



PRODUCT SELECTION DATA

PACKAGED ROOFTOP UNITS WITH R-454B



- Low environmental impact
- High full and part load efficiency
- Compact and simple to install
- Low refrigerant charge
- Low sound level
- Energy recovery
- Variable speed EC fans

50FF/FC 100 - 280 R-454B



Nominal cooling capacity 96.6 - 272.9 kW
Nominal heating capacity 97.1 - 299.2 kW

The **50FF/FC R-454B** consists of autonomous and packaged air-to-air units of horizontal construction, rooftop-type design.

- **50FF series:** for **cooling-only** operation.
- **50FC series:** for **reversible heat pump** operation.

The range of available capacities in the series allows for the air conditioning of medium and large surface areas which are common in shopping malls, food retail, logistics and many other commercial and industrial applications.

50FF/FC units are designed for optimized part-load management in achieving the highest levels of seasonal efficiency, exceeding the limits set by regulation.

With its mono-block lightweight construction, the units feature a self-supporting frame, designed to ease the installation and maintenance works.

The units integrate the latest technological innovations:

- Multi-scroll compressors in tandem.
- Electronic expansion valves.
- Variable speed EC fans.
- Auto-adaptative microprocessor control.

For maximum adaptability, a number of options is available to meet any operating requirement:

- Exhaust air energy recovery.
- Economizer.
- Indoor air quality management.
- Available static pressure up to 80 mm.w.c.
- Zoning with variation of airflow.
- Installation roofcurbs.
- Auxiliary heating modules.
- Extended operation limits.



CARRIER participates in the ECP programme for RT
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R-454B: THE BEST SOLUTION FOR ROOFTOPS

CARRIER offers the best refrigerant choice according to applications, conditions and technologies.



**CO₂ FOOTPRINT
REDUCED BY UP TO 80%**

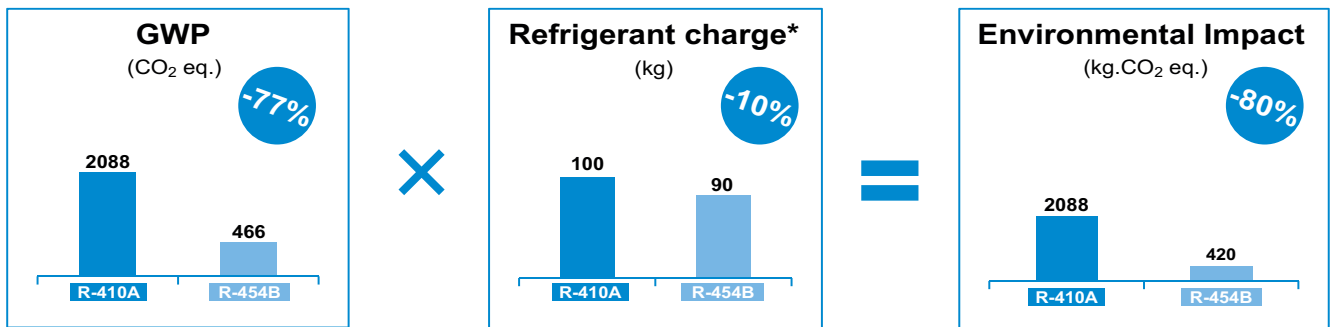
R-454B is currently the ideal refrigeration solution for rooftops. By using R-454B refrigerants, Carrier has reduced the carbon footprint of its version with R-410A by an astonishing 80%.

R-454B is also the right choice economically, reducing the locally imposed tax burden on HFCs based on the CO₂ impact.

The impact of an air conditioning system on global warming of the planet is in large part caused by CO₂ emissions released into the atmosphere when the electricity required to power the unit is produced (**indirect effect**) and in small part by CO₂ emissions linked to uncontrolled emissions of refrigerant with global warming potential into the atmosphere (**direct effect**).

Direct effect. Lower environmental impact ⇒ -80% compared to R-410A

- R-454B has zero Ozone Depletion Potential (ODP).
- The Global Warming Potential (GWP) of R-454B is 466, i.e. approximately one third of that of R-410A (GWP 2088), and 30% lower than R-32 (GWP 675).
- The 50FF/FC R-454B cooling charge is reduced by 10% compared to the version using R-410A*
- The carbon footprint of the 50FF/FC R-454B is therefore 420 (466 x 0.9), i.e. 88% lower than the version using R-410A (2088 x 1).



Note: Units with R-410A can benefit from a retrofit kit to use R-454B.

Indirect effect. Lower environmental impact ⇒ -3% compared to the already astonishing low consumption in 50FC R-410A



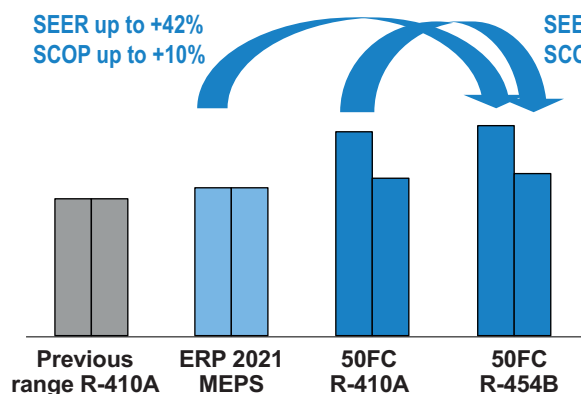
SEER up to +3% (*): Up to 42% savings vs ErP2021

SCOP up to +3% (*): Up to 10% savings vs ErP2021

(*) over the already outstanding performance in 50FC R-410A

The seasonal efficiency of 50FF/FC R-454B is higher than the already outstanding performance in 50FC R-410A.

The savings vs Ecodesign requirements go up to 42% in cooling and 10% in heating with 50FF/FC R-454B.



This performance is the result of the optimize and high quality components rigorously selected:

- R-454B refrigerant with high energy performance.
- New generation of scroll compressors optimized for R-410A and R-454B refrigerant (bivalent compressors) in tandem configuration with 2 frigorific circuits and 4 compressors for high performance in partial load.
- Electronic expansion valves.
- "50FC" control optimizing performance and energy consumption.
- Outdoor EC fans for high efficiency and low noise level.
- Indoor EC plug-fans with pressure transducer.

R-454B is an A2L classified refrigerant thanks to its low flammability.

- The service tools must be certified for A2L refrigerants in accordance with standard ISO 817 or EN378.
- Service technicians must be qualified for brazing components on PED 3 fluid units.

CUSTOMER BENEFITS

Outstanding performance

50FF/FC 100-280 units are designed for optimized part-load management in achieving the highest levels of seasonal efficiency, exceeding the limits set by regulation.



The unit integrates the latest technological innovations:

- Multi-scroll compressors in tandem optimized for R-410A and R-454B refrigerant (bivalent compressors).
- Electronic expansion valves.
- Outdoor EC fans with variable speed.
- Supply EC plug-fans with direct drive and variable speed.
- Auto-adaptative microprocessor control.

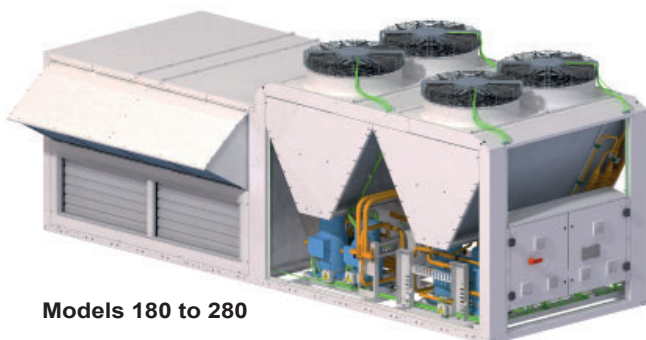
Easy and fast installation

With its mono-block lightweight construction, the 50FF/FC units feature a self-supporting frame, designed to ease the installation and maintenance process. The units are connected directly to an air distribution ductwork without additional elements or equipment, pipes, cables, etc. taking no floor space at all. This design reduces the cost of installation, facilitates a quick connection and ensures reliable operation.

- Vertical supply/return airflow configurations are ideal for new construction or retrofit projects.
- Horizontal airflow configurations are ideal for replacement or applications such as through-the-wall where sound must be attenuated before the duct penetrates the roof.



Models 100 to 170



Models 180 to 280

Adaptability

The range offers a wide range of options and a large set of configurations to customize the unit according to your needs:

- Exhaust air energy recovery.
- Economizer.
- Indoor air quality management.
- Available static pressure up to 800 Pa.
- Adjustable or adaptation roofcurbs.
- Auxiliary heating systems.
- Extended operation limits up to -15°C in heating.
- 4 zone management with airflow control option.
- Heat recovery water coil.
- Low return temperature option for storage applications.
- Double panel option with 50 mm insulation.

Superior reliability

The 50FF/FC 100-280 range has been designed to ensure robustness throughout the lifecycle of the units. The high-reliability of the units is the result of **high-quality material and components** combined with the **highest quality standards** in terms of manufacturing and laboratory testing.



Low sound levels

The 50FF/FC range provides a low-noise level during operation thanks to design optimization and the latest technology to meet the most exigent requirements.

Up to **70%** of the operation time below half-load.

Sound level reduction in partial load operation.

Night operation mode available with free-cooling and disabling compressors. This also helps to reduce the sound level during night periods.

Indoor air quality

The 50FF/FC range offers a wide range of technological features dedicated to improve and maintain the highest level of indoor air quality:

- Ventilation
- Filtration
- Quality sensor
- Airflow control
- Active technologies under request

Discover more about Carrier's approach to Healthy Buildings on <https://www.corporate.carrier.com/healthybuildings/>

KEY 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	0100	A	4	B	B1	LL	000	S	N	A	H	S	000	0000	0000	0	0	AA00	00	A00	000	AA00	0000	0000

A: Unit type

50FF: air/air cooling-only
50FC: air/air heat pump

B: Unit model

2 circuits: 0100 / 0110 / 0120 / 0130 / 0145 / 0160 / 0170 / 0180 / 0200 / 0220 / 0250 / 0280

C: Version of the series

A: Current version

D: Electrical power

4: 400V / 3ph + N / 50Hz
5: 400V / 3ph / 50Hz

E: Type of refrigerant

B: R-454B

F: Airflow + Assembly

B1: Standard
B2: Economizer, 2 dampers
BP: Plug-fan in return section
BA: Cooling recovery circuit with plug-fan in return section
BT: Return top box with plug-fan or centrifugal fan
BB: Cooling recovery circuit with plug-fan or centrifugal fan in return top box
BW: Heat recovery wheel module

G: Coil coating : Indoor - Outdoor

LL: Aluminium - Aluminium
LP: Aluminium - Polyurethane
LN: Polyurethane - Inera®
PP: Polyurethane - Polyurethane
PN: Polyurethane - Inera®
NN: Inera® - Inera®

H: Heating

000: Without auxiliary heating
BAx: Gas burner, 2 power outputs:
x = M (Nominal) / S (High)
RAx: Electrical heaters, 3 power outputs:
x = F (Low) / M (Nominal) / S (High)
HAx: Hot water coil:
x = S (Standard)

I: Protection for low outdoor temperature

S: Without protection
A: Freeze protection OAT lower than -10°C
B: Freeze protection OAT lower than -14°C
C: Freeze protection OAT lower than -10°C + spring shut-off dampers
D: Freeze protection OAT lower than -14°C + spring shut-off dampers

J: Supply fan

F: Low available pressure (aluminium)
N: Nominal available pressure (polypropylene)
M: Nominal available pressure (aluminium)
S: High available pressure (aluminium)

K: Air filtration + droplet eliminator

A: G4
B: G4+ droplet eliminator
C: G4 low pressure drop
D: G4 low pressure drop + droplet eliminator
G: G4 + F7
H: G4 + F7 + droplet eliminator
K: G4 low pressure drop + F7
L: G4 low pressure drop + F7 + droplet eliminator
O: M6 + F7

P: M6 + F7 + droplet eliminator
S: F7 + F9
T: F7 + F9 + droplet eliminator

L: Outdoor fan

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

M: Insulation

S: Standard insulation
M: Insulation M0 with double wall (50mm)

N: Indoor circuit

000 - Without optional accessories
A: Condensate drain pan in stainless steel
A: Room overpressure management
A: Filter fouling detector

O: Outdoor circuit

0000 - Without optional accessories
A: Fresh air safety grid
A: Outdoor coil protection grid
A: Antivibration mounts
A: Droplet eliminator at the fresh air intake

P: Heat recovery wheel

0000 - Without optional accessories
4: Wheel diameter: 1500 mm
5: Wheel diameter: 1800 mm
6: Wheel diameter: 2000 mm
7: Wheel diameter: 2200 mm
A: Wheel speed with on/off control
B: Wheel speed with variable control
A: Channel cross section of 2,0 mm
B: Channel cross section of 2,5 mm
A: Material : Aluminium
C: Material : Hybrid wheel
D: Material : Aluminium with silicagel

Q: Extra heating

0: Without extra heating
B: Heat recovery coil

R: Special applications

0: Without special applications
C: Air zoning
D: Low return temperature application
I: Low T application + Air zoning

S: Sensors

0000 - Without optional accessories
A: Smoke detection control unit
A: CO₂ sensor environment installation
B: CO₂ sensor ducted installation
C: CO₂ sensor on the pLAN network
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 the pLAN network

T: Economizer management + Outdoor hum.

00 - Without economizer + without sensor
A: Outdoor humidity sensor on the unit
B: Outdoor hum. sensor on pLAN network
A: Thermal management
B: Thermoeconomic management
C: Enthalpic management

U: Terminal + Unit communication

000 - Without terminal + stand-alone unit + without communication card
A: Card RS485 Modbus/Carel
B: Card Ethernet PCoWeb
C: Card RS485 LonWorks®
D: Card Ethernet BACnet™
E: Card RS485 BACnet™
F: Card RS485 Konnex
0: Stand-alone unit
A: Master unit
B: Slave unit
A: Graphic terminal in electrical cabinet
B: User terminal in electrical cabinet
C: Graphic terminal in the cabinet + User terminal remote up to 100 m
D: User terminal in the cabinet + Graphic terminal remote up to 200 m
E: Graphic terminal in the cabinet + Graphic terminal remote up to 200 m
F: Touch panel in electrical cabinet
G: Touch panel in the cabinet + Graphic terminal remote up to 200 m
H: Touch panel in the cabinet + User terminal remote up to 100 m

V: Miscellaneous item 1

000 - Without optional accessories
A: On-off control of an humidifier
B: Proportional control of an humidifier
A: Electrical energy meter
B: Cooling capacity & elec. energy meter
Unused

W: Miscellaneous item 2

AA00 - Without optional accessories
Unused
A: Varnish protection
Unused
Unused

X: Return fan

0000 - Without return fan
A: Centrifugal, low airflow
C: Centrifugal, nominal airflow
E: Centrifugal, high airflow
N: Plug-fan, nominal pressure (polyprop.)
M: Plug-fan, nominal pressure (aluminium)
S: Plug-fan, high pressure (aluminium)
Unused

Y: Indoor airflow direction

0000 - Lower direction
0: Lower supply and lower return (B1, B2, BP, BA and BW assemblies)
1: Lateral supply and lower return (B1, B2, BP, BA and BW assemblies)
2: Lower supply and lateral return (B1, B2, BT and BB assemblies)
3: Lateral supply and lateral return (B1, B2, BT and BB assemblies)
4: Upper supply and lower return (B1 and B2 assemblies)
5: Lateral supply and upper return (B1 and B2 assemblies)
6: Upper supply and lateral return (B1 and B2 assemblies)
7: Lower supply and upper return (B1 and B2 assemblies)
8: Upper supply and upper return (B1 and B2 assemblies)
Unused



UNIT COMPONENTS

Casing

- Structure made of galvanised steel metal. Panels and registers in aluminium. Most parts protected with polyester paint, white colour RAL 7035.
- Removable panels for easy access to all components: electrical cabinet, compressors, fans, filters, etc.
- Skids for easy transport in a container. The dimensions of this range allow all models and assemblies to be transported in a container, so that the special SEI4C maritime packaging is not necessary under any circumstances.

Outdoor circuit

- Coils with copper pipes and aluminium fins.
- EC electronic axial fans which adapt the rotation speed to the installation's requirements, thereby reducing electricity consumption, the sound level at partial charge and improving the unit's average seasonal efficiency. IP55 protection.

Indoor circuit

- Thermal and acoustic insulation in panels and registers with M1 fire classification.
- Coils with copper pipes and aluminium fins.
- EC electronic supply plug-fans with variable control speed and flow rate controller.
- Reusable gravimetric air filters G4, mounted on a frame. Dual locking system mounted on the access panel to filters.
- Isolated pan of condensates drainage sloping down towards the drain. This pan is removable for easy cleaning in models 100 to 170.

Cooling circuit

- Hermetic scroll-type compressors in tandem design that improves the management of stages and the part load

efficiencies, assembled over antivibration mounts. Relay for phase-sequence monitoring and phase loss protection.

- Crankcase heater.
- Electronic expansion valves.
- Four-way cycle reversing valves.
- Acid-resistant filters dryer.
- Cooling design in 2-air volumes.

Protections

- High pressure pressostats.
- High and low pressure transducers.
- Refrigerant leak control (by low-pressure alarm).
- Due to the A2L category of refrigerant R-454B (lightly flammable), it requires the installation of a refrigerant leak detector. This detector uses infrared instead of semiconductor technology with no need of calibration (self-calibration), with very fast time response, and high lifetime.

The detector is installed on a panel next to the supply fans of the indoor circuit. This position ensures the correct reading of the gas concentration in the indoor coil.

If the unit is connected to a BMS monitoring system, the electronic control is prepared to send an alarm signal in case of leakage detection.

Note: These units are designed to be installed outdoors in a well ventilated area, but a second leak detector can be installed in the outdoor circuit if in any case it is considered necessary. Available upon request.

- Compressor discharge temperature control.
- Main door switch.
- Protection for power lines of compressors with manual motor starters and power lines of fan motors with magnetothermic switches. These devices provide protection against overload, short circuit, phase failure and undervoltage.
- Automatic switch in the control circuit.

UNIT COMPONENTS

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 doors.
- Electrical power supply with neutral.
- Main ground connection.
- Compressor and fan motor contacts.

“50FC” control

Factory-installed “50FC” control provide the capability for free standing operation or may be linked with a more extensive system. Factory-installed and programmed Modbus communication capability provides simple integration with the building BMS system.

The 50FF/FC range may also be configured to communicate via LonWorks®, BACnet™ MSTP, Konnex, Modbus TCP/IP, BACnet™ Ethernet, TCP/IP, SNMP V1-2-3, FTP and HTTP protocols, if required by the application.

The “50FC” control also have the capability to communicate with our supervision solutions: **pCO Web** (1 unit), **BOSS mini** (50 units) and **BOSS** (300 units).

This communication flexibility allows simple system integration, as well as data collection, trending, monitoring and alarm displays. The control provides unparalleled service diagnostic information.

With this control it is also possible to connect to a local pLAN (“50FC” Local Area Network) for a maximum of 15 units, with one unit configured as “Master” and the others as “Slaves”. This network allows the exchange of data and information between the units, and depending on the conditions of the installation, share the reading of some probes installed on the unit configured as “Master”, temperature setpoints and operating mode. It is also possible to configure one unit as “Back-up” just in case for failure of the another unit on the pLAN network.

- The “50FC” control are your link to a world of simple and easy-to-use rooftop units that offer outstanding performance and value. With the sensors, it maintains control over all the components of the unit and helps optimise the performance of the refrigeration circuits as conditions change, resulting in the following features:
 - Higher part load efficiency.
 - Better control of temperature.
 - Superior reliability.
 - High ambient cooling operation at 48°C.
 - Low ambient cooling operation at -15°C WB.
- The main functions of this control are:
 - Selection of setpoint and operating mode: HEATING / COOLING / AUTO / VENTILATION.
 - Continuous control of the operating parameters.
 - Display of the values measured by the sensors.
 - Compressors cycles.
 - Defrosting management.

- Control of the supply air temperature.
- 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 air flow on the outdoor fans.
- Setpoint compensation based on the outdoor temperature.
- Hourly and weekly schedule.
- Fire protection.
- Diagnosis of faults and general alarm.
- Management of all the optional components available for the unit: economizer, back-up heating, CO₂ air quality sensor, energy recovery,...

User interfaces

Graphic terminal

This terminal, fitted as standard on the electrical cabinet, is very easy to use. It provides detailed explanations of control in easy to understand English. No decoding is required.



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

- This terminal is used to:
 - Carry out initial programming of the unit.
 - Modify operating parameters.
 - Switch the unit ON / OFF.
 - Select the operating mode and adjust the setpoints.
 - Display the variables controlled and sensor values measured.
 - Display the current alarms and their historical record.

User terminal (optional)

This terminal can be installed on the electrical cabinet, instead of the graphic terminal. In this case, the remote connection of the graphic terminal is possible.



- This terminal is used to:
 - Switch the unit ON / OFF.
 - Select the operating mode and adjust the setpoints.
 - Display the installation's temperatures and humidity, outdoor temperature, supply air temperature, CO₂ sensor and opening of the outdoor damper.
 - Display alarms codes.

Touch panel (optional)

With the same functions as the graphic terminal, the 4.3 inch touchscreen panel makes interaction between the user and the unit much easier by simplifying navigation between the various screens.





PHYSICAL DATA WITH R-454B REFRIGERANT (EN-14511-2018)

50FF		100	110	120	130	145	160	170	180	200	220	250	280
Cooling capacities													
Cooling capacity (1)	kW	96,58	106,55	115,79	126,71	140,34	154,61	162,79	173,75	193,77	213,43	244,29	270,96
Power input (3)	kW	29,63	33,30	36,64	38,05	44,55	50,86	54,81	52,65	61,51	71,86	76,10	88,84
EER performance		3,26	3,20	3,16	3,33	3,15	3,04	2,97	3,30	3,15	2,97	3,21	3,05
SEER		5,04	4,95	4,85	5,07	4,91	4,85	4,86	5,16	5,00	4,99	4,92	4,83
η_s		199%	195%	191%	200%	194%	191%	192%	204%	197%	196%	194%	190%
Outdoor circuit fan													
Electronic axial fan													
Nominal air flow	m ³ /h	44.000	44.000	44.000	58.000	58.000	64.000	64.000	80.000	86.000	86.000	120.000	120.000
Available static pressure	mm.w.c	5											
Number / Diameter	mm	2 / 800			2 / 910				4 / 800			4 / 910	
Maximum speed	r.p.m.	1.100			1.070				1.100			1.070	
Motor output	kW	2 x 3,0			2 x 3,3				4 x 3,0			4 x 3,3	
Maximum absorbed current	A	2 x 4,6			2 x 5,0				4 x 4,6			4 x 5,0	
Indoor circuit supply fan													
Electronic plug-fan (Polypropylene)													
Nominal air flow	m ³ /h	18.000	19.800	21.600	23.400	26.100	28.800	30.600	32.400	36.000	39.000	40.500	45.000
Nominal avail. static pressure	mm.w.c	25	25	25	30	35	35	35	35	35	35	35	35
Minimum air flow	m ³ /h	10.800			14.040				19.440			24.300	
Maximum air flow	m ³ /h	25.920			36.720				46.800			54.000	
Number / Diameter	mm	3 / 500				4 / 500			5 / 500			6 / 500	
Speed	r.p.m.	1.800			1.800				1.800			1.800	
Motor output	kW	3 x 3,1			4 x 3,1				5 x 3,1			6 x 3,1	
Maximum absorbed current	A	3 x 4,7			4 x 4,7				5 x 4,7			6 x 4,7	
Compressor													
Scroll													
No. compressors / stages / circuits		4 / 4 / 2											
Oil type		Copeland 3MAF 32cST, Danfoss POE 160SZ, ICI Emkarate RL 32CF, Mobil EAL Artic 22CC											
Volume of oil	l	4 x 3,0	2 x 3,0 + 2 x 3,3	4 x 3,3	4 x 3,3	4 x 3,3	4 x 3,3	2 x 3,3 + 2 x 3,6	2 x 3,3 + 2 x 3,6	3 x 3,6 + 1 x 6,1	1 x 3,6 + 3 x 6,1	4 x 6,1	4 x 6,1
Electrical characteristics													
Mains voltage		400 V / III ph / 50 Hz ($\pm 10\%$)											
Power supply		3 Wires + Ground + Neutral											
Maximum absorbed current	A	80,0	84,6	94,6	100,7	117,3	126,6	133,7	146,8	162,6	180,0	202,1	223,4
Refrigerant													
R-454B													
Global warming potential (4)	GWP	466											
Charge	kg	31,0	31,0	31,0	34,0	34,0	34,5	35,0	49,0	51,0	51,0	61,0	62,0
Environment impact	tCO ₂ eq	14,4	14,4	14,4	15,8	15,8	16,1	16,3	22,8	23,8	23,8	28,4	28,9
Weight													
B1 assembly	kg	1.430	1.450	1.470	1.640	1.680	1.690	1.700	2.265	2.370	2.475	2.795	2.860

(1) Cooling capacity calculated in accordance with the EN-14511-2018 standard given for indoor temperature conditions 27°C, 19°C WB and 35°C outdoor temperature.

(3) Total power input by compressors and motorised fans under nominal conditions, calculated in accordance with the EN-14511-2018 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.

Compliance

- Machinery Directive 2006/42/EC (MD)
- Electromagnetic Compatibility Directive 2014/30/EU (EMC)
- Pressure Equipment Directive 2014/68/EU (Category 3) (PED)
- RoHS Directive 2011/65/EU (RoHS)
- Eco-design Directive 2009/125/EC (ECO-DESIGN)
- Energy Labelling Directive 2017/1369/EU (ECO-LABELLING)
- Harmonised Standard: EN 378-2:2012 (Refrigerating systems and heat pumps - Safety and environmental requirements).



Eurovent
certified
values

PHYSICAL DATA WITH R-454B REFRIGERANT (EN-14511-2018)



50FC		100	110	120	130	145	160	170	180	200	220	250	280
Cooling capacities													
Cooling capacity (1)	kW	97,40	106,91	116,04	126,09	140,58	154,59	162,57	175,06	194,79	214,13	246,58	272,88
Power input (3)	kW	30,16	34,27	37,75	40,16	45,74	52,48	56,66	53,91	63,47	74,07	79,24	92,22
EER performance		3,23	3,12	3,07	3,14	3,07	2,95	2,87	3,25	3,07	2,89	3,11	2,96
SEER		4,90	4,80	4,70	4,90	4,77	4,70	4,71	5,01	4,85	4,83	4,74	4,68
ηs		193%	189%	185%	193%	188%	185%	186%	197%	191%	190%	186%	184%
Heating capacities													
Heating capacity (2)	kW	97,10	106,57	117,39	127,33	143,89	157,93	165,87	183,84	203,48	227,56	271,78	299,22
Power input (3)	kW	26,61	29,87	33,85	34,94	40,26	45,47	48,23	48,73	56,18	64,63	75,12	86,06
COP performance		3,65	3,57	3,47	3,64	3,57	3,47	3,44	3,77	3,62	3,52	3,62	3,48
SCOP		3,53	3,53	3,51	3,50	3,49	3,42	3,44	3,46	3,47	3,46	3,40	3,44
ηs		138%	138%	137%	137%	137%	134%	135%	135%	136%	136%	133%	135%
Outdoor circuit fan													
Electronic axial fan													
Nominal air flow	m³/h	44.000	44.000	44.000	58.000	58.000	64.000	64.000	80.000	86.000	86.000	120.000	120.000
Available static pressure	mm.w.c	5											
Number / Diameter	mm	2 / 800			2 / 910				4 / 800			4 / 910	
Maximum speed	r.p.m.	1.100			1.070				1.100			1.070	
Motor output	kW	2 x 3,0			2 x 3,3				4 x 3,0			4 x 3,3	
Maximum absorbed current	A	2 x 4,6			2 x 5,0				4 x 4,6			4 x 5,0	
Indoor circuit supply fan													
Electronic plug-fan (Polypropylene)													
Nominal air flow	m³/h	18.000	19.800	21.600	23.400	26.100	28.800	30.600	32.400	36.000	39.000	40.500	45.000
Nominal avail. static pressure	mm.w.c	25	25	25	30	35	35	35	35	35	35	35	35
Minimum air flow	m³/h	10.800			14.040				19.440			24.300	
Maximum air flow	m³/h	25.920			36.720				46.800			54.000	
Number / Diameter	mm	3 / 500				4 / 500			5 / 500			6 / 500	
Speed	r.p.m.	1.800			1.800				1.800			1.800	
Motor output	kW	3 x 3,1			4 x 3,1				5 x 3,1			6 x 3,1	
Maximum absorbed current	A	3 x 4,7			4 x 4,7				5 x 4,7			6 x 4,7	
Compressor													
Scroll													
No. compressors / stages / circuits		4 / 4 / 2											
Oil type		Copeland 3MAF 32cST, Danfoss POE 160SZ, ICI Emkarate RL 32CF, Mobil EAL Artic 22CC											
Volume of oil	l	4 x 3,0	2 x 3,0 + 2 x 3,3	4 x 3,3	4 x 3,3	4 x 3,3	4 x 3,3	2 x 3,3 + 2 x 3,6	2 x 3,3 + 2 x 3,6	3 x 3,6 + 1 x 6,1	1 x 3,6 + 3 x 6,1	4 x 6,1	4 x 6,1
Electrical characteristics													
Mains voltage		400 V / III ph / 50 Hz (±10%)											
Power supply		3 Wires + Ground + Neutral											
Maximum absorbed current	A	80,0	84,6	94,6	100,7	117,3	126,6	133,7	146,8	162,6	180,0	202,1	223,4
Refrigerant													
R-454B													
Global warming potential (4)	GWP	466											
Charge	kg	31,0	31,0	31,0	34,0	34,0	34,5	35,0	49,0	51,0	51,0	61,0	62,0
Environment impact	tCO ₂ eq	14,4	14,4	14,4	15,8	15,8	16,1	16,3	22,8	23,8	23,8	28,4	28,9
Weight													
B1 assembly	kg	1.430	1.450	1.470	1.640	1.680	1.690	1.700	2.265	2.370	2.475	2.795	2.860

- (1) Cooling capacity calculated in accordance with the EN-14511-2018 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-14511-2018 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-14511-2018 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.

Compliance

- Machinery Directive 2006/42/EC (MD)
- Electromagnetic Compatibility Directive 2014/30/EU (EMC)
- Pressure Equipment Directive 2014/68/EU (Category 3) (PED)
- RoHS Directive 2011/65/EU (RoHS)
- Eco-design Directive 2009/125/EC (ECO-DESIGN)
- Energy Labelling Directive 2017/1369/EU (ECO-LABELLING)
- Harmonised Standard: EN 378-2:2012 (Refrigerating systems and heat pumps - Safety and environmental requirements).



Eurovent certified values

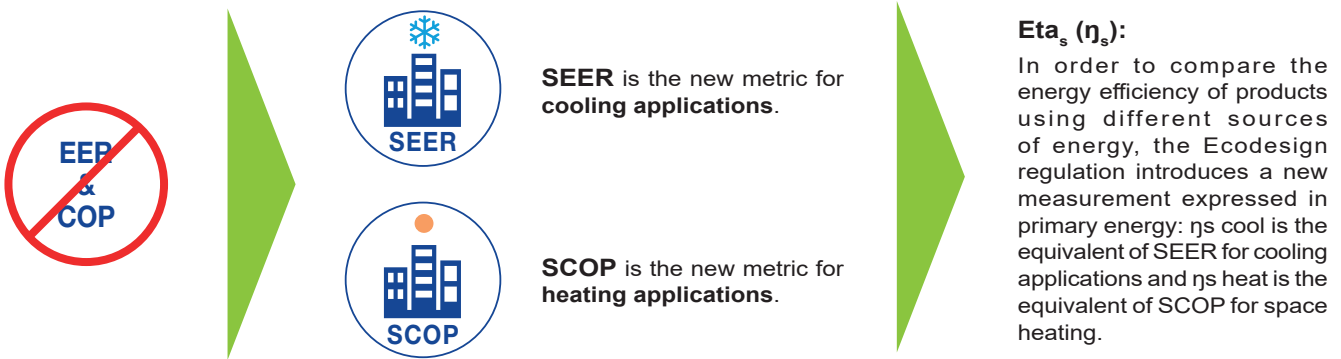
ECODESIGN REGULATIONS

New metrics because seasonal efficiency matters

With all new buildings expected to be close to zero energy, calculations of the energy efficiency of buildings require accurate indicators of the efficiency of their equipment. These indicators must be representative of actual operations throughout the year, measuring the performance of equipment on a seasonal basis.

EER & COP belong to the past. Now, and in the future, the focus is on seasonal efficiency. With a broad new products range, Carrier is fully engaged to take up the challenge of energy efficiency.

Compliance with the Ecodesign regulations therefore involves the use of new, more meaningful seasonal efficiency metrics. The Seasonal Energy Efficiency Ratio (SEER), and Seasonal Coefficient of Performance (SCOP) all ensure precise evaluation of the energy actually consumed by rooftops, by including seasonal variations in their measurements. Previous metrics (EER & COP) measured operations only at a single point, at full thermal load, and were therefore less representative of consumption over entire heating and cooling seasons.



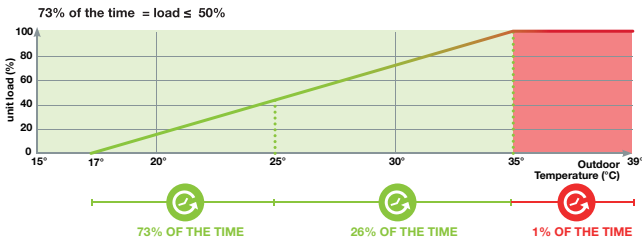
These new seasonal performance metrics are now the key indicator used for rooftops, in all applications. They are calculated according to technical standard **EN 14825** and compliance is mandatory for a product to obtain CE marking.

Confort cooling

SEER - Seasonal Energy Efficiency Ratio



SEER measures the seasonal energy efficiency of rooftops by calculating the ratio between annual cooling demand and annual energy input. It takes into account the energy efficiency achieved for each outdoor temperature weighted by the number of hours observed for each of these temperatures, using actual climate data.



SEER is a new way of measuring the true energy efficiency of rooftops for cooling over an entire year.

This new indicator gives a more realistic indication of the real energy efficiency and environmental impact of a cooling system.

Efficiency requirements

Regulation 2016/2281 sets seasonal energy efficiency in $\eta_{s, cool}$ (this expresses SEER in terms of primary energy and so makes it possible to compare the energy efficiency of units using different energy sources).

Minimum $\eta_{s, cool}$ (SEER) according regulation (EU) 2016/2281:

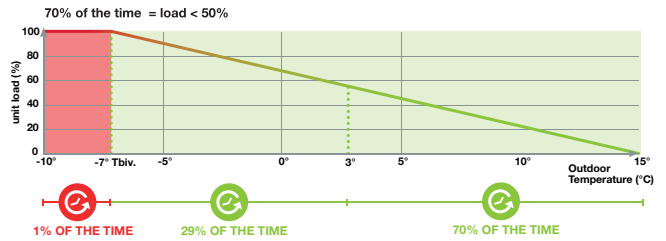
From 01/2018. Tier1		From 01/2021. Tier2	
$\eta_{s, cool}$ %	SEER	$\eta_{s, cool}$ %	SEER
117	3,00	138	3,53

Space heating

SCOP – Seasonal Coefficient of Performance



SCOP measures the seasonal energy efficiency of rooftops by calculating the ratio between annual heating demand and annual energy input. It takes into account the energy efficiency achieved at each outdoor temperature of an average climate weighted by the number of hours observed for each of these temperatures.



SCOP is a new way of measuring the true energy efficiency in heating mode over an entire year.

This new indicator gives a more realistic indication of the real energy efficiency and environmental impact of a heating system.

Efficiency requirements

Regulation 2016/2281 sets seasonal energy efficiency in $\eta_{s, heat}$ (this expresses SCOP in terms of primary energy and so makes it possible to compare the energy efficiency of units using different energy sources).

Minimum $\eta_{s, heat}$ (SCOP) according regulation (EU) 2016/2281:

From 01/2018. Tier1		From 01/2021. Tier2	
$\eta_{s, heat}$ %	SCOP	$\eta_{s, heat}$ %	SCOP
115	2,95	125	3,20

The technical data sheets (TDS) for CARRIER units are available at www.ecodesign.hvac.carrier.com

COOLING CAPACITY (kW) WITH R-454B REFRIGERANT



Outdoor temperature 35°C

50FF	Flow (m³/h)	Indoor air temperature																				
		15°C / 50% RH			20°C / 50% RH			23°C / 50% RH			25°C / 50% RH			27°C / 50% RH			29°C / 50% RH			31°C / 50% RH		
		Pft	Pfs	Pa	Pft	Pfs	Pa	Pft	Pfs	Pa	Pft	Pfs	Pa	Pft	Pfs	Pa	Pft	Pfs	Pa	Pft	Pfs	Pa
100	10.800	63,9	50,7	23,4	74,7	56,6	24,0	81,2	58,7	24,4	85,7	60,0	24,6	93,1	58,7	25,1	95,7	62,4	25,2	101,0	63,5	25,5
	14.400	69,3	60,1	23,6	79,4	64,5	24,2	86,1	67,0	24,6	90,9	68,7	24,9	97,8	67,8	25,3	101,1	71,8	25,5	106,7	73,3	25,7
	18.000	71,8	66,2	23,7	82,0	71,5	24,3	88,8	74,7	24,7	93,6	76,6	25,0	99,5	77,1	25,3	103,9	80,5	25,5	109,4	82,3	25,8
	25.920	75,8	77,8	23,9	86,3	84,9	24,6	93,2	89,3	25,0	98,1	92,1	25,3	103,9	93,6	25,6	108,6	97,6	25,8	114,1	100,3	26,1
110	10.800	69,0	54,9	26,6	80,6	59,9	27,2	87,6	62,0	27,7	92,5	63,3	28,0	100,4	61,9	28,6	103,0	65,7	28,7	108,8	66,9	29,1
	14.400	75,1	63,5	26,8	86,1	68,1	27,6	93,3	70,7	28,1	98,3	72,3	28,4	105,8	71,3	28,9	109,3	75,4	29,2	115,1	76,9	29,6
	19.800	79,4	72,9	27,0	90,5	78,7	27,9	97,9	82,2	28,4	103,1	84,3	28,7	109,4	84,8	29,2	114,1	88,5	29,4	120,0	90,5	29,8
	25.920	82,6	82,0	27,3	93,9	89,2	28,1	101,3	93,5	28,6	106,6	96,2	29,0	112,7	97,7	29,4	117,7	101,7	29,7	123,6	104,4	30,1
120	10.800	73,3	58,8	28,8	85,7	64,1	29,6	93,2	66,3	30,2	98,3	67,6	30,6	106,6	66,0	31,2	109,5	70,0	31,5	115,5	71,2	31,9
	14.400	80,5	68,0	29,2	92,1	72,7	30,1	99,8	75,3	30,7	105,1	76,9	31,1	113,0	75,8	31,7	116,7	80,0	32,0	122,9	81,4	32,5
	21.600	86,9	80,8	29,7	98,8	87,2	30,6	106,7	90,9	31,3	112,3	93,2	31,7	119,1	93,6	32,2	124,1	97,6	32,5	130,4	99,7	33,0
	25.920	89,2	87,3	29,9	101,2	94,7	30,8	109,2	99,0	31,5	114,7	101,7	31,9	121,3	103,0	32,3	126,6	106,9	32,7	133,0	109,6	33,1
130	14.040	83,3	66,8	31,1	97,3	72,9	31,9	105,6	75,5	32,4	111,5	77,1	32,8	121,0	75,4	33,5	124,2	80,1	33,7	131,1	81,5	34,1
	18.720	90,4	77,3	31,4	103,5	82,9	32,3	112,1	86,0	32,9	118,2	88,1	33,3	127,0	87,0	33,8	131,2	92,0	34,1	138,3	93,9	34,5
	23.400	93,7	85,0	31,6	106,8	91,7	32,5	115,5	95,7	33,0	121,7	98,1	33,4	129,3	98,6	33,9	134,8	102,9	34,2	142,0	105,3	34,6
	36.720	100,0	103,4	32,0	113,6	113,1	32,9	122,6	119,1	33,5	128,8	122,9	33,9	136,3	125,0	34,3	142,4	130,5	34,7	149,5	134,3	35,0
145	14.040	90,9	71,7	35,8	106,0	78,1	36,7	115,0	80,7	37,3	121,2	82,3	37,8	131,4	80,4	38,6	134,8	85,3	38,8	142,2	86,7	39,2
	18.720	99,2	82,8	36,2	113,3	88,5	37,2	122,5	91,7	37,9	129,1	93,7	38,4	138,7	92,3	39,1	143,3	97,5	39,3	151,0	99,4	39,8
	26.100	105,2	95,3	36,6	119,6	102,7	37,7	129,1	106,9	38,4	135,8	109,6	38,8	144,2	110,1	39,4	150,2	114,9	39,7	158,0	117,4	40,1
	36.720	110,3	110,6	37,0	125,2	120,2	38,1	135,0	125,9	38,8	141,8	129,7	39,3	149,9	131,8	39,7	156,5	137,1	40,1	164,7	140,9	40,6
160	14.040	97,3	75,9	40,8	113,6	82,7	41,8	123,3	85,4	42,4	130,0	87,0	42,9	141,0	85,0	43,7	144,8	90,1	43,9	152,8	91,5	44,4
	18.720	106,9	87,6	41,2	122,2	93,5	42,4	132,2	96,8	43,1	139,3	98,8	43,6	149,7	97,3	44,3	154,8	102,7	44,6	163,0	104,5	45,1
	28.800	116,0	105,1	41,9	131,9	113,2	43,1	142,4	117,9	43,7	149,8	120,9	44,2	159,0	121,4	44,9	165,6	126,5	45,2	174,1	129,4	45,8
	36.720	120,0	116,5	42,2	136,3	126,4	43,3	147,0	132,2	44,1	154,5	135,8	44,6	163,3	137,7	45,1	170,5	143,1	45,6	178,9	146,7	46,1
170	14.040	101,7	79,0	43,4	118,3	85,9	44,5	128,2	88,6	45,3	135,2	90,2	45,9	146,6	88,0	46,8	150,5	93,3	47,1	158,7	94,7	47,8
	18.720	111,7	90,9	44,0	127,5	96,9	45,3	137,9	100,2	46,1	145,3	102,2	46,7	156,0	100,6	47,6	161,1	106,1	48,0	169,6	107,9	48,7
	30.600	122,8	111,8	44,9	139,4	120,2	46,3	150,4	125,1	47,2	158,1	128,2	47,8	167,6	128,8	48,5	174,5	134,2	49,1	183,2	137,1	49,7
	36.720	125,9	120,4	45,2	142,8	130,4	46,6	153,9	136,1	47,5	161,6	139,8	48,1	170,7	141,5	48,8	178,0	146,9	49,4	186,8	150,3	50,0
180	19.440	115,9	90,3	41,8	135,2	98,5	42,8	146,7	101,9	43,4	154,8	103,9	43,9	167,9	101,6	44,6	172,4	107,9	44,9	181,8	109,7	45,5
	25.920	125,6	105,4	42,1	143,7	112,9	43,2	155,6	117,2	44,0	164,0	119,9	44,4	176,1	118,2	45,2	181,9	124,9	45,5	191,5	127,4	46,1
	32.400	130,4	116,9	42,2	148,3	126,0	43,4	160,2	131,2	44,1	168,6	134,4	44,6	179,2	135,1	45,3	186,6	140,8	45,7	196,2	143,8	46,2
	46.800	137,2	139,6	42,6	155,7	152,1	43,9	167,9	159,6	44,6	176,3	164,4	45,2	186,4	166,9	45,7	194,5	173,7	46,2	204,2	178,3	46,8
200	19.440	126,4	96,2	47,9	147,3	105,1	49,0	159,8	108,9	49,8	168,5	111,0	50,5	182,7	108,4	51,5	187,7	114,9	51,9	198,0	116,7	52,5
	25.920	138,1	112,9	48,4	157,6	120,5	49,7	170,3	124,5	50,5	179,6	127,4	51,3	192,9	125,5	52,2	199,2	132,4	52,6	209,9	134,9	53,3
	36.000	146,3	131,1	48,8	166,1	141,1	50,3	179,3	146,9	51,2	188,6	150,4	51,9	200,1	151,0	52,7	208,6	157,5	53,2	219,3	161,0	53,8
	46.800	151,6	148,9	49,2	171,9	161,3	50,7	185,3	168,3	51,6	194,6	172,9	52,3	206,0	175,3	53,1	214,9	182,2	53,6	225,7	186,7	54,3
220	19.440	136,1	104,0	56,4	158,7	113,0	57,7	172,1	116,4	58,6	181,3	118,5	59,4	196,9	115,7	60,5	202,0	122,5	60,9	213,0	124,3	61,7
	25.920	149,1	120,4	56,8	170,6	128,5	58,5	184,8	133,0	59,7	194,4	135,5	60,4	208,9	133,4	61,4	215,7	140,5	61,9	227,5	143,2	62,7
	39.000	161,7	145,1	57,8	183,6	156,0	59,5	198,0	162,2	60,6	208,0	166,0	61,3	220,7	166,7	62,2	229,9	173,5	62,8	241,5	177,3	63,6
	46.800	166,4	158,1	58,0	188,1	170,7	59,9	202,1	177,6	61,0	212,6	182,3	61,7	224,9	184,5	62,5	234,7	191,4	63,2	246,3	196,0	63,9
250	24.300	161,2	120,5	60,7	188,7	131,4	61,9	205,5	136,0	62,6	217,3	138,8	63,2	235,6	135,6	64,2	242,3	143,8	64,3	255,8	146,2	65,0
	32.400	176,7	140,1	61,0	202,8	150,1	62,4	220,2	155,7	63,3	232,5	159,2	63,9	249,9	157,0	64,7	258,5	165,8	65,1	272,5	169,0	65,7
	40.500	185,0	155,0	61,2	210,9	166,8	62,7	228,3	173,7	63,5	240,6	177,8	64,1	251,9	184,6	64,8	266,7	186,0	65,3	280,9	189,9	65,9
	54.000	193,7	176,7	61,6	220,6	191,8	63,3	238,5	200,6	64,2	250,8	205,9	64,7	265,6	208,8	65,3	277,6	216,8	65,9	291,9	222,1	66,5
280	24.300	171,6	132,7	70,4	200,7	144,6	72,0	218,3	149,5	72,9	230,5	152,4	73,6	250,2	148,7	74,9	257,2	157,7	75,2	271,5	160,1	76,0
	32.400	189,5	154,3	71,0	217,1	164,9	72,8	235,4	170,7	73,9	248,3	174,3	74,6	266,9	171,7	75,8	276,1	181,1	76,3	290,9	184,3	77,2
	45.000	201,6	177,9	71,8	231,0	192,1	73,6	251,2	200,6	74,6	263,3	204,6	75,5	279,8	205,4	76,5	291,6	213,8	77,1	306,9	218,3	78,0
	54.000	209,0	193,8	72,2	237,8	209,6	74,0	256,9	218,4	75,1	270,0	223,6	76,1	286,2	226,8	76,9	299,0	235,0	77,6	314,1	240,6	78,5

Pft: Total gross cooling capacity in kW
 Pfs: Sensitive cooling capacity in kW
 Pa: Compressor power input in kW

Correction coefficients: variation of outdoor temperature and humidity

Outdoor temp.	20°C	25°C	30°C	35°C	40°C	45°C	48°C	50°C	52°C	Relative hum.	40%	50%	60%	70%	80%	90%	Correction
Coefficient K1	1,161	1,111	1,045	1,000	0,939	0,874	0,845	0,815	0,797	Coefficient K4	0,962	1,000	1,045	1,089	1,133	1,176	PFT = Pft x K1 x K4
Coefficient K2	1,085	1,058	1,030	1,000	0,968	0,934	0,910	0,909	0,894	Coefficient K5	1,108	1,000	0,929	0,760	0,684	0,532	PFS = Pfs x K2 x K5
Coefficient K3	0,711	0,797	0,893	1,000	1,119	1,249	1,332	1,393	1,415	Coefficient K6	0,992	1,000	1,010	1,020	1,031	1,040	PA = Pa x K3 x K6



COOLING CAPACITY (kW) WITH R-454B REFRIGERANT

Outdoor temperature 35°C

50FC	Flow (m³/h)	Indoor air temperature																				
		15°C / 50% RH			20°C / 50% RH			23°C / 50% RH			25°C / 50% RH			27°C / 50% RH			29°C / 50% RH			31°C / 50% RH		
		Pft	Pfs	Pa	Pft	Pfs	Pa	Pft	Pfs	Pa	Pft	Pfs	Pa	Pft	Pfs	Pa	Pft	Pfs	Pa	Pft	Pfs	Pa
100	10.800	64,1	51,2	23,3	74,9	57,1	23,8	81,4	59,2	24,2	86,0	60,5	24,5	93,4	59,2	24,9	96,0	62,9	25,0	101,4	64,1	25,3
	14.400	69,5	60,6	23,4	79,7	65,0	24,1	86,4	67,6	24,5	91,2	69,2	24,7	98,1	68,4	25,1	101,5	72,4	25,3	107,1	74,0	25,5
	18.000	72,1	66,7	23,5	82,2	72,1	24,2	89,1	75,3	24,6	93,9	77,3	24,8	99,9	77,7	25,2	104,2	81,2	25,4	109,8	83,0	25,6
	25.920	76,0	78,5	23,8	86,5	85,6	24,4	93,5	90,0	24,8	98,4	92,9	25,1	104,2	94,4	25,4	108,9	98,4	25,6	114,5	101,2	25,9
110	10.800	69,3	55,4	26,4	80,9	60,4	27,0	87,9	62,6	27,5	92,8	63,8	27,8	100,7	62,4	28,4	103,3	66,2	28,5	109,1	67,5	28,9
	14.400	75,4	64,0	26,6	86,3	68,7	27,4	93,6	71,3	27,9	98,7	72,9	28,2	106,1	71,9	28,8	109,7	76,0	29,0	115,5	77,5	29,4
	19.800	79,7	73,5	26,9	90,8	79,4	27,7	98,2	82,9	28,2	103,4	85,0	28,5	109,8	85,5	29,0	114,4	89,2	29,2	120,4	91,3	29,6
	25.920	82,9	82,7	27,1	94,2	90,0	27,9	101,7	94,3	28,4	106,9	97,0	28,8	113,1	98,6	29,2	118,1	102,5	29,5	124,0	105,3	29,9
120	10.800	73,5	59,3	28,6	85,9	64,7	29,4	93,5	66,9	30,0	98,6	68,2	30,4	107,0	66,6	31,0	109,8	70,6	31,2	115,9	71,8	31,7
	14.400	80,8	68,6	29,0	92,4	73,3	29,9	100,1	75,9	30,5	105,5	77,6	30,9	113,4	76,4	31,5	117,1	80,6	31,8	123,3	82,1	32,2
	21.600	87,2	81,5	29,5	99,1	87,9	30,4	107,1	91,6	31,0	112,6	94,0	31,5	119,5	94,4	32,0	124,5	98,4	32,3	130,8	100,6	32,7
	25.920	89,5	88,1	29,7	101,6	95,5	30,6	109,6	99,8	31,2	115,1	102,5	31,7	121,7	103,8	32,1	127,1	107,9	32,5	133,4	110,5	32,9
130	14.040	83,4	67,8	31,2	97,3	73,9	31,9	105,7	76,5	32,5	111,6	78,2	32,9	121,1	76,5	33,5	124,3	81,2	33,7	131,2	82,7	34,1
	18.720	90,4	78,4	31,4	103,5	84,0	32,3	112,2	87,3	32,9	118,2	89,3	33,3	127,1	88,2	33,9	131,3	93,3	34,1	138,4	95,2	34,5
	23.400	93,8	86,2	31,6	106,9	93,1	32,5	115,6	97,1	33,1	121,7	99,5	33,5	129,3	100,1	33,9	134,9	104,4	34,2	142,1	106,8	34,6
	36.720	100,1	104,9	32,0	113,7	114,7	33,0	122,6	120,8	33,6	128,9	124,6	34,0	136,3	126,8	34,4	142,4	132,4	34,7	149,6	136,2	35,1
145	14.040	91,0	72,8	35,9	106,1	79,3	36,8	115,0	81,9	37,4	121,3	83,5	37,9	131,5	81,5	38,6	134,9	86,5	38,8	142,3	87,9	39,3
	18.720	99,3	84,0	36,2	113,4	89,8	37,3	122,6	93,0	38,0	129,2	95,0	38,4	138,8	93,7	39,1	143,4	98,9	39,4	151,1	100,8	39,8
	26.100	105,2	96,7	36,6	119,6	104,1	37,7	129,2	108,5	38,4	135,9	111,2	38,9	144,3	111,7	39,4	150,3	116,6	39,7	158,1	119,1	40,2
	36.720	110,4	112,2	37,0	125,3	121,9	38,1	135,0	127,7	38,8	141,9	131,6	39,3	150,0	133,7	39,8	156,6	139,0	40,2	164,8	142,9	40,6
160	14.040	97,4	77,0	40,9	113,6	83,9	41,8	123,4	86,6	42,5	130,1	88,3	43,0	141,1	86,2	43,8	144,9	91,4	44,0	152,9	92,9	44,5
	18.720	107,0	88,9	41,3	122,3	94,9	42,4	132,3	98,1	43,1	139,4	100,2	43,6	149,8	98,7	44,3	154,9	104,2	44,6	163,1	106,0	45,1
	28.800	116,1	106,6	42,0	132,0	114,8	43,1	142,5	119,6	43,8	149,9	122,6	44,3	159,1	123,1	44,9	165,7	128,3	45,3	174,2	131,3	45,8
	36.720	120,1	118,2	42,2	136,4	128,3	43,4	147,1	134,1	44,1	154,6	137,8	44,6	163,4	139,7	45,2	170,6	145,1	45,6	179,0	148,8	46,1
170	14.040	101,7	80,2	43,4	118,4	87,1	44,6	128,3	89,8	45,4	135,3	91,5	46,0	146,7	89,3	46,9	150,5	94,6	47,2	158,8	96,0	47,8
	18.720	111,7	92,2	44,0	127,6	98,3	45,3	138,0	101,6	46,2	145,4	103,7	46,8	156,1	102,0	47,6	161,2	107,6	48,1	169,7	109,4	48,7
	30.600	122,8	113,4	44,9	139,5	122,0	46,3	150,5	126,9	47,2	158,2	130,1	47,9	167,7	130,6	48,6	174,6	136,1	49,1	183,3	139,0	49,8
	36.720	126,0	122,1	45,2	142,9	132,3	46,6	154,0	138,1	47,5	161,7	141,8	48,1	170,8	143,6	48,8	178,2	149,0	49,4	186,9	152,5	50,1
180	19.440	116,5	93,8	41,5	135,9	102,3	42,5	147,5	105,8	43,1	155,7	107,9	43,6	168,8	105,5	44,3	173,3	112,0	44,6	182,9	113,9	45,2
	25.920	126,3	109,4	41,8	144,5	117,3	42,9	156,5	121,7	43,7	164,9	124,5	44,1	177,0	122,8	44,9	182,9	129,7	45,2	192,5	132,2	45,8
	32.400	131,1	121,4	41,9	149,1	130,8	43,1	161,1	136,2	43,8	169,6	139,6	44,3	180,2	140,3	45,0	187,7	146,1	45,3	197,3	149,4	45,9
	46.800	138,0	144,9	42,3	156,6	157,9	43,6	168,8	165,7	44,3	177,3	170,6	44,9	187,4	173,3	45,4	195,6	180,4	45,9	205,3	185,2	46,4
200	19.440	127,1	99,9	47,5	148,2	109,2	48,7	160,7	113,1	49,5	169,4	115,2	50,1	183,8	112,5	51,1	188,7	119,3	51,5	199,1	121,2	52,2
	25.920	138,8	117,3	48,0	158,4	125,1	49,4	171,2	129,3	50,2	180,6	132,3	50,9	194,0	130,3	51,8	200,3	137,5	52,3	211,0	140,1	52,9
	36.000	147,1	136,1	48,4	167,1	146,5	49,9	180,3	152,5	50,9	189,6	156,2	51,5	201,2	156,8	52,3	209,7	163,5	52,8	220,5	167,1	53,5
	46.800	152,4	154,6	48,9	172,9	167,4	50,4	186,3	174,8	51,3	195,7	179,6	52,0	207,1	182,1	52,7	216,1	189,2	53,2	226,9	193,8	53,9
220	19.440	136,9	108,0	56,0	159,6	117,3	57,3	173,1	120,9	58,2	182,3	123,0	58,9	198,0	120,1	60,1	203,1	127,2	60,5	214,1	129,1	61,2
	25.920	150,0	125,0	56,4	171,6	133,5	58,1	185,9	138,0	59,2	195,5	140,7	60,0	210,0	138,5	61,0	216,9	145,9	61,5	228,7	148,7	62,3
	39.000	162,6	150,6	57,3	184,6	162,0	59,1	199,1	168,4	60,2	209,1	172,3	60,9	221,9	173,0	61,8	231,1	180,2	62,3	242,8	184,0	63,1
	46.800	167,3	164,2	57,6	189,1	177,2	59,5	203,3	184,4	60,6	213,8	189,2	61,2	226,1	191,6	62,1	236,0	198,8	62,7	247,6	203,5	63,5
250	24.300	162,6	127,6	59,2	190,4	139,2	60,4	207,3	144,0	61,1	219,2	147,0	61,6	237,7	143,6	62,7	244,4	152,3	62,8	258,0	154,8	63,4
	32.400	178,2	148,4	59,5	204,6	159,0	60,9	222,2	164,9	61,8	234,5	168,6	62,3	252,1	166,3	63,2	260,8	175,6	63,5	274,9	179,0	64,1
	40.500	186,7	164,1	59,7	212,8	176,7	61,2	230,3	183,9	62,0	242,7	188,3	62,5	254,1	195,5	63,3	269,1	196,9	63,7	283,4	201,1	64,4
	54.000	195,5	187,1	60,1	222,5	203,1	61,7	240,6	212,5	62,6	253,0	218,1	63,1	267,9	221,1	63,7	280,1	229,6	64,3	294,5	235,2	64,9
280	24.300	173,1	140,5	68,7	202,5	153,2	70,2	220,3	158,3	71,2	232,5	161,4	71,9	252,4	157,5	73,0	259,4	167,0	73,4	273,9	169,6	74,2
	32.400	191,2	163,4	69,3	219,1	174,7	71,1	237,5	180,8	72,1	250,4	184,6	72,8	269,3	181,8	73,9	278,5	191,8	74,5	293,5	195,2	75,3
	45.000	203,4	188,4	70,0	233,1	203,5	71,8	253,4	212,4	72,8	265,6	216,7	73,7	282,3	217,5	74,6	294,2	226,5	75,3	309,6	231,2	76,1
	54.000	210,9	205,3	70,4	239,9	222,0	72,2	259,2	231,3	73,2	272,4	236,9	74,3	288,7	240,2	75,0	301,6	248,9	75,8	316,9	254,8	76,6

Pft: Total gross cooling capacity in kW
Pfs: Sensitive cooling capacity in kW
Pa: Compressor power input in kW

Correction coefficients: variation of outdoor temperature and humidity

Outdoor temp.	20°C	25°C	30°C	35°C	40°C	45°C	48°C	Relative humidity	40%	50%	60%	70%	80%	90%	Correction
Coefficient K1	1,161	1,111	1,045	1,000	0,939	0,874	0,845	Coefficient K4	0,962	1,000	1,045	1,089	1,133	1,176	PFT = Pft x K1 x K4
Coefficient K2	1,085	1,058	1,030	1,000	0,968	0,934	0,910	Coefficient K5	1,108	1,000	0,929	0,760	0,684	0,532	PFS = Pfs x K2 x K5
Coefficient K3	0,711	0,797	0,893	1,000	1,119	1,249	1,332	Coefficient K6	0,992	1,000	1,010	1,020	1,031	1,040	PA = Pa x K3 x K6



HEATING CAPACITY (kW) WITH R-454B REFRIGERANT

Indoor temperature 20°C

50FC	Flow (m³/h)	Outdoor air temperature																	
		-15°C WB		-10°C WB		-5°C WB		-3°C WB		0°C WB		3°C WB		6°C WB		10°C WB		15°C WB	
		Pc	Pa	Pc	Pa	Pc	Pa	Pc	Pa	Pc	Pa	Pc	Pa	Pc	Pa	Pc	Pa	Pc	Pa
100	10.800	51,2	19,3	59,3	20,7	69,4	22,7	75,2	23,9	81,2	25,2	87,1	26,4	93,9	27,9	103,2	29,8	115,3	32,6
	14.400	50,7	17,7	58,8	18,7	69,5	20,5	75,5	21,5	82,0	22,4	88,2	23,4	95,3	24,5	105,2	26,2	118,7	28,5
	18.000	50,4	17,3	58,6	17,9	69,5	19,2	75,6	19,9	82,1	20,7	88,6	21,6	95,7	22,5	106,1	23,8	120,2	25,5
	25.920	50,6	16,5	58,8	16,9	70,0	18,0	76,4	18,5	83,2	19,2	90,1	19,9	97,4	20,6	108,2	21,6	123,6	22,9
110	10.800	55,8	22,1	65,1	23,6	76,3	25,7	82,5	27,2	89,3	28,7	95,7	30,2	102,8	31,8	112,9	34,1	125,7	37,3
	14.400	55,5	20,0	64,7	21,2	76,2	23,2	82,8	24,2	89,8	25,4	96,7	26,6	104,3	27,9	115,1	29,9	129,6	32,6
	19.800	54,9	19,4	64,3	19,8	76,1	21,2	83,0	22,0	90,2	22,9	97,5	23,8	104,9	24,9	117,0	26,3	132,7	28,4
	25.920	55,2	19,0	64,2	19,0	76,3	20,1	83,0	20,8	90,9	21,6	98,3	22,4	106,6	23,3	118,6	24,5	135,3	26,1
120	10.800	62,6	25,8	70,9	27,3	83,4	29,9	90,3	31,8	97,2	33,6	103,6	35,3	111,2	37,3	121,4	40,0	134,4	43,9
	14.400	62,2	23,1	70,7	24,2	83,2	26,5	90,3	27,9	97,7	29,3	104,9	30,8	113,1	32,4	124,4	34,8	139,3	38,1
	21.600	61,9	21,7	71,4	22,5	83,5	23,6	91,0	24,5	98,8	25,6	106,5	26,7	115,2	27,8	127,5	29,5	144,3	31,8
	25.920	62,0	21,1	71,8	21,5	83,7	22,7	91,4	23,6	99,4	24,5	107,3	25,4	116,1	26,4	128,9	27,9	146,3	29,9
130	14.040	70,3	25,9	78,1	27,5	91,3	29,8	98,8	31,4	106,7	33,2	114,3	34,8	123,1	36,6	135,3	39,2	151,1	42,9
	18.720	69,8	23,4	77,6	24,6	91,6	26,8	99,1	28,1	107,6	29,4	115,6	30,8	124,9	32,3	138,0	34,5	155,6	37,6
	23.400	69,2	23,0	77,6	23,7	91,2	25,1	99,3	26,1	107,8	27,2	116,3	28,3	125,5	29,5	139,1	31,3	157,6	33,7
	36.720	70,7	21,8	79,0	22,0	92,1	23,1	100,9	23,9	109,5	24,8	118,4	25,6	128,3	26,5	142,7	27,8	163,0	29,6
145	14.040	82,1	30,8	91,3	33,0	103,8	35,7	111,8	37,7	120,2	39,8	128,4	41,7	137,8	44,0	150,7	47,2	167,5	51,8
	18.720	81,5	27,9	90,9	29,6	103,9	31,9	112,4	33,4	121,2	35,1	130,1	36,6	140,0	38,5	154,0	41,1	172,8	44,9
	26.100	82,0	26,4	91,0	27,5	104,2	29,0	113,1	30,1	122,3	31,3	131,6	32,5	141,8	33,8	156,7	35,7	177,2	38,5
	36.720	83,3	25,0	92,3	26,0	104,8	27,2	114,3	28,1	123,8	29,0	133,4	30,0	144,0	31,0	159,6	32,5	181,5	34,6
160	14.040	90,6	37,5	101,3	39,7	113,6	42,5	122,4	44,9	131,4	47,4	139,9	49,8	149,8	52,6	163,1	56,3	180,4	61,7
	18.720	90,3	33,2	101,1	35,0	113,7	37,4	122,8	39,1	132,4	41,0	141,8	42,9	152,3	45,1	167,0	48,3	186,5	52,7
	28.800	90,0	29,9	101,9	31,0	114,0	32,5	123,7	33,7	133,8	35,0	144,1	36,3	155,2	37,8	171,4	39,9	193,6	43,0
	36.720	90,6	28,7	102,8	29,3	114,4	30,8	124,4	31,8	134,8	32,9	145,2	34,0	156,8	35,2	173,6	37,0	197,1	39,5
170	14.040	94,3	39,2	104,7	41,5	118,5	45,1	127,6	47,7	136,8	50,5	145,7	53,2	155,8	56,2	169,7	60,3	187,1	66,2
	18.720	93,6	35,2	104,1	36,9	118,7	39,7	128,2	41,7	138,1	43,8	147,7	45,9	158,5	48,4	173,8	52,0	193,7	56,9
	30.600	93,1	31,1	104,2	32,3	119,5	34,2	129,7	35,5	140,4	37,0	151,0	38,4	162,6	40,0	179,8	42,4	202,8	45,7
	36.720	93,1	30,0	104,2	31,1	119,9	32,8	130,3	34,0	141,2	35,3	152,1	36,6	163,9	38,0	181,6	40,1	205,4	42,9
180	19.440	98,9	36,3	112,2	38,7	131,4	41,7	141,9	43,9	152,6	46,1	163,2	48,3	175,2	50,9	191,3	54,4	213,0	59,9
	25.920	99,0	32,4	112,1	34,2	132,0	37,1	143,1	38,6	154,8	40,4	166,1	42,0	179,4	44,1	197,4	47,1	221,8	51,3
	32.400	98,5	31,4	112,4	32,3	132,1	34,4	143,5	35,7	155,4	37,1	167,6	38,5	180,8	40,1	200,0	42,4	225,9	45,6
	46.800	99,8	30,8	113,9	30,9	133,3	31,8	145,3	32,8	158,3	33,9	170,6	35,0	184,5	36,2	204,8	38,0	234,0	40,5
200	19.440	110,0	41,8	124,7	44,3	144,7	48,4	155,9	51,1	167,4	53,9	178,6	56,6	191,5	59,7	208,7	64,1	231,0	70,6
	25.920	109,8	37,4	124,6	39,2	145,4	42,5	157,3	44,5	169,9	46,6	182,2	48,7	196,2	51,1	215,4	54,7	241,3	59,9
	36.000	110,4	35,2	125,7	36,0	146,1	38,1	158,8	39,6	171,9	41,2	185,3	42,8	199,4	44,5	220,6	47,1	249,5	50,7
	46.800	111,8	34,1	127,3	34,2	147,1	35,9	160,1	37,1	173,6	38,4	187,5	39,7	202,9	41,2	224,6	43,2	255,5	46,2
220	19.440	125,7	52,0	141,5	55,5	162,1	59,9	174,3	63,5	186,7	67,1	198,6	70,6	212,2	74,6	230,3	80,1	251,4	86,3
	25.920	125,3	45,6	141,4	47,9	162,6	51,7	175,7	54,1	189,4	56,9	202,4	59,5	217,2	62,6	238,0	67,2	265,2	73,6
	39.000	126,1	41,6	142,9	43,0	163,7	44,5	177,6	46,2	192,3	48,0	206,6	49,8	222,3	51,8	245,7	54,8	277,2	58,9
	46.800	127,3	40,3	143,4	40,7	164,2	42,4	178,5	43,8	193,4	45,3	208,1	46,9	224,7	48,6	248,3	51,1	281,8	54,7
250	24.300	157,1	53,8	175,7	57,6	195,9	62,0	211,1	65,4	226,7	68,9	242,2	72,3	259,6	76,1	283,7	81,4	313,5	89,2
	32.400	156,1	48,3	174,1	51,1	196,2	54,6	212,6	57,1	229,4	59,7	246,2	62,4	264,8	65,5	290,9	70,0	326,1	76,3
	40.500	156,6	46,7	173,8	48,5	196,0	50,4	212,7	52,3	230,3	54,5	247,6	56,5	266,8	58,9	294,5	62,5	331,9	67,3
	54.000	156,9	44,5	174,0	45,1	197,4	47,0	214,9	48,5	233,1	50,1	251,2	51,8	271,4	53,7	300,3	56,4	340,9	60,2
280	24.300	177,0	65,4	196,2	69,3	214,1	73,5	230,4	77,7	247,1	82,2	263,2	86,4	281,7	91,2	306,5	97,7	336,3	105,3
	32.400	178,3	59,7	197,1	62,0	215,0	64,4	232,0	67,5	250,1	70,8	267,6	74,2	287,6	78,1	315,8	83,8	352,4	91,5
	45.000	181,1	53,7	199,0	55,5	215,4	57,4	233,6	59,6	252,6	62,1	272,1	64,6	292,5	67,4	323,4	71,5	364,8	77,2
	54.000	182,9	52,7	201,2	53,2	216,5	54,8	235,0	56,7	254,6	58,7	274,0	60,9	295,6	63,3	328,1	66,7	369,8	71,6

Pc: Total gross heating capacity in kW
Pa: Compressor power input in kW

Correction coefficients: variation of indoor temperature

Indoor temperature	10°C	12°C	14°C	16°C	18°C	20°C	21°C	22°C	23°C	24°C	25°C	26°C	27°C	Correction
Coefficient K1	1,042	1,033	1,026	1,017	1,009	1,000	0,995	0,991	0,986	0,982	0,977	0,972	0,969	PC = Pc x K1
Coefficient K2	0,790	0,836	0,869	0,911	0,954	1,000	1,024	1,047	1,072	1,098	1,123	1,150	1,178	PA = Pa x K2

OPERATING LIMITS

Inlet air conditions		Cooling		Heating
		50FF	50FC	50FC
Indoor coil	Minimum temperature	9,7°C WB		10°C
	Maximum temperature	24°C WB		27°C
Outdoor coil	Minimum temperature	-10°C (1)		-15°C WB (2)
	Maximum temperature	52°C	48°C	15°C WB

- (1) With the condensation pressure control disabled, operation up to 12°C.
- (2) When the outdoor temperature is usually below 5°C WB, the installation of a support element is recommended.

SOUND LEVELS dB(A)

Sound power level (LW)

50FF/FC	100	110	120	130	145	160	170	180	200	220	250	280
63 Hz	64,6	65,1	65,6	66,1	66,6	66,9	67,1	67,1	67,9	69,1	70,6	71,6
125 Hz	71,4	71,9	72,4	72,9	73,4	73,7	73,9	73,9	74,7	75,9	77,4	78,4
250 Hz	77,9	78,4	78,9	79,4	79,9	80,2	80,4	80,4	81,2	82,4	83,9	84,9
500 Hz	80,2	80,7	81,2	81,7	82,2	82,5	82,7	82,7	83,5	84,7	86,2	87,2
1000 Hz	80,6	81,1	81,6	82,1	82,6	82,9	83,1	83,1	83,9	85,1	86,6	87,6
2000 Hz	78,1	78,6	79,1	79,6	80,1	80,4	80,6	80,6	81,4	82,6	84,1	85,1
4000 Hz	74,2	74,7	75,2	75,7	76,2	76,5	76,7	76,7	77,5	78,7	80,2	81,2
8000 Hz	69,4	69,9	70,4	70,9	71,4	71,7	71,9	71,9	72,7	73,9	75,4	76,4
Total dB(A)	86,0	86,5	87,0	87,5	88,0	88,3	88,5	88,5	89,3	90,5	92,0	93,0

Sound pressure level (LP)

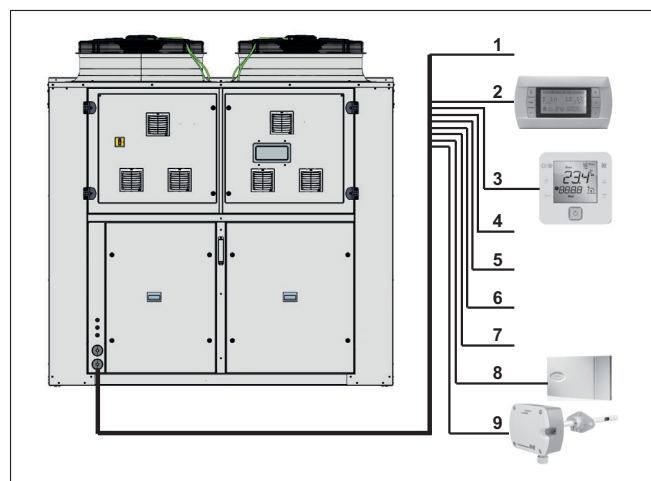
Measurement conditions: in a clear field, measured at a distance of 5 metres, directivity 2 and at 1,5 metres from the ground.

50FF/FC	100	110	120	130	145	160	170	180	200	220	250	280
Total dB(A)	58,6	59,1	59,6	60,0	60,5	60,8	61,0	60,7	61,5	62,7	64,0	65,0

Note: The sound pressure level depends on the installation conditions and, as such, it only indicated as a guide. Values obtained according to the ISO 3744 standard.

ELECTRICAL CONNECTIONS

No.	50FF/FC		100 to 280
1	Main power supply	400 III (±10%)	3 Wires + Ground + Neutral
2	Remote connection of graphic terminal (by default installed on the electrical cabinet) (1)		Telephone cable 6 wires standard (RJ12 connector)
3	Connection of user terminal (optional) (2)		2 wires for power supply 230V + 1 shielded cable for communication type AGW20 / 22 (1 braided pair + drainwire + shielding)
4	Remote off/on (optional)		2 wires
5	General fault signal (opt.) (3)		2 wires
6	Remote Cooling / Heating (optional upon request)		2 wires
7	Circulation pump signal for HWC (antifreeze safety) (opt.)		1 wire
8	Ambient sensor	NTC	2 wires
		RS485	5 wires (4)
9	CO ₂ sensor (optional)		3 wires



- (1) In this case, it's possible to install the user terminal on the electrical cabinet.
- (2) It's necessary that the terminal uses the same power supply that the control board.
- (3) 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.
- (4) Up to four RS485 ambient sensors can be connected in series on the field-bus of the control board.

FACTORY OPTIONS AND ACCESSORIES

Category	Description	Upon request	Factory installed option	Field installed accessory
Electrical power	400 V / 3 ph / 50 (without neutral)		X	
Airflow + Assembly	B2: Economizer, 2 dampers		X	
	BP: Plug-fan in return section		X	
	BA: Cooling recovery circuit with plug-fan in return section		X	
	BT: Return top box with plug-fan or centrifugal fan		X	
	BB: Cooling recovery circuit with plug-fan or centrifugal fan in return top box		X	
	BW: Heat recovery wheel module		X (*)	
	B3: Economizer, 3 dampers	X	X	
	BL: Return top box with plug-fan or centrifugal fan with heat recovery wheel module	X	X (*)	
Coil coating	INERA® coils with aluminium alloy fins and copper pipes		X	
	Coils with polyurethane precoated aluminium fins and copper pipes		X	
	Blygold® coating	X	X	
Heating	Auxiliary hot water coil: «Standard»		X	
	Auxiliary hot water coil: «Very low outdoor temperature»	X	X	
	Auxiliary electrical heaters: on/off control		X	
	Auxiliary electrical heaters: proportional control	X	X	
	Warm air heater module with gas burner (supplied installed inside a pre-assembly roofcurb)			X
Protection low temperature	Freeze protection OAT lower than -10°C		X	
	Freeze protection OAT lower than -14°C		X	
	Freeze protection OAT lower than -10°C + spring shut-off dampers		X	
	Freeze protection OAT lower than -14°C + spring shut-off dampers		X	
Supply fan	Indoor plug-fan with nominal available pressure (Aluminum), low pressure (Aluminum) or high pressure (Aluminum)		X	
Air filtration + droplet eliminator	Droplet eliminator after the indoor air coil		X	X
	Filters G4 low pressure drop		X	X
	Filters G4 + folded filters F7		X	X
	Filters G4 low pressure drop + folded filters F7		X	X
	Double stage of folded filters: M6+F7, F7+F9		X	X
Outdoor fan	Two-speed direct-driven axial fans		X	
Insulation	Thermal and acoustic insulation, Euroclass A2-s1, d0 (M0), with double wall (50mm)		X	
Indoor circuit	Condensates drain pan in stainless steel		X	X
	Room overpressure management		X	
	Filter fouling detection with differential pressure switch		X	
Outdoor circuit	Fresh air safety grid		X	X
	Outdoor coil protection grid		X	X
	Droplet eliminator at the fresh air intake		X	X
	Antivibration mounts made of rubber		X	X
Heat recovery wheel	Selection of the heat recovery wheel (BW assembly): diameter, channel cross section, wheel material and and type of speed control		X	
Extra heating	Heat recovery coil		X (*)	
Special applications	Air zoning		X (*)	
	Low return temperature application		X	
	Low return temperature application + Air zoning		X (*)	
Sensors	NTC ambient temperature sensor on the control board or 1 to 4 sensors with RS485 comm.		X	X
	Ambient temperature + humidity sensor with RS485 communication. Up to four sensors		X	X
	CO ₂ sensor: environment or ducted installation or installed on a pLAN network		X	X
	Smoke detection control unit in accordance with the NF S 61-961 standard		X	X
Economizer + Outd. humidity	Economizer management: thermal, enthalpic or thermoenthalpic		X	X
	Outdoor air humidity sensor: supplied with the unit or installed on a pLAN network		X	X
Terminal + Unit communication	Graphic terminal installed in the electrical cabinet + User terminal remote up to 100 m		X	X
	Graphic terminal installed in the electrical cabinet + Graphic terminal remote up to 200 m		X	X
	User terminal installed in the electrical cabinet		X	X
	User terminal installed in the electrical cabinet + Graphic terminal remote up to 200 m		X	X
	Touch panel in the electrical cabinet		X	X
	Touch panel in the cabinet + Graphic terminal remote up to 200 m		X	X
	Touch panel in the cabinet + User terminal remote up to 100 m		X	X
	Unit configuration: stand-alone, master or slave		X	X
	Communication cards: RS485 Modbus/Carel; Ethernet PCoWeb; RS485 LonWorks®; Ethernet BACnet™; RS485 BACnet™; RS485 Konnex		X	X
Miscellaneous item 1	Management of an humidifier with on-off or proportional control		X	
	Electrical energy meter		X	
	Cooling capacity and electrical energy meter		X	
Miscellaneous item 2	Varnish protection for components on the electrical cabinet: control board, cards and terminals		X	
Return fan	Centrifugal return fan: 3 airflow options: low, nominal and high		X	
	Return plug-fan: 3 available pressure options: nominal pressure (Polypropylene), nominal pressure (Aluminium) or high pressure (Aluminium)		X	
Airflow direction	There are 9 combinations in the direction of airflow with: - Supply: lower, lateral and upper - Return: lower, lateral and upper		X	
Roofcurb	Pre-assembly roofcurbs with adjustable height			X
	Adaptation roofcurbs for replacing units on site	X		X

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

FACTORY OPTIONS AND ACCESSORIES

Assembly + Indoor air flow direction

B1 assembly

Standard

BW assembly

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

B2 assembly

Economizer, 2 dampers: fresh air damper interlocked with return damper

BT assembly

Return top box with plug-fan or centrifugal fan

BP assembly

Plug-fan in return section

BB assembly

Return top box with plug-fan or centrifugal fan + Cooling recovery circuit (active recovery)

BA assembly

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

BL assembly (upon request)

Return top box with plug-fan or centrifugal fan + Heat recovery wheel module (passive recovery)

B3 assembly (upon request)

Economizer, 3 dampers: fresh air damper and exhaust air damper

Legend

S Lower air supply	R Lower air return
S' Lateral air supply	R' Lateral air return
S'' Upper air supply	R'' Upper air return
F Fresh air intake	E Exhaust air outlet

Note: only one of the three possible options (lower, lateral or upper) can be selected for both, supply and return.

Indoor airflow direction

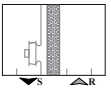
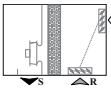
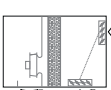
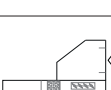
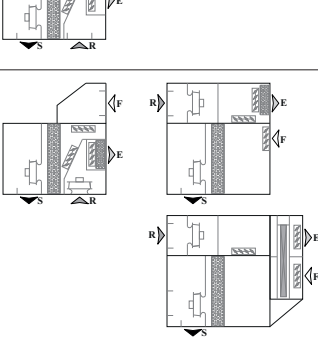
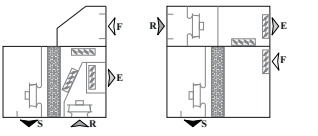
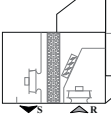
0 Lower supply and lower return	3 Lateral supply and lateral return	6 Upper supply and lateral return
1 Lateral supply and lower return	4 Upper supply and lower return	7 Lower supply and upper return
2 Lower supply and lateral return	5 Lateral supply and upper return	8 Upper supply and upper return

FACTORY OPTIONS AND ACCESSORIES

Air pressure control in different assemblies

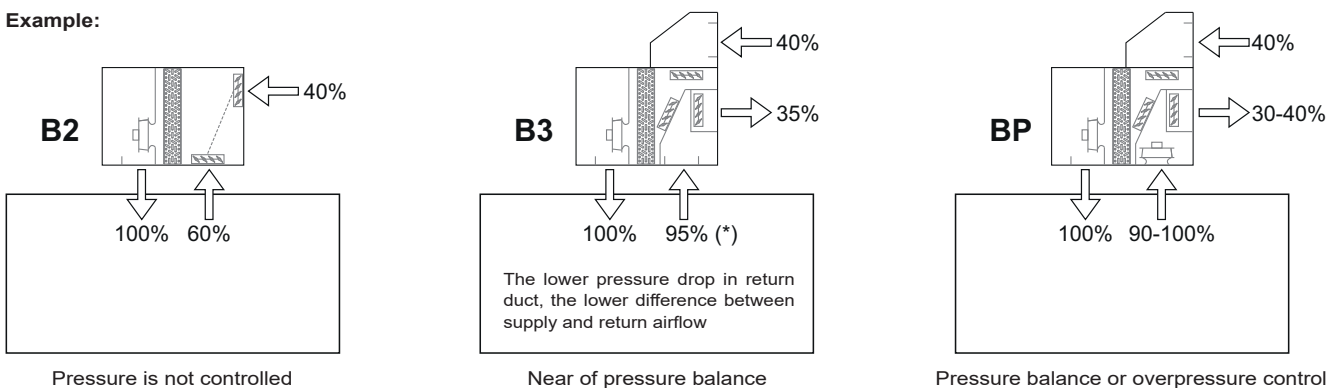
In case of assemblies with fresh air (ventilation) but without extraction air, overpressure will be generated in the building, higher with higher fresh air ratios or in free-cooling mode. It will not generate any issue in buildings with low air tightness and/or with doors frequently opened, but we should 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.

50FF/FC 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 (upon request)		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, BL (upon request)		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		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, BB and BL assemblies because this type of control of the dampers penalizes cooling recovery.

Example:



FACTORY OPTIONS AND ACCESSORIES

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 aluminium fins with **polyurethane** coating. Level of corrosion protection: basic. This treatment offers a resistance of more than 1000 hours (ASTM B117 NSST).
- 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 and hot water coil) according to the combinations available in the "Selection Software".

Heating

The unit only can incorporate one of these heating elements:

- Warm air heater module with gas burner** with modulating actuator, in accordance with the Gas Directive 2009/142/EC, installed inside a pre-assembly roofcurb.

The 50FF/FC unit with lower air supply will be placed on this roofcurb.



Note: It's recommended to use the filter fouling detector (optional) in units with gas burner.

Two values of power available for each model:

50FF/FC	100 to 120	130 to 170	170 to 280
BAM (Nominal)	PCH080	PCH130	PCH160
BAS (High)	PCH130	PCH160	PCH210

- Auxiliary electrical heaters**, with two power stages and on/off control, for assembly and connection inside the unit.

Up to 3 values of total power available for each model:

50FF/FC	RAF (Low)	RAM (Nominal)	RAS (High)
100 to 120	27 kW	36 kW	54 kW
130 to 170	36 kW	54 kW	72 kW
180 to 220	45 kW	72 kW	90 kW
250 to 280	54 kW	72 kW	108 kW

- Electrical heater with proportional control (**upon request**).

- Auxiliary hot water coil**, with three-way valve and proportional control, for assembly inside the unit.

The unit incorporates a freeze protection thermostat.

- Optional «Very low outdoor temperature» (**upon request**):

Additional freeze protection technology based on the water temperature. This protection is made up of a circulation pump as well as two sensors inserted in the input and the output of the coil.

Important: this option is mandatory for an outdoor temperature lower than -20°C WB. Consult for percentages of glycol water above 20%.

Protection for low outdoor temperature

- Freeze protection OAT lower than -10°C. Mandatory for an outdoor temperature lower than -10°C WB.
 - Electrical heater for protection of the components of the electrical cabinet.
 - Compressor with protection for low temperature.
- Freeze protection OAT lower than -14°C. Mandatory for an outdoor temperature lower than -14°C WB.

In addition to the options of -10°C, this includes:

 - Reinforced electrical heater for protection of the components of the electrical cabinet.
 - Electrical heater for anti-freeze protection of dampers of the economizer (if applicable).
 - Protective kit of the gas burner for low temperature (if applicable).
- Freeze protection OAT lower than -10°C + spring shut-off dampers in case of a power failure.
- Freeze protection OAT lower than -14°C + spring shut-off dampers in case of a power failure.

Supply fan

- By default, these units are fitted with plug-fans for a nominal available pressure (N), in Polypropylene.

The following fans can optionally be supplied:

- F: Low available pressure (Aluminium)
- M: Nominal available pressure (Aluminium)
- S: High available pressure (Aluminium)

FACTORY OPTIONS AND ACCESSORIES

Note: Aluminium fans are rated A2-s1, d0 (M0) and comply with regulations for public promises in France.

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

Air filtration + Droplet eliminator

Options to improve indoor air quality:

- Different combinations of filters are available:
 - Gravimetric filters G4 with low pressure drop.
 - Gravimetric filters G4 of standard type + folded opacimetric filters F7.
 - Gravimetric filters G4 with low pressure drop + folded opacimetric filters F7.
 - Double-stage of folded opacimetric filters: M6+F7 or F7+F9.

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

- G4 → ISO Coarse 60%
- M6 → ISO ePM10 70%
- F7 → ISO ePM1 50%
- F9 → ISO ePM1 80%

- Droplet eliminator after the indoor air coil. Recommended in cases where a high moisture content in the air is foreseen or when the air flow is high.

Note: with hot water coil it is not possible to assemble the droplet eliminator.

Outdoor fan

- Two-speed direct-driven axial fan(s). Watertight motor class F, IP54 and internal thermal protection. Dynamically balanced propellers and outdoor protective grille.

Insulation

- Thermal and acoustic insulation A2-s1,d0 (M0) with sandwich panels with double wall, 50 mm thick, in all indoor section in contact with airflow.



Standard insulation



M0 insulation

Indoor circuit

- Condensate drain pan in stainless steel for corrosion protection.
- Filter fouling detection with differential pressure switch.
- Room overpressure management. Assemblies that include a return fan allow the management of airflow differences between supply air and return air of up to 10%, setting up flow setpoints.

Optionally, the fresh air damper and the exhaust damper can be managed independently for greater airflow differences. This option may be necessary to prevent the entry of outside air (BP, BT and BW assemblies).

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

Outdoor circuit

- Fresh air safety grid (9x9mm).
- Outdoor coil protection grid.
- Antivibration mounts made of rubber.
- Droplet eliminator at the fresh air intake. This one and the thermoenthalpic free-cooling are necessary in cases where a high moisture content in the air is foreseen.

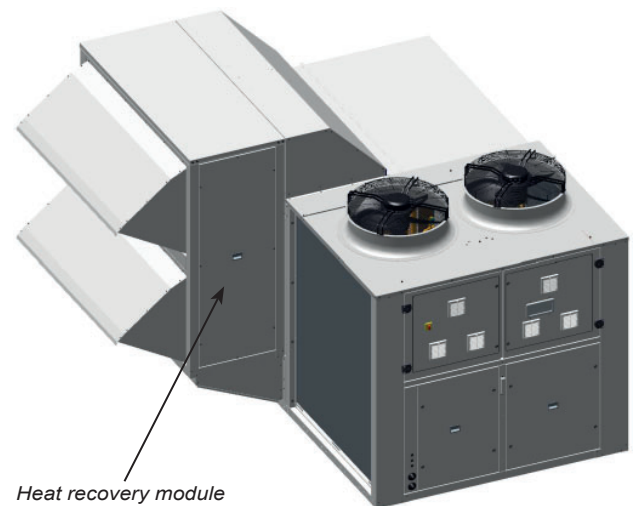
Heat recovery wheel

- The heat recovery wheel is fitted into a module placed on one side of the unit. This module is supplied disassembled with the unit, for installation on site.

Available with BW assembly, and upon request, with BL assembly.

This rotary recovery unit is used to transfer the sensible and latent heat from the air-conditioned room's return air to the fresh air used for ventilation, before it's 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 cross section and type of speed control.



Heat recovery module

Extra heating

- Heat recovery coil (HRC). 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. The coil is supplied with a 3-way valve for installation outside the unit but managed by the electronic control. This option is compatible with B1, B2, BT and BB assemblies.

FACTORY OPTIONS AND ACCESSORIES

Special applications

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

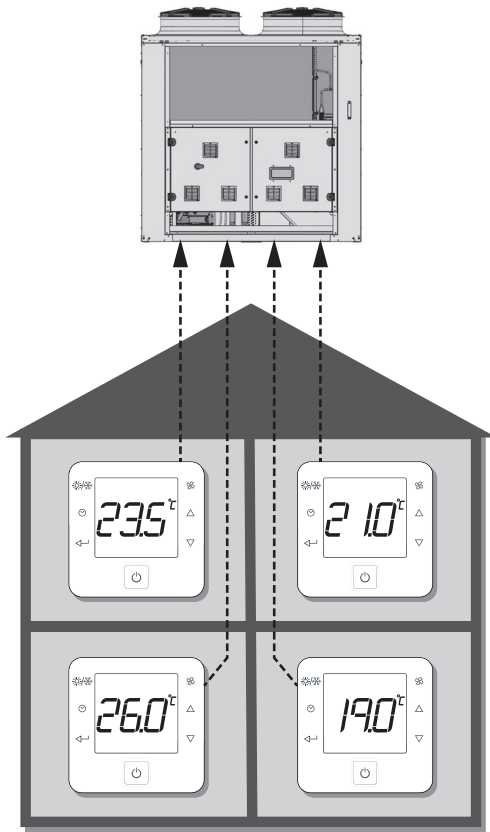
With this option, the unit adapts all its devices to manage low return temperature (15°C) in cooling mode. This is possible due to some changes in the control operation parameters.

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

■ **Zoning of the air flow up to 4 different zones.**

This option allows the management of the air flow of the unit to condition up to 4 different zones with a minimum air flow of 35% (all of them in same operating mode: heating or cooling). This function allows to adapt the indoor air flow to the installation requirements.

Note: zoning is only possible with plug-fans.



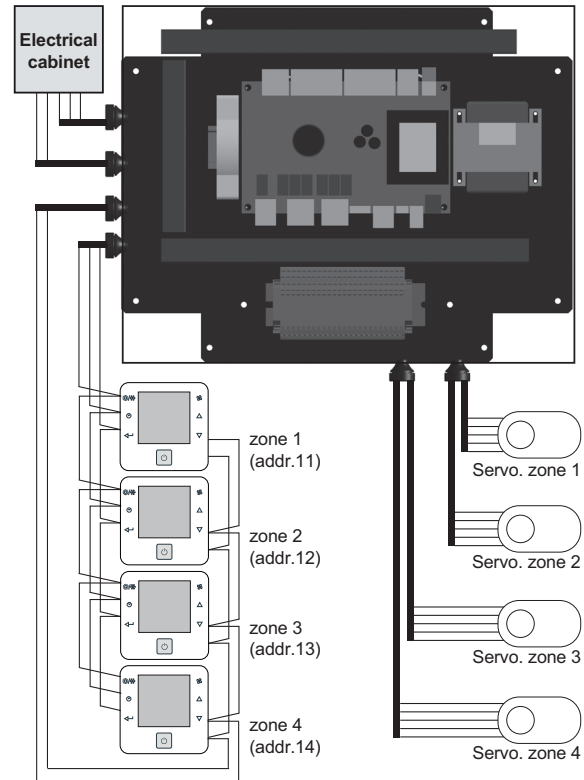
Regulation gives the control signal to the dampers installed in each zone (dampers and servomotors for those dampers not supplied). The unit modifies the air flow and capacity depending on information coming from sensors in each zone and considering active zones in each moment.

The option includes 4 zone terminals (one for each zone) and a control board supplied in an independent box. The 4 terminals, the PJ unit main board and also the servomotors that control dampers in each zone are connected on this board (dampers and servos not supplied).

The temperature information for each zone is coming from temperature sensor integrated inside each zone terminal. It is not needed to install any extra ambient sensor.

Note: In case the unit includes an economizer for enthalpic or thermoenthalpic free cooling (T+H control) an extra return T+H sensor in the offer is required. If the unit additionally includes CO₂ probe, it must be a return probe and not an ambient probe.

In following picture, electronic PCB and 4 zone terminals are detailed. Connections can be found in the “50FC” control manual.



Note: There is a new option with **constant supply pressure** that extends the possibilities for multi-zone management. Available upon request.

Sensors

- **Ambient temperature sensor(s).** 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.
 - Up to four sensors with RS485 communication.
 - Sensor(s) installed on the master unit of the local network (pLAN).
- One to four **ambient temperature + humidity sensor(s)** with RS485 communication or installed on the pLAN network. This sensor is compulsory in units with enthalpic or thermoenthalpic free-cooling (optional). In this case, the outdoor air humidity sensor is also added.
- **CO₂ sensor for air quality control.** There are 3 options:
 - Ambient air quality sensor,
 - Return air quality sensor (duct-mounted),
 - Sensor installed on the master unit of the local network (pLAN).
- **Smoke detection control unit** in accordance with the NF S 61-961 standard, 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 select the opening of the fresh air damper and the exhaust air damper to 100% (return air damper closed).

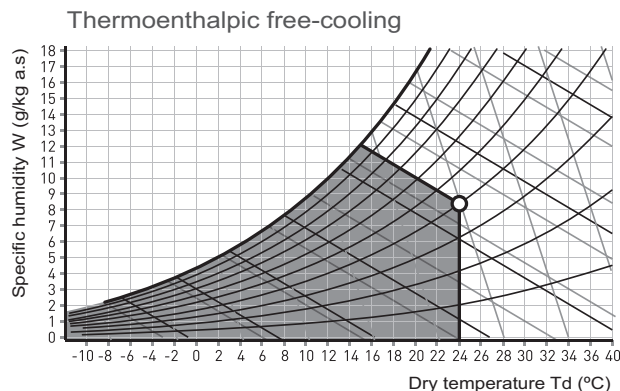
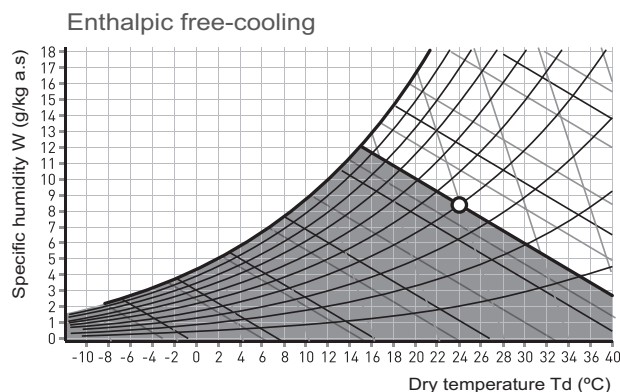
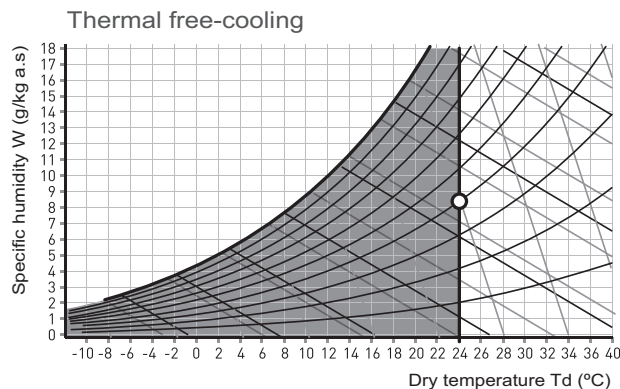
FACTORY OPTIONS AND ACCESSORIES

Economizer management + outdoor humidity

■ Managing free-cooling with an **economizer** allows to make best use of outdoor air conditions when these are more favourable than the return air conditions. This allows the cooling capacity to be reduced. The percentage of outdoor air can vary between 0% and 100%.

The economizer management can be:

- Thermal, by comparing the temperatures.
- Enthalpic, by comparing the enthalpies. Recommended in cases where a high moisture content in the air is foreseen.
- Thermoenthalpic, by comparing the enthalpies and correcting for temperature. This is the optimum solution as it takes the variability of the climate into account.



One function that helps improve energy management is **nocturnal free-cooling**. This feature allows the compressors to be disabled in summer with programming, the unit works providing free-cooling at night, when the outdoor conditions are favourable. This allows the cooling demand to decrease significantly early in the day.

■ **Outdoor air humidity** sensor (compulsory in units with optional enthalpic or thermoenthalpic free-cooling).

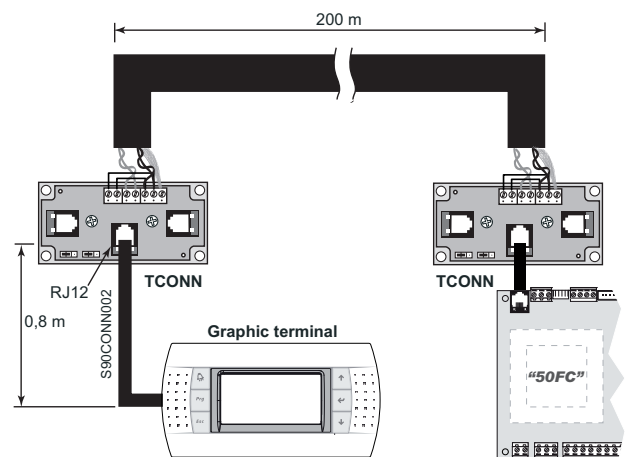
There are 2 options:

- Sensor supplied with the unit.
- Sensor installed on another unit of the local network (pLAN).

Terminal + unit communication

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

- Graphic terminal installed in the electrical cabinet and User terminal remote up to 100 meters.
- Graphic terminal installed in the electrical cabinet and Graphic terminal remote up to 200 meters (two TCONN bypass cards must be used from 50 to 200 meters).
- User terminal installed in the electrical cabinet, instead of the graphic terminal.
- User terminal installed in the electrical cabinet and Graphic terminal remote up to 200 meters (two TCONN bypass cards must be used from 50 to 200 meters).



- Touch panel installed in the electrical cabinet, instead of the graphic terminal.
- Touch panel installed in the electrical cabinet and Graphic terminal remote up to 200 meters (two TCONN bypass cards must be used from 50 to 200 meters).
- Touch panel installed in the electrical cabinet and User terminal remote up to 100 meters.



Graphic terminal



Touch panel



User terminal

FACTORY OPTIONS AND ACCESSORIES

- Control without terminal (for units with shared terminal in a pLAN network).

- By default, the electronic control is configured for a stand-alone unit, but it is also possible to place it in a pLAN network (Local Area Network) as Master, Slave or Back-up. The maximum number of units that can be configured on a Master/Slave pLAN network is 15, and in case of Back-up units is 2.

Important: to use any of the following functionalities it is necessary to configure in the "Selection software" one unit as Master and the others as Slaves (including the back-up unit). The specific functionality will be configured on site (according to the "50FF/FC control manual").

The pLAN network allows to have the following functionalities depending on the parameterized configuration:

- Master/Slave:

It allows to share the VetricGD terminal, as well as some of the probes installed in the master unit: ambient temperature or ambient temperature + humidity, outdoor temperature, outdoor humidity and CO₂ air quality.

- Extended Master/Slave:

It includes "Master/Slave" functionalities and the master unit provides ambient temperature setpoints to the other units.

- Master/Slave with the same operating mode:

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

- Back-up in case of alarm:

One unit is configured as a backup unit, in case of malfunction of the other pLAN network unit.

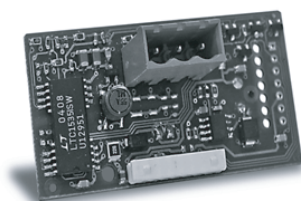
- Extended Back-up:

It includes the "Back-up 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 Back-up units, it is not possible to share the probes, nor the terminal, 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).

- This control allows the connection to a centralised technical management system by using a specific BMS card for some of the following communication protocols:

- RS485 serial cards for network communication with protocols: Carel, Modbus, LonWorks®, BACnet™ MSTP, Konnex.
- Ethernet pCO Web card for network communication with protocols: Modbus TCP/IP, BACnet™ Ethernet, TCP/IP, SNMP V1-2-3, FTP and HTTP.



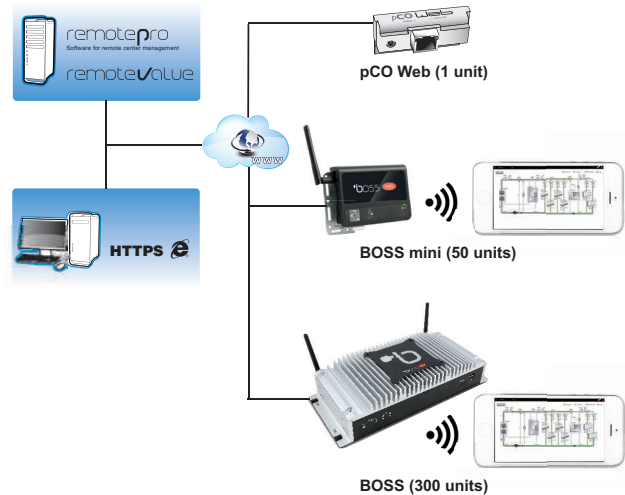
RS485 Carel/Modbus card



Ethernet pCO Web card

Supervision solutions

Different solutions of supervision are available bases on the dimensions of the installation for unit fitted with Ethernet pCO Web and RS485 Carel / Modbus cards.



- pCO Web:

It is the solution for the management and supervision of a single unit if this incorporates the Ethernet pCO Web card.

- BOSS:

This is the solution for the management and supervision of air-conditioning installations with up to 300 units.

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.

It offers advanced monitoring and maintenance functions and allows zones and groups to be created to simplify the management of the installation. It also allows energy meters to be integrated to monitor the installation electricity consumption.

BOSS is available in two versions:

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

For this option, each unit needs one RS485 Carel / Modbus board.

- BOSS mini (New)

This is the solution for the management and supervision of air-conditioning installations with up to 10 units with 50 variables per unit or 50 units with 10 variables maximum per unit, but with the same features as BOSS.

BOSS mini is available in two versions:

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

These systems are used to manage the installation remotely. All the information on the system can be accessed via a simple Internet connection. The online interface, the same one used by the local user, enables monitoring and complete configuration of the installation: from the office or anywhere else the user happens to be.

To control multiple sites remotely, there are special tools dedicated to centralized management, such as **RemotePRO** and **RemoteValue**.

FACTORY OPTIONS AND ACCESSORIES

Miscellaneous item 1

- Management of an humidifier with on-off or proportional control.
- Electrical energy meter for monitoring of the power consumption of the installation.
- Cooling capacity and electrical energy meter. 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

- Varnish protection for the components on the electrical cabinet: control board, cards and terminals.

Return fan

- Centrifugal return fan, coupled by pulleys and belts. Electric motor with tensioner, class F, IP55 and internal thermal protection. Turbine with an impeller of front-curved blades. Greased spherical bearings, with no maintenance required. Available in BB and BT assemblies.

There are 3 fan options depending on the airflow: low, nominal and high.

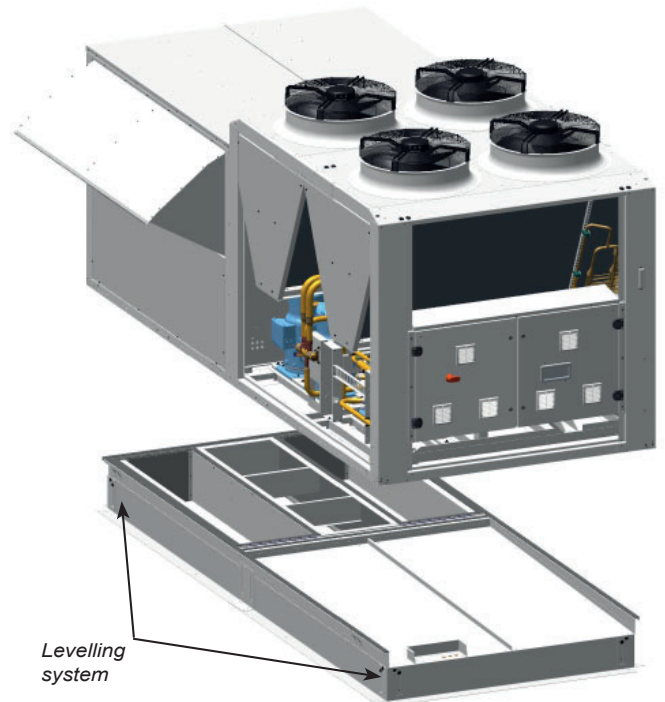
- Return plug-fan. There are 3 fan options depending on the available pressure:
 - N: Nominal available pressure (Polypropylene).
 - M: Nominal available pressure (Aluminium).
 - S: High available pressure (Aluminium).

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

Pre-assembly roofcurbs

- The units can rest on standardised pre-assembly roofcurbs with adjustable height, built in galvanised steel panelling with polyester paint and thermal insulation.

The levelling system uses angle pieces that allow adjustments in the X and Y axes.



- Adaptation roofcurbs ready for direct replacement on site of units from different manufacturers (**upon request**).

ADDITIONAL FACTORY OPTIONS UPON REQUEST

This chapter contains additional options available upon request, in addition to those already indicated on the previous chapter:

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		✓
Constant supply pressure		✓	
Adjustable pre-assembly roofcurbs with higher height		✓	

General alarm signalling

"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, gas boiler, rotary heat exchanger and on/off signal for external humidifier. In this case, under consultation, you could have a general alarm output in an input/output expansion module. 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

"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 Back-up 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.

Constant supply pressure

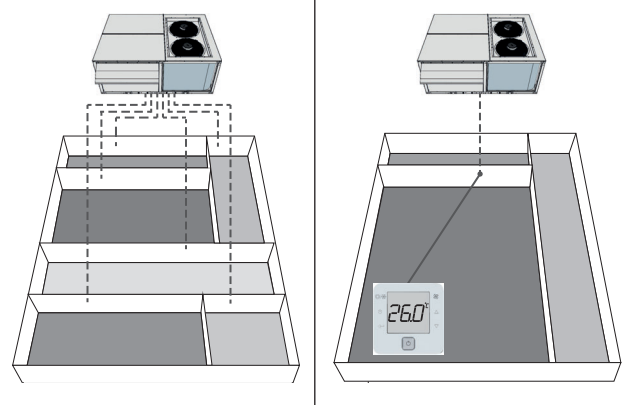
The 50FF/FC range provides the greatest choice in terms of multi-zone management. This new option of "Constant supply pressure" is added to the option "Air flow zoning up to 4 zones".

This function allows to control the air flow to maintain constant pressure in the supply duct, with the setpoint value set by parameter.

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

Characteristics	Zoning up to 4 zones	Constant supply pressure
Number of zones	up to 4	unlimited
Type of fan	plug-fan	plug-fan
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 (see "Configurations")
Minimum air flow	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)	<ul style="list-style-type: none"> • Based on the return conditions (by default) • Based on the environment conditions (configurable), in case of a main zone (see "Configurations")

Configurations	
Capacity control based on the return conditions (by default)	Capacity control based on the environment conditions (configurable)
Several zones	Several zones (one main zone)
Same comfort priority by zone	One main zone. Comfort of all zones depends on the demand of the main zone



Note: For variable management of fresh air it is necessary to select the optional return air quality probe (CO₂) (instead of the ambient probe).

There is only one case in which the ambient air quality probe can be used: with constant supply pressure and capacity based on the environmental conditions of the main zone.

OPTIONS FOR THE OUTDOOR CIRCUIT

Axial 2-speed outdoor fan

50FF/FC			100	110	120	130	145	160	170	180	200	220	250	280
Cooling: efficiency with R-454B	50FF	SEER	4,32	4,31	4,25	4,37	4,33	4,09	4,10	4,48	4,35	4,39	4,24	4,10
		ηs	170%	169%	167%	172%	170%	161%	161%	176%	171%	172%	167%	161%
	50FC	SEER	4,20	4,18	4,12	4,23	4,20	3,97	3,97	4,35	4,22	4,26	4,13	3,98
		ηs	165%	164%	162%	166%	165%	156%	156%	171%	166%	167%	162%	156%
Heating: efficiency with R-454B	50FC	SCOP	3,36	3,35	3,35	3,37	3,37	3,30	3,30	3,37	3,29	3,32	3,31	3,29
		ηs	131%	131%	131%	132%	132%	129%	129%	132%	129%	130%	129%	129%
Nominal air flow (m³/h)			44.000	44.000	44.000	58.000	58.000	64.000	64.000	80.000	86.000	86.000	120.000	120.000
Available static pressure (mm.w.c.)			4											
Number / Diameter (mm)			2 / 800			2 / 910			4 / 800			4 / 910		
Maximum speed (r.p.m.)			880 / 670			885 / 685			880 / 670			885 / 685		
Output (kW)			2 x (1,9 / 1,2)			2 x (2,5 / 1,6)			4 x (1,9 / 1,2)			4 x (2,5 / 1,6)		
Max. absorbed current (A)			2 x 3,9			2 x 5,2			4 x 3,9			4 x 5,2		

OPTIONS FOR THE INDOOR CIRCUIT

Supply plug-fan with different available pressure options

50FF/FC			100	110	120	130	145	160	170	180	200	220	250	280		
Nominal air flow (m³/h)			18.000	19.800	21.600	23.400	26.100	28.800	30.600	32.400	36.000	39.000	40.500	45.000		
Nominal pressure (Aluminium) (M)	Number / Diameter (mm)		3 / 500			3 / 500			4 / 500			5 / 500			6 / 500	
	Speed (r.p.m.)		1.855			1.855			1.855			1.855			1.855	
	Output (kW)		3 x 3,1			3 x 3,1			4 x 3,1			5 x 3,1			6 x 3,1	
	Max. absorbed current (A)		3 x 4,8			3 x 4,8			4 x 4,8			5 x 4,8			6 x 4,8	
Low pressure (Aluminium) (F)	Number / Diameter (mm)		2 / 500			3 / 500			3 / 500			4 / 500			5 / 500	
	Speed (r.p.m.)		1.855			1.855			1.855			1.855			1.855	
	Output (kW)		2 x 3,1			3 x 3,1			3 x 3,1			4 x 3,1			5 x 3,1	
	Max. absorbed current (A)		2 x 4,8			3 x 4,8			3 x 4,8			4 x 4,8			5 x 4,8	
High pressure (Aluminium) (S)	Number / Diameter (mm)		3 / 500			3 / 500			4 / 500			5 / 500			6 / 500	
	Speed (r.p.m.)		2.100			2.100			2.100			2.100			2.100	
	Output (kW)		3 x 4,8			3 x 4,8			4 x 4,8			5 x 4,8			6 x 4,8	
	Max. absorbed current (A)		3 x 7,3			3 x 7,3			4 x 7,3			5 x 7,3			6 x 7,3	

Note: the value of power input according to the selected flow can be found at the "Selection Software".

Return plug-fan (BP / BA / BT / BB / BW assemblies)

50FF/FC			100	110	120	130	145	160	170	180	200	220	250	280	
Nominal air flow (m³/h)			18.000	19.800	21.600	23.400	26.100	28.800	30.600	32.400	36.000	39.000	40.500	45.000	
Nominal pressure (Polypropyl.) (N)	Number / Diameter (mm)		2 / 500						3 / 500			3 / 500		4 / 500	
	Speed (r.p.m.)		1.800						1.800			1.855		2.100	
	Output (kW)		2 x 3,1						3 x 3,1			3 x 3,1		3 x 4,8	
	Max. absorbed current (A)		2 x 4,7						3 x 4,7			3 x 4,8		3 x 7,3	
Nominal pressure (Aluminium) (M)	Number / Diameter (mm)		2 / 500			2 / 500			3 / 500			3 / 500		4 / 500	
	Speed (r.p.m.)		1.855			2.100			1.855			1.855		2.100	
	Output (kW)		2 x 3,1			2 x 4,8			3 x 3,1			3 x 3,1		3 x 4,8	
	Max. absorbed current (A)		2 x 4,8			2 x 7,3			3 x 4,8			3 x 4,8		3 x 7,3	
High pressure (Aluminium) (S)	Number / Diameter (mm)		2 / 500						3 / 500					4 / 500	
	Speed (r.p.m.)		2.100						2.100					2.100	
	Output (kW)		2 x 4,8						3 x 4,8					4 x 4,8	
	Max. absorbed current (A)		2 x 7,3						3 x 7,3					4 x 7,3	

Note: the value of power input according to the selected flow can be found at the "Selection Software".

OPTIONS FOR THE INDOOR CIRCUIT

Heat recovery wheel module (BW assembly)

This heat recovery wheel is used to transfer the sensible and latent heat from the air-conditioned room's return air to the fresh air used for ventilation, before it's discharged outdoors.

The return air circulates in half of the heat recovery unit and the ventilation air circulates in the other half, in the opposite direction. As the rotor rotates, very fine channels of air which form the matrix come into contact with the fresh air and the return air in turn, thereby transferring heat and humidity from one to the other.

The efficiency of the recovery depends on the following factors:

Wheel diameters:

- Models 100 to 120: 1500 mm and 1800 mm
- Models 130 to 170: 1800 mm and 2000 mm
- Models 180 to 280: 2000 mm and 2200 mm

Matrix materials:

- Aluminium: sensible heat recovery.
- Hybrid wheel: enthalpic recovery.
- Silicagel coated aluminium: enthalpic recovery with high efficiency in the recovery of latent heat.
- Epoxy coated aluminium (**upon request**): sensible heat recovery in aggressive environments.

Channel cross section:

The wheel is formed of two panels of aluminium, one smooth and one fluted. The fluted panel can be provided in two different configurations:

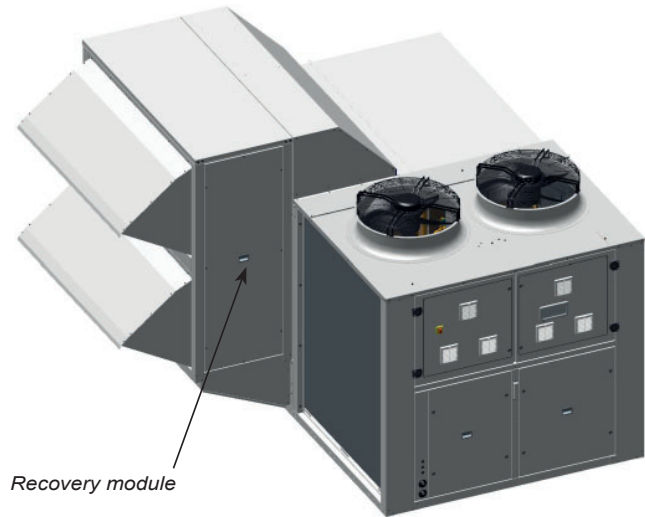
- 2.0 mm cross section: the commonly-used cross section due to its high efficiency and moderate pressure drops.
- 2.5 mm cross section: low pressure drop. Designed for high frontal speeds with low pressure drops.

The heat recovery wheel is fitted into a module placed on one side of the unit.

This module features gravimetric filters G4 with low pressure drop both on the fresh air intake and on the exhaust air outlet.

This assembly can be supplied, in option, with a speed drive for the wheel which avoids the risk of ice forming on the wheel during the defrost operation.

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



Important: the calculations for the selection of a rotary heat exchanger according to the parameters described above should be done using the "Selection Software".

Centrifugal return fan (BT / BB assemblies)

50FF/FC		100	110	120	130	145	160	170	180	200	220	250	280
Option A: Low airflow	Air flow (m ³ /h)	14.400	15.840	17.280	18.720	20.880	23.040	24.480	25.920	28.800	31.200	32.400	36.000
	Available pressure (mm.w.c.)	15	15	15	15	15	15	15	15	15	15	15	15
	Motor output (kW)	2 x 1,5	2 x 1,1	2 x 1,5	3 x 1,5	3 x 1,5	3 x 1,5	3 x 1,1	3 x 1,5	3 x 2,2	3 x 2,2	4 x 1,1	4 x 1,5
	Power input (kW)	2 x 0,78	2 x 0,98	2 x 1,25	3 x 0,56	3 x 0,72	3 x 0,92	3 x 1,07	3 x 1,25	3 x 1,65	3 x 2,12	4 x 1,05	4 x 1,39
	Max. abs. current (A)	2 x 3,6	2 x 2,7	2 x 3,6	3 x 3,6	3 x 3,6	3 x 3,6	3 x 2,7	3 x 3,6	3 x 5,0	3 x 5,0	4 x 2,7	4 x 3,6
	Speed (r.p.m.)	490	490	548	439	459	490	516	584	610	490	514	581
	OPK code	2 x OPK0719	2 x OPK0721	2 x OPK0722	3 x OPK0720	3 x OPK0724	3 x OPK0719	3 x OPK0725	3 x OPK0723	3 x OPK0726	3 x OPK0727	4 x OPK0725	4 x OPK0723
Option C: Nominal airflow	Air flow (m ³ /h)	18.000	19.800	21.600	23.400	26.100	28.800	30.600	32.400	36.000	39.000	40.500	45.000
	Available pressure (mm.w.c.)	15	15	15	15	15	15	15	15	15	15	15	15
	Motor output (kW)	3 x 1,5	3 x 1,5	3 x 1,5	3 x 1,1	3 x 1,5	3 x 2,2	3 x 2,2	3 x 3,0	3 x 3,0	3 x 3,0	4 x 2,2	4 x 3,0
	Power input (kW)	3 x 0,51	3 x 0,64	3 x 0,78	3 x 0,94	3 x 1,27	3 x 1,65	3 x 1,99	3 x 2,33	3 x 2,98	3 x 2,98	4 x 1,95	4 x 2,60
	Max. abs. current (A)	3 x 3,6	3 x 3,6	3 x 3,6	3 x 2,7	3 x 3,6	3 x 5,0	3 x 5,0	3 x 6,9	3 x 6,9	3 x 6,9	4 x 5,0	4 x 6,9
	Speed (r.p.m.)	439	439	490	490	581	623	659	718	757	769	659	718
	OPK code	3 x OPK0720	3 x OPK0720	3 x OPK0719	3 x OPK0721	3 x OPK0723	3 x OPK0726	3 x OPK0727	3 x OPK0729	3 x OPK0728	3 x OPK0730	4 x OPK0727	4 x OPK0729
Option E: High airflow	Air flow (m ³ /h)	21.600	23.760	25.920	28.080	30.015	31.680	35.190	35.640	--	--	48.600	49.500
	Available pressure (mm.w.c.)	15	15	15	15	15	15	15	15	--	--	15	15
	Motor output (kW)	3 x 1,5	3 x 1,1	3 x 1,5	3 x 1,5	3 x 2,2	3 x 2,2	3 x 3,0	3 x 3,0	--	--	4 x 3,0	4 x 3,0
	Power input (kW)	3 x 0,78	3 x 0,98	3 x 1,25	3 x 1,47	3 x 1,88	3 x 2,2	3 x 2,96	3 x 2,98	--	--	4 x 2,98	4 x 2,98
	Max. abs. current (A)	3 x 3,6	3 x 2,7	3 x 3,6	3 x 3,6	3 x 5,0	3 x 5,0	3 x 6,9	3 x 6,9	--	--	4 x 6,9	4 x 6,9
	Speed (r.p.m.)	490	490	548	581	659	659	757	757	--	--	376	769
	OPK code	3 x OPK0719	3 x OPK0721	3 x OPK0722	3 x OPK0723	3 x OPK0727	3 x OPK0727	3 x OPK0728	3 x OPK0728	--	--	4 x OPK0728	4 x OPK0730

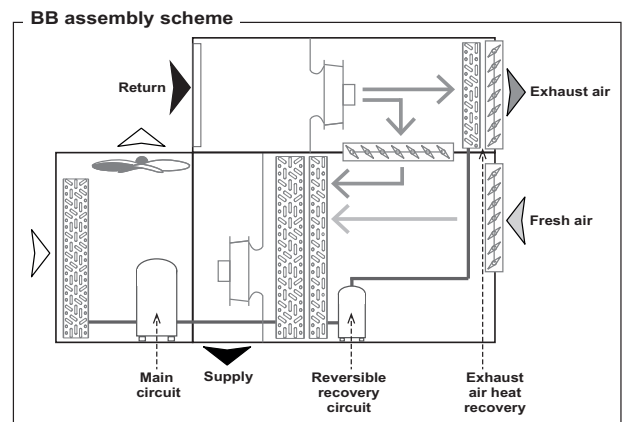
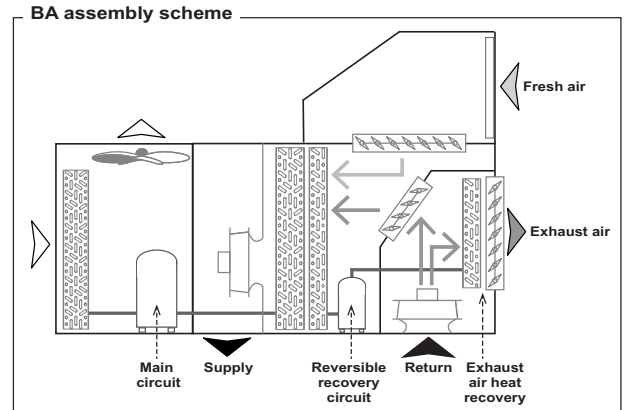
OPTIONS FOR THE INDOOR CIRCUIT

Cooling recovery circuit (BA / BB assemblies)

Thermodynamic circuit dedicated to the recovery of the extracted air energy, with independent and proportional control, adapted to the air renewal requirements in order to raise the COP, EER and seasonal efficiency of the unit set.

- The circuit is composed of:
 - EC plug-fan in return section.
 - Air circuit comprised of coils with copper pipes and aluminium fins.
 - Electronic expansion valve.
 - Hermetic scroll-type compressor with sound insulation, assembled over antivibration mounts.
 - Crankcase heater.
 - Four-way cycle reversing valve.
 - Anti-acid dehydrator filter.
 - High and low pressure transducers.
 - Condensates drain pan.

50FF/FC	100 to 120	130 to 145	160 to 170	180 to 220	250 to 280
Compressor type	Scroll				
No. of compressors / circuits	1 / 1				
Max. absorbed current (A)	13,7	18,7	21,7	24,0	27,5
Oil type	Copeland 3MAF 32cST, Danfoss POE 160SZ, ICI Emkarate RL 32CF, Mobil EAL Artic 22CC				
Volume of oil (l)	3,0	3,3	3,3	3,3	3,6
Charge of R-454B (kg)	4,8	5,8	5,8	6,8	10,7
Environment impact (tCO ₂ eq)	2,2	2,7	2,7	3,2	5,0



Heat recovery coil

The function of the heat recovery coil 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 function is managed by the unit's electronic control.

The coil is supplied with a 3-way valve for installation outside the unit but managed by the unit's electronic control.

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

50FF/FC		100	110	120	130	145	160	170	180	200	220	250	280
Air pressure drop	(mm.w.c.)	2,3	2,7	3,1	2,9	3,6	4,2	4,6	4,6	5,5	6,2	5,8	6,0
Water 35/30°C (30% MEG) and inlet air 20°C	Heating capacity (kW)	39,4	41,9	44,3	49,9	53,4	56,9	59,0	58,5	62,6	64,8	81,6	82,8
	Water flow (m ³ /h)	7,3	7,8	8,2	9,3	9,9	10,5	10,9	10,9	11,6	12,1	15,2	15,4
	Water pressure drop (1) (m.w.c)	3,1	3,2	3,3	5,1	5,3	5,6	5,7	4,4	4,5	4,5	7,0	7,0

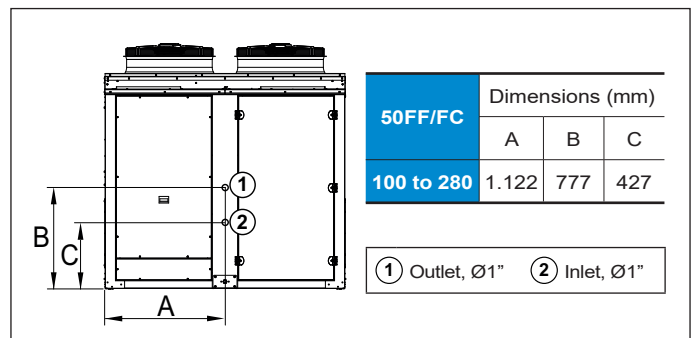
(1) Pressure drop in the coil and in the internal circuit of the unit.

Note: the heat recovery coil is not compatible with the hot water coil or the gas burner.

Correction coefficients

Water (inlet air 20°C)	30/35°C	*/40°C	*/45°C
Correction coefficients	1,00	1,35	1,70
% of MEG	10%	20%	30%
Correction coefficients	1,06	1,03	1,00

Position of the hydraulic connections



OPTIONS FOR THE INDOOR CIRCUIT

Droplet eliminator after the indoor air coil

Air flow at which it is recommended to install a droplet eliminator after the indoor coil.

50FF/FC	100	110	120	130	145	160	170	180	200	220	250	280
Air flow (m³/h)	25.920	25.920	25.920	34.700	34.700	34.700	34.700	39.658	39.658	39.658	46.675	46.675

Note: for operating conditions with high dehumidification in the indoor coil (e.g. in installations close to the coast) it may be necessary to install a separator even if the flow is less than the previous one.

Note: the droplet eliminator after the indoor coil is not compatible with the hot water coil.

Auxiliary electrical heaters

Auxiliary electrical heaters, with two power stages and on/off control, for assembly and connection inside the unit.

■ Up to 3 values of total power available for each model:

50FF/FC	RAF (Low)	RAM (Nominal)	RAS (High)
100 to 120	27 kW	36 kW	54 kW
130 to 170	36 kW	54 kW	72 kW
180 to 220	45 kW	72 kW	90 kW
250 to 280	54 kW	72 kW	108 kW

■ Characteristics:

Total power (kW)	27	36	45	54	72	90	108
Stages power (kW)	9	18	18	27	36	45	54
	+ 18	+ 18	+ 27	+ 27	+ 36	+ 45	+ 54
Current (A)	39,0	52,0	65,0	78,0	104,0	130,0	156,0
Power supply	400 V / III ph						

Auxiliary hot water coil

Auxiliary hot water coil, with three-way valve and proportional control, for assembly and connection inside the unit. This option always incorporates a freeze protection thermostat.

50FF/FC	100	110	120	130	145	160	170	180	200	220	250	280	
Air pressure drop (mm.w.c.)	2,2	2,6	3,0	2,9	3,5	4,1	4,5	3,9	4,7	5,4	4,2	5,0	
Water 80/60°C and inlet air 20°C	Heating capacity (kW)	181,0	192,4	203,2	226,4	242,3	257,3	266,8	278,2	295,8	309,5	336,8	358,5
	Water flow (m³/h)	8,0	8,5	9,0	10,0	10,7	11,4	11,8	12,3	13,1	13,7	14,9	15,9
	Water pressure drop (m.w.c.)	3,3	3,4	3,5	4,0	4,2	4,3	4,4	4,3	4,3	4,3	5,9	6,0
Water 90/70°C and inlet air 20°C	Heating capacity (kW)	222,5	236,6	250,0	278,1	297,9	316,6	328,3	346,2	368,2	385,7	416,9	443,9
	Water flow (m³/h)	9,9	10,5	11,1	12,4	13,3	14,1	14,6	15,4	16,4	17,1	18,5	19,7
	Water pressure drop (m.w.c.)	3,6	3,7	3,8	4,5	4,6	4,8	5,0	4,4	4,4	4,5	6,1	6,2

Note: Maximum water inlet temperature 95°C, maximum pressure 4 bar.

Note: The hot water coil is not compatible with the droplet eliminator after the indoor air coil or the heat recovery coil.

Position of the hydraulic connections of the hot water coil

The inlet/outlet connections of the hot water coil are located inside the unit and the connection is made via the side panel. It can also be made via the base of the unit using flexible piping (for installation with pre-assembly roofcurb).

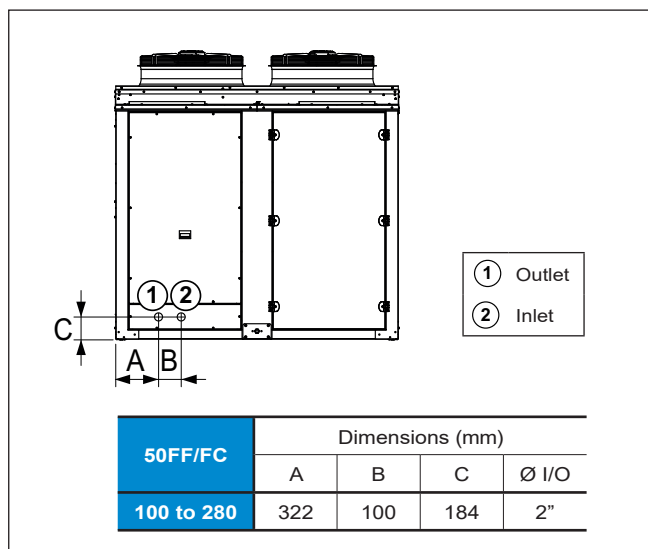
The position of the sheet metal precuts on the side panel are shown in the following diagrams.

“Very low outdoor temperature” option (upon request)

■ This anti-freeze safety incorporates:

- Circulation pump.
- Water temperature sensors located in the inlet and the outlet of the coil.

Important: this option is mandatory for an outdoor temperature lower than -20°C WB. Consult for percentages of glycol water above 20%.



OPTIONS FOR THE INDOOR CIRCUIT

Warm air heater module with gas burner

Warm air heater module with gas burner with modulating actuator, in accordance with the Gas Directive 2009/142/EC, installed inside a pre-assembly roofcurb. The 50FF/FC unit with lower air supply will be placed on this roofcurb.

EC certification: 0476CQ0451.

■ Two values of power available for each model:

50FF/FC	100 to 120	130 to 170	170 to 280
BAM (Nominal)	PCH080	PCH130	PCH160
BAS (High)	PCH130	PCH160	PCH210

Note: the gas burner is not compatible with the heat recovery coil.

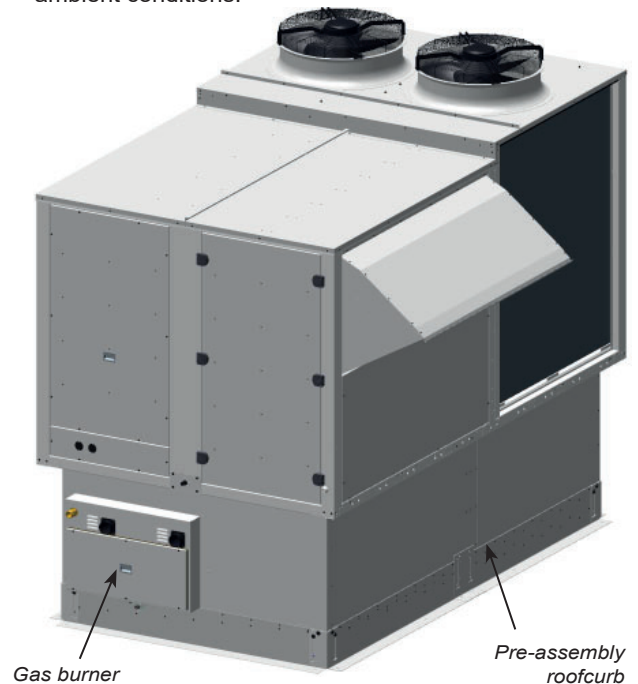
■ The key features of the boiler are:

- Natural or propane gas burner.
- Condensation boiler with premixing and modulation technology that allows outputs close to 109% (Hi performance).
- The premixed burner, in combination with the air/gas valve, ensures a "clean" combustion. Low NOx emissions < 70 mg/kWh HCV (class 5, according to standard EN 297).

Note: Burners must not exceed NOx:70mg/kWh HCV emission values from January 1st, 2021 (according to European Regulations 2016/2281).

- The combustion chamber and the burner are entirely made of stainless steel.
- Electronic controller with microprocessor and multifunction LCD display, located inside the burner, for burner's control, configuration and diagnostics.

- The electronic control of the unit will only manage the burner connection as heating support depending on the ambient conditions.



Note: It's recommended to use the clogged filter pressostat (optional) in units with gas burner.

Model		PCH080	PCH130 (2 x PCH065)		PCH160 (2 x PCH080)		PCH210 (2 x PCH105)			
Type of equipment		B23P - B53P - C13 - C43 - C53 - C63 - C83								
EC certification	PIN.	0476CQ0451								
NOx Class	Val	5								
Heater performance	Range	Min.	Max	Min.	Max	Min.	Max	Min.	Max	
	Thermal output (Hi)	kW	16,40	82,00	12,40	130,00	16,40	164,00	21,00	200,00
	Useful thermal output	kW	17,77	80,03	13,40	125,86	17,77	160,06	22,77	194,30
	Hi performance (L.C.V.)	%	108,35	97,60	108,06	96,82	108,35	97,60	108,40	97,15
	Hs performance (H.C.V.)	%	97,62	87,93	97,36	87,22	97,62	87,93	97,68	87,52
	Flue losses with burner on (Hi)	%	0,3	2,4	0,2	3,2	0,3	2,4	0,2	2,8
	Flue losses with burner off (Hi)	%	<0,1							
	Losses in enclosure (1)		0%							
	Max. condensation (2)	l/h	3,3		4,2		6,6		5,4	
Exhaust gases - Polluting emissions	Carbon monoxide - B1 - (0% of O ₂) (3)	ppm	< 5							
	Nitrogen oxides - NOx - (0% of O ₂) (Hi) (4)		41 mg/kWh - 23 ppm		39 mg/kWh - 22 ppm		41 mg/kWh - 23 ppm		39 mg/kWh - 22 ppm	
	Nitrogen oxides - NOx - (0% of O ₂) (Hs) (5)		37 mg/kWh - 21 ppm		35 mg/kWh - 20 ppm		37 mg/kWh - 21 ppm		35 mg/kWh - 20 ppm	
	Available pressure at flue	Pa	120							
Electrical data	Power supply		230 Vac - 50 Hz single-phase							
	Power input		20	123	30	194	40	246	40	260
	Power input in stand-by		<5							
	Ingress protection rating		IP X5D							
	Operating temperatures		from -15°C to +40°C							
Connections	Ø gas connection	GAS	3/4" M			1 1/2" M				
	Ø intake/exhaust pipes	mm	80/80			2 x 80/80				

(1) Enclosure losses match those of the machine housing the PCH.

(2) Max. condensation produced acquired from testing 30%Qn.

(3) Value referenced to cat. H (G20)

(4) Weighted value to EN1020:2009 ref. to class H (G20), referred to Hi (L.C.V.).

(5) Weighted value to EN1020:2009 ref. to class H (G20), referred to Hs (H.C.V.).

OPTIONS FOR THE INDOOR CIRCUIT

■ Gas settings:

Gas type	Gas settings	PCH080		PCH130 (2 x PCH065)		PCH160 (2 x PCH080)		PCH210 (2 x PCH105)	
		min.	max.	min.	max.	min.	max.	min.	max.
G20 Cat. E-H	Air supply pressure	mbar 20 [min 17-max 25]							
	Ø pilot nozzle	mm 0,7							
	Gas consumption (15°C-1013mbar)	1,74	8,68	2 x 1,31	2 x 6,88	2 x 1,74	2 x 8,68	2 x 2,22	2 x 10,58
	Carbon dioxide - CO ₂ content	8,7	9,1	8,7	9,1	8,7	9,1	8,5	9,1
	Fumes temperature	26,5	70	31	86	26,5	70	28	80
	Fume mass flow rate (max.)	kg/h 135		2 x 107		2 x 135		2 x 165	
	Gas butterfly valve	mm 12,2		11,0		12,2		15,8	
G25 Cat. L-LL	Air supply pressure	mbar 25 [min 17-max 30] (20 for Germany)							
	Ø pilot nozzle	mm 0,7 (0,75 for Germany)							
	Gas consumption (15°C-1013mbar)	2,02	10,1	2 x 1,53	2 x 8,00	2 x 2,02	2 x 10,1	2 x 2,21	2 x 12,30
	Carbon dioxide - CO ₂ content	8,6	8,9	8,8	9,2	8,6	8,9	8,8	9,0
	Fumes temperature	26	70	31	86	26	70	28	80
	Fume mass flow rate (max.)	kg/h --							
	Gas butterfly valve	mm Not necessary							
G30 Cat. 3B-P	Air supply pressure	mbar 30 [min 25-max 35] - 50 [min 42,5-max 57,5]							
	Ø pilot nozzle	mm 0,51							
	Gas consumption (15°C-1013mbar)	1,49	6,80	2 x 1,03	2 x 5,39	2 x 1,49	2 x 6,80	2 x 1,70	2 x 8,30
	Carbon dioxide - CO ₂ content	10,1	10,3	10,7	11,3	10,1	10,3	10,4	10,6
	Fumes temperature	26,5	70	31	86	26,5	70	28	80
	Fume mass flow rate (max.)	kg/h --							
	Gas butterfly valve	mm 7,0		6,5		7,0		9,3	
G31 Cat. 3P	Air supply pressure	mbar 30 [min 25-max 35] - 37 [min 25-max 45] - 50 [min 42,5-max 57,5]							
	Ø pilot nozzle	mm 0,51							
	Gas consumption (15°C-1013mbar)	1,34	6,70	2 x 1,01	2 x 5,31	2 x 1,34	2 x 6,70	2 x 1,47	2 x 8,18
	Carbon dioxide - CO ₂ content	9,3	9,6	9,4	9,6	9,3	9,6	9,5	9,8
	Fumes temperature	26,5	70	31	86	26,5	70	28	80
	Fume mass flow rate (max.)	kg/h 107		2 x 84		2 x 107		2 x 130	
	Gas butterfly valve	mm 7,0		6,5		7,0		9,3	

■ Type of gas used depending on the destination country:

Country	Category	Gas	Pressure (mbar)	Gas	Pressure (mbar)
Austria, Switzerland	I12H3B/P	G20	20	G30/G31	50
Belgium < 70kW	I2E(S)B,I3P	G20/G25	20/25	G31	37
Belgium > 70kW	I2E(R)B,I3P	G20/G25	20/25	G31	37
Germany	I12ELL3B/P	G20/G25	20	G30/G31	50
Denmark, Finland, Greece, Sweden, Norway, Italy, Czech Republic, Estonia, Lithuania, Slovenia, Albania, Macedonia, Bulgaria, Romania, Croatia, Turkey, Azerbaijan	I12H3B/P	G20	20	G30/G31	30
Spain, United Kingdom, Ireland, Portugal, Slovakia	I12H3P	G20	20	G31	37
France	I12Esi3P	G20/G25	20/25	G31	37
Luxembourg	I12E3P	G20/G25	20	G31	37/50
Netherlands	I12EK3B/P	G20/G25.3	20/25	G30/G31	30
Hungary	I12HS3B/P	G20/G25.1	25	G30/G31	30
Cyprus, Malta	I3B/P	--	--	G30/G31	30
Latvia	I2H	G20	20		
Iceland	I3P	--	--	G31	37
Poland	I12ELwLs-3B/P	G20/G27/G2.350 (*)	20/13	G30/G31	37
Russia	I12H3B/P	G20	20	G30/G31	30

(*) Consult the available burners with G2.350.

PRESSURE DROPS DUE TO THE INDOOR CIRCUIT OPTIONS

50FF/ FC	Flow (m³/h)	Pressure drops (mm.w.c)														
		Filters (1)					Droplet eliminator		HWC	EH	HRC	Adjustable roofcurb	Gas burner			
		G4 lpd	G4 + F7	G4 lpd + F7	M6 + F7	F7 + F9	Ind. coil	Air intake (2)					PCH -020	PCH -034	PCH -045	PCH -105
100	10.800	-0,6	3,5	3,0	4,2	6,5	1,0	0,6	0,6	1,0	0,7	0,9	2,8	1,2	--	--
	14.400	-0,7	5,0	4,2	5,8	9,1	1,4	0,8	1,4	1,7	1,5	1,6	4,9	2,2	--	--
	18.000	-0,9	6,5	5,6	7,4	11,8	1,8	1,1	2,2	2,7	2,3	2,5	7,7	3,4	--	--
	25.920	-1,2	10,4	9,2	11,3	18,5	3,0	1,6	4,0	5,6	4,1	5,1	16	7,0	--	--
110	10.800	-0,6	3,5	3,0	4,2	6,5	1,0	0,6	0,6	1,0	0,7	0,9	2,8	1,2	--	--
	14.400	-0,7	5,0	4,2	5,8	9,1	1,4	0,8	1,4	1,7	1,5	2,0	4,9	2,2	--	--
	19.800	-1,0	7,3	6,3	8,3	13,3	2,1	1,2	2,6	3,3	2,7	3,0	9,3	4,1	--	--
	25.920	-1,2	10,4	9,2	11,3	18,5	3,0	1,6	4,0	5,6	4,1	5,1	16	7,0	--	--
120	10.800	-0,6	3,5	3,0	4,2	6,5	1,0	0,6	0,6	1,0	0,7	0,9	2,8	1,2	--	--
	14.400	-0,7	5,0	4,2	5,8	9,1	1,4	0,8	1,4	1,7	1,5	2,3	4,9	2,2	--	--
	21.600	-1,0	8,2	7,1	9,1	14,8	2,3	1,3	3,0	3,9	3,1	3,6	11,1	4,9	--	--
	25.920	-1,2	10,4	9,2	11,3	18,5	3,0	1,6	4,0	5,6	4,1	5,1	16,0	7,0	--	--
130	14.040	-0,7	4,3	3,6	5,0	7,9	1,2	0,7	1,6	1,2	0,8	1,0	--	1,2	1,3	--
	18.720	-0,9	6,0	5,2	6,9	11,0	1,7	0,9	2,2	2,0	1,9	1,8	--	2,1	2,3	--
	23.400	-1,0	8,0	6,9	8,9	14,4	2,3	1,2	2,9	3,2	2,9	2,8	--	3,2	3,7	--
	36.720	-1,4	14,5	13,1	15,2	25,5	4,2	2,1	6,4	7,9	6,0	6,7	--	8,0	9,0	--
145	14.040	-0,7	4,3	3,6	5,0	7,9	1,2	0,7	1,6	1,2	0,8	1,0	--	1,2	1,3	--
	18.720	-0,9	6,0	5,2	6,9	11,0	1,7	0,9	2,2	2,0	1,9	2,2	--	2,1	2,3	--
	26.100	-1,1	9,2	8,0	10,1	16,5	2,6	1,4	3,5	4,0	3,6	3,4	--	4,0	4,5	--
	36.720	-1,4	14,5	13,1	15,2	25,5	4,2	2,1	6,4	7,9	6,0	6,7	--	8,0	9,0	--
160	14.040	-0,7	4,3	3,6	5,0	7,9	1,2	0,7	1,6	1,2	0,8	1,0	--	1,2	1,3	--
	18.720	-0,9	6,0	5,2	6,9	11,0	1,7	0,9	2,2	2,0	1,9	2,7	--	2,1	2,3	--
	28.800	-1,2	10,4	9,2	11,4	18,7	3,0	1,5	4,1	4,8	4,2	4,2	--	4,9	5,5	--
	36.720	-1,4	14,5	13,1	15,2	25,5	4,2	2,1	6,4	7,9	6,0	6,7	--	8,0	9,0	--
170	14.040	-0,7	4,3	3,6	5,0	7,9	1,2	0,7	1,6	1,2	0,8	1,0	--	1,2	1,3	--
	18.720	-0,9	6,0	5,2	6,9	11,0	1,7	0,9	2,2	2,0	1,9	3,0	--	2,1	2,3	--
	30.600	-1,2	11,3	10,1	12,2	20,1	3,2	1,6	4,5	5,5	4,6	4,7	--	5,6	6,3	--
	36.720	-1,4	14,5	13,1	15,2	25,5	4,2	2,1	6,4	7,9	6,0	6,7	--	8,0	9,0	--
180	19.440	-0,8	5,4	4,6	6,2	9,8	1,5	0,9	1,5	1,5	1,5	1,7	--	--	2,1	2,4
	25.920	-1,0	7,7	6,6	8,6	13,9	2,2	1,2	2,7	2,7	3,1	2,9	--	--	3,7	4,3
	32.400	-1,2	10,2	9,0	11,2	18,3	2,9	1,6	3,9	4,2	4,6	4,5	--	--	5,8	6,7
	46.800	-1,4	16,9	15,5	17,4	29,5	4,9	2,5	7,2	8,8	8,1	9,2	--	--	12,0	14,0
200	19.440	-0,8	5,4	4,6	6,2	9,8	1,5	0,9	1,5	1,5	1,5	1,7	--	--	2,1	2,4
	25.920	-1,0	7,7	6,6	8,6	13,9	2,2	1,2	2,7	2,7	3,1	3,6	--	--	3,7	4,3
	36.000	-1,3	11,8	10,5	12,6	20,9	3,4	1,8	4,7	5,2	5,5	5,5	--	--	7,1	8,3
	46.800	-1,4	16,9	15,5	17,4	29,5	4,9	2,5	7,2	8,8	8,1	9,2	--	--	12,0	14,0
220	19.440	-0,8	5,4	4,6	6,2	9,8	1,5	0,9	1,5	1,5	1,5	1,7	--	--	2,1	2,4
	25.920	-1,0	7,7	6,6	8,6	13,9	2,2	1,2	2,7	2,7	3,1	4,2	--	--	3,7	4,3
	39.000	-1,3	13,1	11,8	13,9	23,2	3,8	2,0	5,4	6,1	6,2	6,5	--	--	8,3	9,7
	46.800	-1,4	16,9	15,5	17,4	29,5	4,9	2,5	7,2	8,8	8,1	9,2	--	--	12,0	14,0
250	24.300	-0,8	5,8	4,9	6,6	10,5	1,6	0,9	1,5	1,8	5,1	1,7	--	--	2,0	2,4
	32.400	-1,1	8,3	7,2	9,2	14,9	2,4	1,3	2,8	3,1	5,4	2,9	--	--	3,6	4,3
	40.500	-1,2	11,1	9,8	12,0	19,7	3,2	1,7	4,2	4,9	5,8	4,5	--	--	5,6	6,8
	54.000	-1,4	16,4	15,0	17,0	28,7	4,8	2,4	6,5	8,7	6,4	8,0	--	--	10,0	12,0
280	24.300	-0,8	5,8	4,9	6,6	10,5	1,6	0,9	1,5	1,8	5,1	1,7	--	--	2,0	2,4
	32.400	-1,1	8,3	7,2	9,2	14,9	2,4	1,3	2,8	3,1	5,4	3,6	--	--	3,6	4,3
	45.000	-1,3	12,8	11,5	13,6	22,6	3,7	1,9	5,0	6,0	6,0	5,6	--	--	6,9	8,3
	54.000	-1,4	16,4	15,0	17,0	28,7	4,8	2,4	6,5	8,7	6,4	8,0	--	--	10,0	12,0

(1) The pressure drops in the filters are based on clean filters. Data refer to the difference with regard to the standard G4 pressure drops, considered as part of the machine pressure drops.

(2) The pressure drops in the stop-drops of the fresh air intake are based on 20% of flow.

Abbreviations:

lpd = low pressure drop

HWC = hot water coil

EH = electrical heaters

HRC = heat recovery coil

WEIGHT OVERVIEW

Weight overview of the various assemblies (kg)

50FF/FC		100	110	120	130	145	160	170	180	200	220	250	280	
Standard insulation	B1 assembly	1.430	1.450	1.470	1.640	1.680	1.690	1.700	2.265	2.370	2.475	2.795	2.860	
	B2 assembly	1.505	1.525	1.545	1.713	1.753	1.763	1.773	2.402	2.477	2.582	2.946	3.011	
	BP assembly	1.713	1.733	1.753	1.982	2.022	2.032	2.042	2.797	2.872	2.977	3.291	3.356	
	BA assembly	1.824	1.844	1.864	2.132	2.172	2.182	2.192	2.987	3.062	3.167	3.491	3.556	
	BT assembly	1.809	1.829	1.849	2.072	2.082	2.092	2.102	2.907	2.982	3.087	3.341	3.406	
	BB assembly	1.919	1.939	1.959	2.222	2.232	2.242	2.252	3.057	3.132	3.237	3.541	3.606	
	BW assembly	Machine	1.677	1.697	1.717	1.868	1.908	1.918	1.928	2.806	2.881	2.986	3.234	3.299
		Wheel module (smaller diam.)	560	560	560	650	650	650	650	685	685	685	705	705
		Total weight	2.237	2.257	2.277	2.518	2.558	2.568	2.578	3.491	3.566	3.671	3.939	4.004
	M0 insulation	B1 assembly	1.550	1.570	1.590	1.735	1.775	1.785	1.795	2.415	2.520	2.625	2.995	3.060
B2 assembly		1.630	1.650	1.670	1.808	1.848	1.858	1.868	2.552	2.627	2.732	3.146	3.211	
BP assembly		1.834	1.854	1.874	2.097	2.137	2.147	2.157	2.992	3.067	3.172	3.516	3.581	
BA assembly		1.949	1.969	1.989	2.267	2.307	2.317	2.327	3.182	3.257	3.362	3.716	3.781	
BT assembly		1.919	1.939	1.959	2.197	2.237	2.247	2.257	3.102	3.177	3.282	3.566	3.631	
BB assembly		2.049	2.069	2.089	2.367	2.407	2.417	2.427	3.252	3.327	3.432	3.766	3.831	
BW assembly		Machine	1.787	1.807	1.827	2.113	2.153	2.163	2.173	3.001	3.076	3.181	3.459	3.524
		Wheel module (smaller diam.)	590	590	590	685	685	685	685	725	725	725	745	745
		Total weight	2.377	2.397	2.417	2.798	2.838	2.848	2.858	3.726	3.801	3.906	4.204	4.269

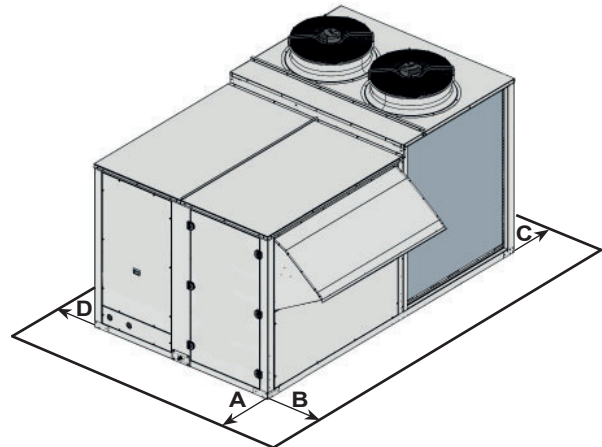
Weight supplement from the main options (kg)

50FF/FC		100	110	120	130	145	160	170	180	200	220	250	280
Larger diameter wheel (recovery module)		10	10	10	20	20	20	20	10	10	10	10	10
Outer security base (only with pre-assembly roofcurb)		--	--	--	--	--	--	--	67	67	67	95	95
Pre-assembly roofcurb (without gas burner)		374	374	374	402	402	402	402	467	467	467	534	534
Pre-assembly roofcurb (with gas burner)	BAM (Nominal)	804	804	804	925	925	925	925	1.084	1.084	1.084	1.204	1.204
	BAS (High)	867	867	867	974	974	974	974	1.127	1.127	1.127	1.250	1.250
Electrical heaters	RAF (Low)	29	29	29	34	34	34	34	40	40	40	45	45
	RAM (Nominal)	32	32	32	41	41	41	41	57	57	57	58	58
	RAS (High)	39	39	39	55	55	55	55	64	64	64	73	73
Hot water coil (HWC)	Empty	94	94	94	102	102	102	102	113	113	113	128	128
	Service	143	143	143	155	155	155	155	181	181	181	201	201
Heat recovery coil (HRC)	Empty	77	77	77	84	84	84	84	90	90	90	109	109
	Service	123	123	123	132	132	132	132	153	153	153	181	181
Supply fan	Low pressure, aluminium (F)	-28	-28	-28	7	-25	-25	-25	-32	-32	-32	-21	-21
	Nominal pressure, aluminium (M)	7	7	7	41	9	9	9	11	11	11	14	14
	High pressure, aluminium (S)	65	65	65	65	33	86	86	108	108	108	129	129
Droplet eliminator	Indoor coil	67	67	67	78	78	78	78	84	84	84	97	97
	Fresh air intake: B2, BW assemblies	23	23	23	26	26	26	26	29	29	29	33	33
	Fresh air intake: BP, BA, BT, BB assemblies	18	18	18	21	21	21	21	23	23	23	26	26
Outdoor coil protection grid		40	40	40	50	50	50	50	17	17	17	20	20
Filters	G4 low pressure drop	2	2	2	3	3	3	3	4	4	4	5	5
	G4 + F7	16	16	16	19	19	19	19	22	22	22	24	24
	G4 low pressure drop + F7	17	17	17	30	30	30	30	23	23	23	26	26
	M6 + F7	25	25	25	29	29	29	29	34	34	34	35	35
	F7 + F9	26	26	26	30	30	30	30	35	35	35	39	39
Centrifugal return fan (BT and BB assemblies)	Low airflow	45	33	41	78	50	46	29	58	62	3	58	69
	Nominal airflow	102	102	102	61	37	47	48	132	126	83	83	167
	High airflow	102	84	97	70	48	48	111	132	--	--	168	188
Return plug-fan (BP, BA, BT, BB and BW assemblies)	Nominal pressure, aluminium (M)	4	4	4	43	10	6	6	9	0	0	0	0
	High pressure, aluminium (S)	43	43	43	97	65	65	65	65	59	0	78	78

RECOMMENDED SERVICE CLEARANCE

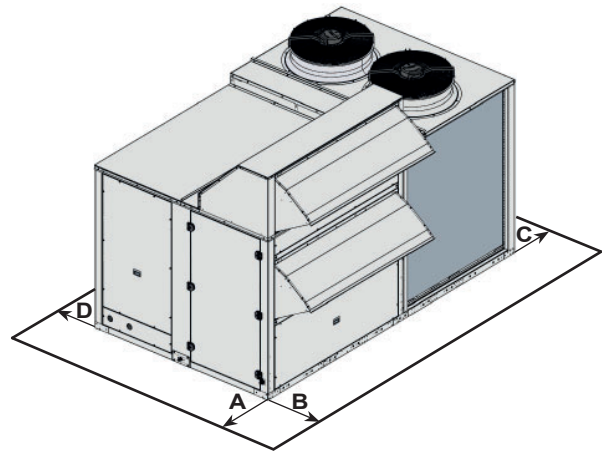
50FF/FC 100 to 170: B1 and B2 assemblies

50FF/FC	Overall dimension (mm)			Service clearance (mm)			
	Length	Width	Height	A	B	C	D
100 to 120	3.820	2.257	2.293	2.200	1.000	1.200	1.000
130 to 170	4.224	2.257	2.340	2.400	1.000	1.200	1.000



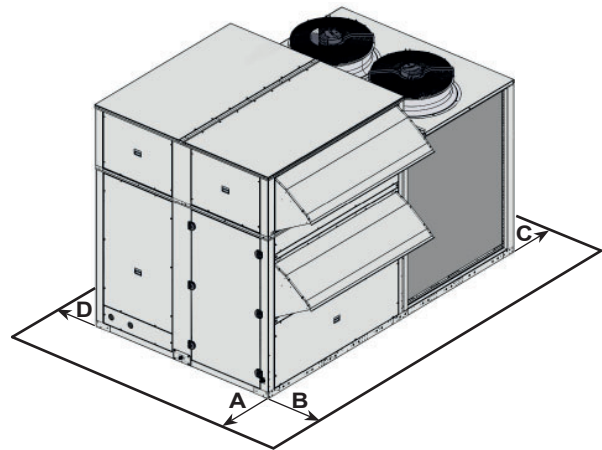
50FF/FC 100 to 170: BP and BA assemblies

50FF/FC	Overall dimension (mm)			Service clearance (mm)			
	Length	Width	Height	A	B	C	D
100 to 120	3.820	2.257	2.555	2.200	1.000	1.200	1.000
130 to 170	4.224	2.257	2.555	2.400	1.000	1.200	1.000



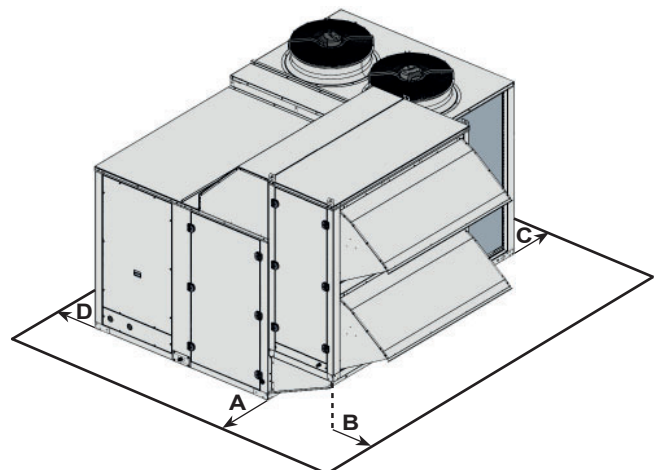
50FF/FC 100 to 170: BT and BB assemblies

50FF/FC	Overall dimension (mm)			Service clearance (mm)			
	Length	Width	Height	A	B	C	D
100 to 120	3.825	2.268	2.555	2.200	1.000	1.200	1.000
130 to 170	4.229	2.268	2.555	2.400	1.000	1.200	1.000



50FF/FC 100 to 170: BW assembly

50FF/FC	Overall dimension (mm)			Service clearance (mm)			
	Length	Width	Height	A	B	C	D
100 to 120	3.820	3.112	2.255	2.200	1.000	1.200	1.000
130 to 170	4.224	3.112	2.555	2.400	1.000	1.200	1.000



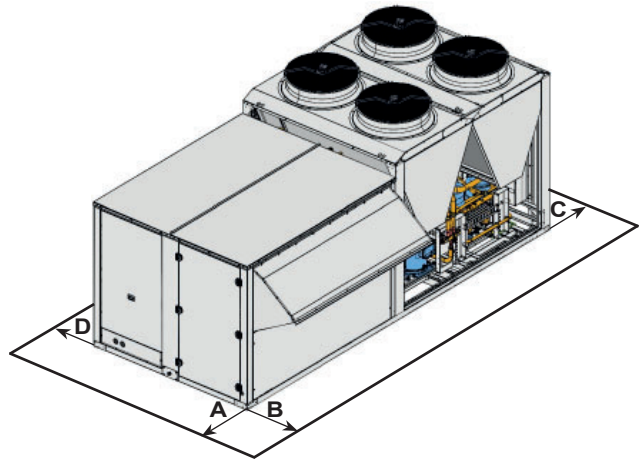
NOTE:

- Unit not designed to have overhead obstruction.

RECOMMENDED SERVICE CLEARANCE

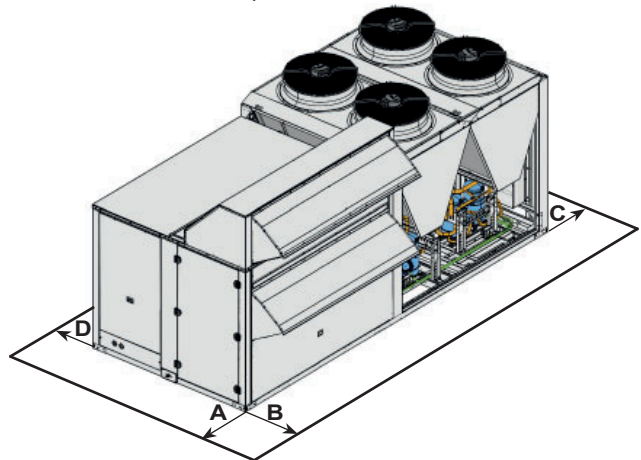
50FF/FC 180 to 280: B1 and B2 assemblies

50FF/FC	Overall dimension (mm)			Service clearance (mm)			
	Length	Width	Height	A	B	C	D
180 to 220	5.300	2.257	2.421	2.600	2.500	1.200	1.000
250 to 280	6.350	2.257	2.494	3.000	2.500	1.200	1.000



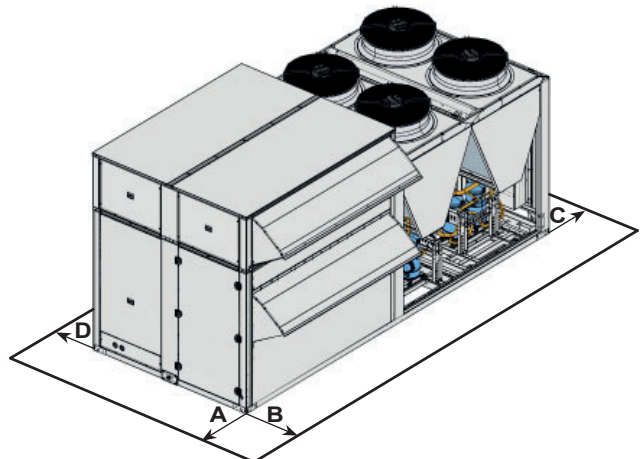
50FF/FC 180 to 280: BP and BA assemblies

50FF/FC	Overall dimension (mm)			Service clearance (mm)			
	Length	Width	Height	A	B	C	D
180 to 220	5.300	2.257	2.555	2.600	2.500	1.200	1.000
250 to 280	6.350	2.257	2.555	3.000	2.500	1.200	1.000



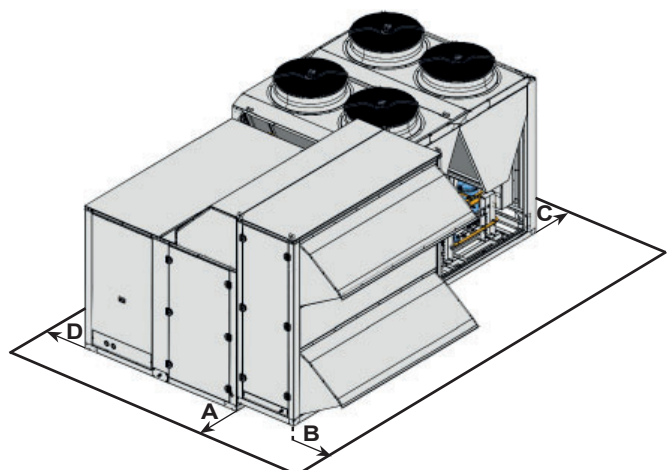
50FF/FC 180 to 280: BT and BB assemblies

50FF/FC	Overall dimension (mm)			Service clearance (mm)			
	Length	Width	Height	A	B	C	D
180 to 220	5.306	2.268	2.555	2.600	2.500	1.200	1.000
250 to 280	6.356	2.268	2.555	3.000	2.500	1.200	1.000



50FF/FC 180 to 280: BW assembly

50FF/FC	Overall dimension (mm)			Service clearance (mm)			
	Length	Width	Height	A	B	C	D
180 to 220	5.300	3.112	2.555	2.600	1.700	1.200	1.000
250 to 280	6.350	3.112	2.555	3.000	2.500	1.200	1.000



NOTE:

- Unit not designed to have overhead obstruction.