal located up to 200 m from the unit.
- Graphic terminal installed in the electrical cabinet and a remote 7-inch Touch panel located up to 500 m from the unit.

Note: One 7-inch touchscreen panel can be shared by up to 6 units.

- 4.3-inch Touch panel installed in the electrical cabinet.



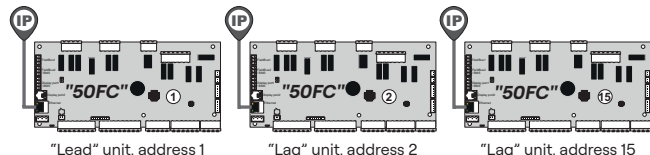
- Control without terminal, for units with shared terminal. One Graphic terminal can be shared by up to 15 units if they are integrated into a local pLAN network.



FACTORY OPTIONS AND ACCESSORIES

• Stand-alone or networked unit

By default, the electronic control is configured for a stand-alone unit, but it is also possible to include it in a SHRD shared network as "Lead", "Lag" or Backup. The maximum number of units that can be integrated into an "Lead/Lag" shared network is 15, and in the case of "Backup" it is 2 units.



Important: to use any of the following functionalities it is necessary to configure in the "Selection Program" a unit as "Lead" and all other units as "Lags" (including the Backup unit).

The specific functionality will be configured on site, according to the "50FC" control IOM manual (No. 10186).

The shared network (SHRD) allows to have the following functionalities depending on the parametrized configuration:

- Lead/Lag:

It allows the sharing of some of the probes installed in the "Lead" unit: ambient temperature or ambient temperature + humidity, outdoor temperature, outdoor humidity and CO₂ air quality.

Important: These probes can only be shared if installation features allow it.

- Extended Lead/Lag:

It includes "Lead/Lag" functionalities and the "Lead" unit provides ambient temperature setpoints to the other units.

- Lead/Lag with the same operating mode:

It includes the "Extended Lead/Lag" functionalities and the "Lead" unit also provides the status (Cooling-Heating - Ventilation) to the other units.

- Backup in case of alarm:

One unit is configured as a Backup unit, for activation in case of malfunction of the other unit.

- Extended Backup:

It includes the "Backup in case of alarm" functionalities and also, the control manages the automatic switching between the two units weekly, to compensate the operation times of both units.

Note: In the case of installations with Backup units, it is not possible to share the probes, since both units must be fully autonomous in their operation. If both units are connected to the same supply duct network, it is imperative that the installation consists of non-return dampers (installer responsibility).

Miscellaneous item 1

- Management of an **humidifier** with proportional or on/off control.

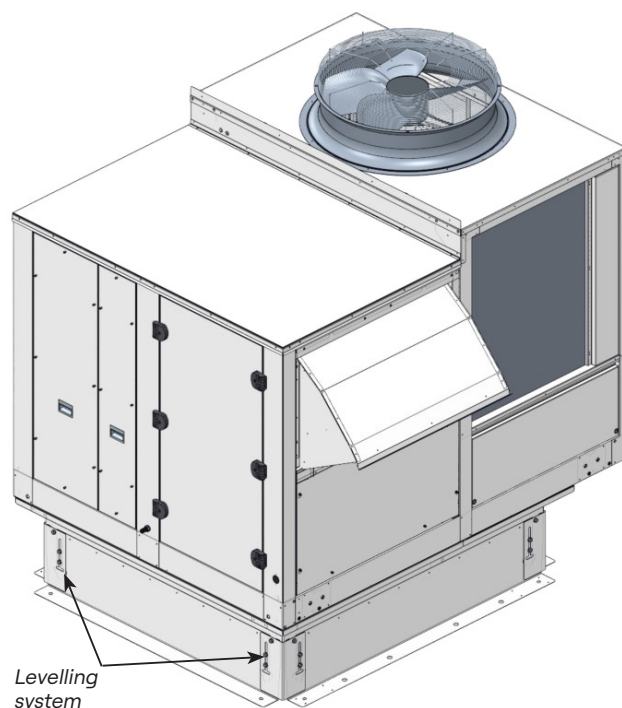
- **Energy meter** for monitoring of the power consumption of the installation.
- **Energy meter and calculation** of the cooling and heating capacities. In addition to the energy meter, the unit incorporates mixing and supply enthalpic sensors with RS485 communication that enable cooling and heating capacities to be calculated.

Miscellaneous item 2

- **Tropicalization:** Control board, electronic cards, and terminals inside the electrical cabinet are tropicalized with a protective conformal coating to enhance resistance to humidity and corrosive environments..
- High performance **phase monitoring relay** (BA and BB assemblies). A phase-monitoring relay is mandatory for the heat recovery circuit compressor. Two options are available: a standard relay or a high-performance relay. The high-performance relay provides protection against incorrect phase sequence, phase loss, undervoltage, overvoltage, and phase imbalance. It is particularly recommended for installations with unstable power supplies, voltage fluctuations, or high levels of electromagnetic interference (EMC).

Pre-assembly roof curbs

- The units can be installed on standardised **pre-assembly roof curbs** with adjustable height, built in galvanised steel panelling with polyester coating and thermal insulation. The levelling system uses angle brackets that allow adjustments in the X and Y axes.



- Roof curbs adapted for direct on-site replacement of units from different manufacturers (**upon request**).

FACTORY OPTIONS AND ACCESSORIES

Additional factory options upon request

This chapter describes the most frequently requested optional features available upon request. These options are not included in the "Nomenclature of the model number".

Overview table

Description		Installation in factory	Installation on site
Options of electronic control	Activation of the remote COOLING / HEATING operating mode	✓	
	General alarm signalling by relay	✓	
	Mechanical disconnection of stages	✓	
	Ventilation mode with 100% fresh air by digital input	✓	
	Control of supply and return dampers		✓
	Ventilation with differential air pressure sensor		✓
	Leak detector alarm via relay	✓	
100% fresh air (BF assembly)		✓	
Rotary wheel bypass (with BL assembly)		✓ (*)	
Dampers of the mixing box with spring			✓
Condensate drain pan for outdoor circuit			✓
Roof curbs adapted for direct on-site replacement			✓

(*) Part of this option must be installed on-site.

- General alarm signalling:**

The "50FC" control allows the management of a relay for remote alarm signalling.

The output for general alarm signal is not compatible with the following options: hot water coil, heat recovery coil, rotary heat exchanger and on/off signal for external humidifier.

In this case, upon request, it would be possible to have a general alarm output in an input/output expansion module.

- Mechanical disconnection of stages:**

This option allows the mechanical disconnection of stages of compressor and/or electrical heaters using digital inputs.

This is especially useful in the following cases:

- To reduce electricity consumption in certain time slots.
- When electricity consumption is limited.

- Ventilation mode with 100% fresh air by digital input:**

The "50FC" control allows to manage a ventilation mode with 100% fresh air through the Graphic terminal or by BMS supervision, but on certain occasions it may be interesting to activate this mode through a digital input.

This option is especially useful when rapid air renewal is needed, for example in cinema rooms.

- Control of supply and return dampers:**

This function allows the management of external drive and return dampers located in the ducts, so that the closure of the ducts can be controlled after the unit is stopped.

This option can also be useful in installations with Backup units.

- Ventilation with differential air pressure sensor:**

In installations with this differential pressure sensor, the percentage of air renewal is adjusted according to the pressure in the room. This option allows dynamic control of the damper opening by measuring the pressure differential between inside and outside.

- Leak detector alarm via relay:**

The A2L leak detector installed in these units includes standard BMS alarm reporting capability. Additionally, a physical alarm output via relay can be provided upon request.

- 100% fresh air (BF assembly):**

The 100% fresh air configuration, without return or exhaust air recirculation, is designed for applications where the use of return air is not permitted due to contamination risks, such as kitchens and other spaces with odours or airborne pollutants.



- Rotary wheel bypass for extended free-cooling operation:**

During free-cooling operation, the rotary wheel is stopped and the airflow passes through it. The achievable free-cooling rate is at least equal to the selected fresh-air rate and may reach higher values depending on the unit selection. ECAT determines the maximum rate by checking that the differential pressure across the wheel remains ≤ 600 Pa and that the supply and return fans can overcome the additional pressure drop.

Available under request for the BL assembly, the bypass option redirects both fresh and exhaust air through the upper bypass box instead of through the rotary wheel during free-cooling operation. This allows higher free-cooling rates while reducing the additional pressure drop and, consequently, supply and return fan energy consumption.

- Dampers of the mixing box with spring:**

In combination with the "Antifreeze Protection Kits", the mixing box dampers can be equipped with spring-return actuators, ensuring automatic closure in the event of a power failure.

TECHNICAL CHARACTERISTICS (EN-14511-2022)

50FC series		023	029	038	044	048	051
Cooling capacities							
Cooling capacity ①	kW	23,1	29,5	36,3	41,5	44,0	49,1
Power input ③	kW	7,5	9,7	12,7	15,5	16,2	20,1
EER performance		3,06	3,05	2,86	2,68	2,71	2,44
SEER		5,19	5,25	4,73	4,66	4,69	4,55
ηs		205%	207%	186%	184%	185%	179%
Heating capacities							
Heating capacity ②	kW	22,2	28,0	35,6	41,7	44,6	49,9
Power input ③	kW	6,9	9,2	12,0	14,4	15,1	17,8
COP performance		3,23	3,05	2,98	2,89	2,95	2,80
SCOP		3,67	3,63	3,56	3,65	3,69	3,69
ηs		144%	142%	140%	143%	145%	145%
Outdoor circuit fan		Electronic axial fan					
Nominal airflow	m³/h	9.000	14.500	17.000	17.000	17.750	17.750
Available static pressure	mm.w.c	5					
Number / Diameter	mm	1 / 800					
Ingress protection rating		IP55					
Maximum speed	r.p.m.	1.100					
Motor output	kW	3,0					
Maximum absorbed current	A	4,6					
Indoor circuit supply fan		Electronic plug fan					
Nominal airflow	m³/h	4.800	6.000	6.750	7.800	8.350	9.100
Available static pressure	mm.w.c	12	12	15	15	15	15
Minimum airflow	m³/h	2.880	2.880	4.050	4.050	4.050	4.050
Maximum airflow	m³/h	7.200	7.200	10.920	10.920	13.000	13.000
Number / Diameter	mm	1 / 500		1 / 500			
Speed	r.p.m.	2.140		2.480			
Motor output	kW	1 × 3,05		1 × 4,15			
Maximum absorbed current	A	4,75		6,3			
Compressor		Variable-speed scroll					
Number of compressors / circuits		1 / 1					
Oil type		Danfoss POE 160SZ, Copeland 3MAF 32cST, ICI Emrakate RL 32CF					
Volume of oil	l	1 × 3,63	1 × 3,63	1 × 3,63	1 × 3,63	1 × 3,63	1 × 3,63
Electrical characteristics							
Mains voltage		400 V / III ph / 50 Hz (±10%)					
Power supply		3 Wires + Ground + Neutral					
Maximum absorbed current	A	21,4	23,6	28,4	33,6	38,8	46,8
Refrigerant		R-454C					
Global warming potential ④	GWP	148					
Charge	kg	10,0	10,4	13,4	13,8	14	14,3
Environment impact	tCO2eq	1,5	1,5	2,0	2,0	2,1	2,1
Weight							
B1 assembly	kg	763	763	790	800	800	800

- ① Cooling capacity calculated in accordance with the EN-14511-2022 standard given for indoor temperature conditions 27°C, 19°C WB and 35°C outdoor temperature.
- ② Heating capacity calculated in accordance with the EN-14511-2022 standard given for indoor temperature conditions 20°C and 6°C WB outdoor temperature.
- ③ Total power input by compressors and motorised fans under nominal conditions, calculated in accordance with the EN-14511-2022 standard.
- ④ Climatic warming potential of a kilogram of fluorinated greenhouse gas in relation to a kilogram of carbon dioxide over a period of 100 years.

TECHNICAL CHARACTERISTICS (EN-14511-2022)

Axial 2-speed outdoor fan

50FC series		023	029	038	044	048	051
Cooling: efficiency with R-454C	SEER	4,43	4,07	3,87	3,88	3,89	3,81
	η_s	174%	160%	152%	152%	153%	149%
Heating: efficiency with R-454C	SCOP	3,24	3,21	3,31	3,37	3,41	3,41
	η_s	127%	126%	129%	132%	133%	133%
Nominal airflow	(m ³ /h)	9.000	14.500	16.200	16.500	17.000	17.000
Available static pressure	(mm.w.c.)	5					
Number / Diameter	(mm)	1 / 800					
Maximum speed	(r.p.m.)	670 / 880					
Motor output	(kW)	1,2 / 1,9					
Maximum absorbed current	(A)	3,9					

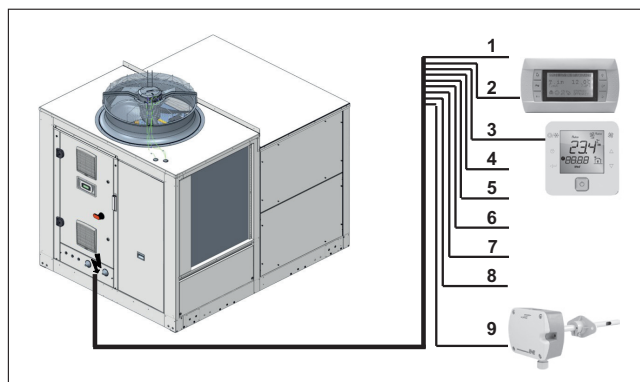
OPERATION LIMITS

Inlet air conditions		Cooling	Heating
Indoor coil	Minimum temperature	9,7°C WB	5°C
	Maximum temperature	24°C WB	27°C
Outdoor coil	Minimum temperature	-10°C ①	-18°C WB ② ③
	Maximum temperature	50°C	15°C WB

- ① If the condensation pressure control (standard) is disabled, the minimum temperature will be 12°C.
- ② When the outdoor temperature is typically below 5°C WB, the installation of a support heating element is recommended.
- ③ Operation up to -15°C WB at full load.

ELECTRICAL CONNECTIONS

No.	50FC series		023 to 051
1	Main power supply	400 III ($\pm 10\%$)	3 wires + ground + neutral
2	Remote installation of the Graphic terminal (installed in the electrical cabinet as standard)		telephone cable 6 wires standard (RJ12 connector)
3	Remote installation of a User terminal (optional) ①		2 × 1 mm ² (230V) + 1 shielded cable for communication type AGW20 / 22 (1 braided pair + drain wire + shielding)
4	Remote off/on (optional)		2 × 1 mm ²
5	General alarm signal (optional) ②		2 × 1 mm ²
6	Remote Cooling/Heating (optional upon request)		2 × 1 mm ²
7	Circulation pump signal for HWC (antifreeze sec.) (optional)		1 × 1 mm ²
8	Ambient probe	NTC	2 × 1,5 mm ²
		RS485	4 × 1,5 mm ² + shielding ③
9	Air quality probe (optional)		3 × 1,5 mm ²

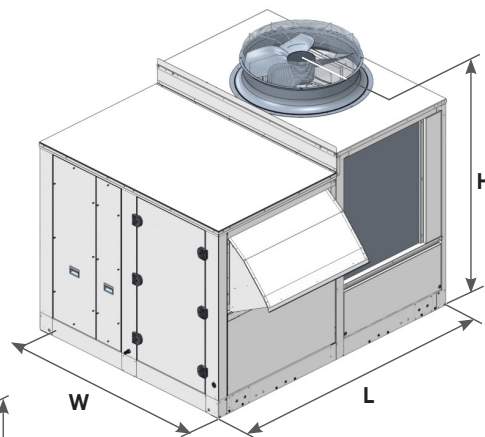


- ① The electrical cabinet power supply (230 V) must be used to power the User terminal
- ② The output for general alarm signal is not compatible with the following options: hot water coil, heat recovery coil, rotary heat exchanger and on/off signal for external humidifier. With these options, possibility of general alarm upon request.
- ③ Up to four RS485 ambient sensors can be connected in series on the field-bus of the control board.

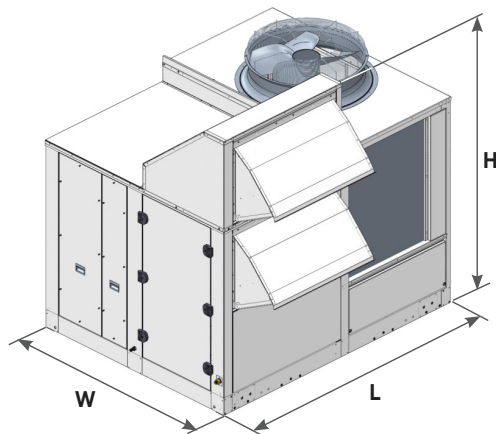
OVERALL DIMENSIONS OF THE DIFFERENT ASSEMBLIES

50FC series	Assembly														
	B1, B2			B3, BP, BA			BW			BT, BB			BL		
	Length (mm)	Width (mm)	Height (mm)	Length (mm)	Width (mm)	Height (mm)	Length (mm)	Width (mm)	Height (mm)	Length (mm)	Width (mm)	Height (mm)	Length (mm)	Width (mm)	Height (mm)
023	2.225	1.750	1.960	2.230	1.755	2.200	2.230	2.565	2.200	2.230	1.760	2.200	2.230	2.570	2.200
029	2.225	1.750	1.960	2.230	1.755	2.200	2.230	2.565	2.200	2.230	1.760	2.200	2.230	2.570	2.200
038	2.225	1.750	1.960	2.230	1.755	2.200	2.230	2.565	2.200	2.230	1.760	2.200	2.230	2.570	2.200
044	2.225	1.750	1.960	2.230	1.755	2.200	2.230	2.565	2.200	2.230	1.760	2.200	2.230	2.570	2.200
048	2.225	1.750	1.960	2.230	1.755	2.200	2.230	2.565	2.200	2.230	1.760	2.200	2.230	2.570	2.200
051	2.225	1.750	1.960	2.230	1.755	2.200	2.230	2.565	2.200	2.230	1.760	2.200	2.230	2.570	2.200

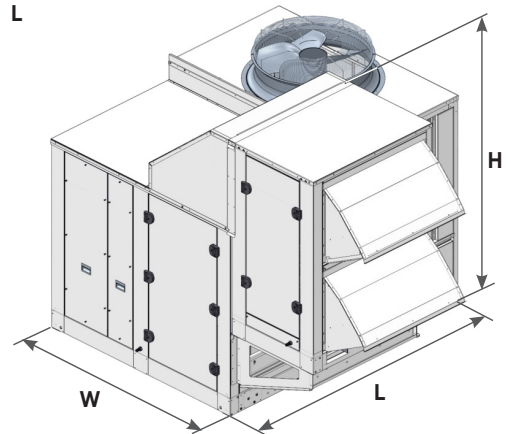
B1 and B2 assemblies



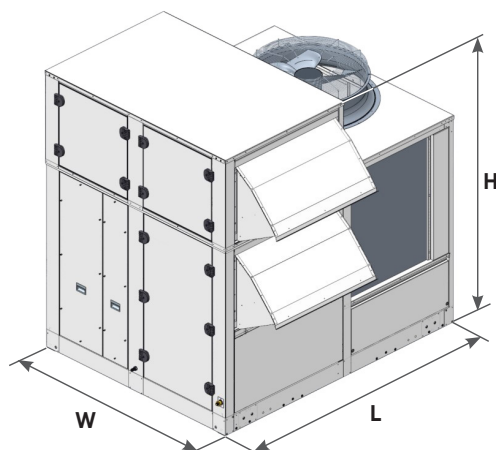
B3, BP and BA assemblies



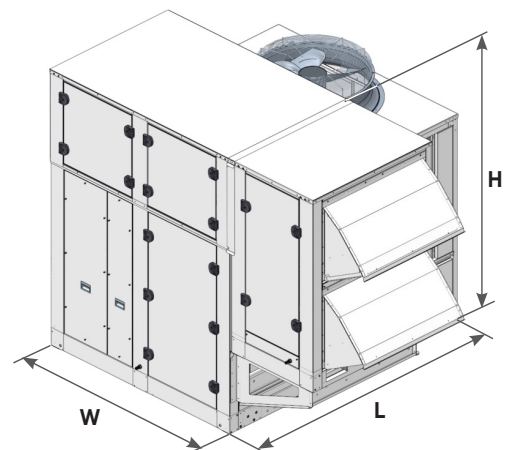
BW assembly



BT and BB assemblies



BL assembly



WEIGHT OVERVIEW OF THE ASSEMBLIES AND THE MAIN OPTIONS

Weight overview of the various assemblies (kg)

50FC series		023	029	038	044	048	051
B1 assembly (*)		763	763	790	800	800	800
B2 assembly (*)		776	776	805	815	815	815
B3 assembly (*)		863	863	891	901	901	901
BP assembly (*)		894	894	924	934	934	934
BA assembly (*)		962	962	992	1.002	1.002	1.002
BT assembly (*)		942	942	958	968	968	968
BB assembly (*)		1.009	1.009	1.027	1.037	1.037	1.037
BW assembly	Machine (*)	878	878	906	916	916	916
	Recovery module	273	273	273	273	273	273
	Total weight	1.151	1.151	1.179	1.189	1.189	1.189
BL assembly	Machine (*)	904	904	929	940	940	940
	Recovery module	273	273	273	273	273	273
	Total weight	1.177	1.177	1.202	1.213	1.213	1.213

(*) An additional weight of 27 kg should be added for transportation due to the temporary shipping supports fitted to the unit. These supports will be removed during installation.

Weight supplement from the main options (kg)

50FC series		023	029	038	044	048	051
Pre-assembly roof curb (without gas burner) (*)		165	165	165	165	165	165
Pre-assembly roof curb (with gas burner) (*)	BAF (Low)	270	270	270	270	270	270
	BAM (Nominal)	281	281	281	281	281	281
	BAS (High)	288	288	288	288	288	288
Electrical heaters	RAF (Low)	14	14	14	14	14	14
	RAM (Nominal)	15	15	15	15	15	15
	RAS (High)	-	-	19	19	19	19
Hot water coil	Empty	28	28	31	31	31	31
	Service	33	33	38	38	38	38
Heat recovery coil	Empty	29	29	30	30	30	30
	Service	36	36	37	37	37	37
Supply fan	Low pressure (F)	0	0	-7	-7	-7	-7
	High pressure (S)	-7	-7	-7	-7	-7	-7
Stop-drop	Indoor coil	27	27	27	27	27	27
	Fresh air intake	8	8	8	8	8	8
Air filters	G4 l.p.d. + F7	4	4	4	4	4	4
	M6 + F7	8	8	8	8	8	8
	F7 + F9	8	8	8	8	8	8

(*) An additional weight of 14 kg should be added for transportation due to the temporary shipping supports fitted to the roof curb. These supports will be removed during installation.