MODULAR COMPACT HEAT PUMPS

R-410A refrigerant

Scroll compressor in tamdem

Flexibility of configuration

Outdoor plug-fan with EC HEE motor

50NI 90 - 485

Nominal cooling capacity 19,1-114,9 kW
Nominal heating capacity 19,3-121,4 kW

Air to air compact units with vertical construction for indoor use only.

- **50NI series**: Air-air reversible heat pump units. Ten different models available:
  - 90, 120, 160 and 180: 1 circuit and 2 compressors.
  - 200, 240, 280, 320, 360, 420 and 485: 2 circuits and 4 compressors.

These units are equipped with hermetic scroll compressors and tandem configuration, as well as pluf-fan EC for indoor and outdoor circuits. This allows to get a high seasonal performance.

The units are supplied in 2 modules, **outdoor module** and **indoor module** for installation on site as compact version or split version, according to the choice.

A vast number of options meet numerous operating demands.

All of the units are tested and checked in the factory.

Compliance

Machinery Directive 2006/42/EC (MD)

Electromagnetic Compatibility Directive 2014/30/EU (EMC)

Low Voltage Directive 2014/35/EU (LVD)

Pressure Equipment Directive 2014/68/EU (Category 2) (PED)

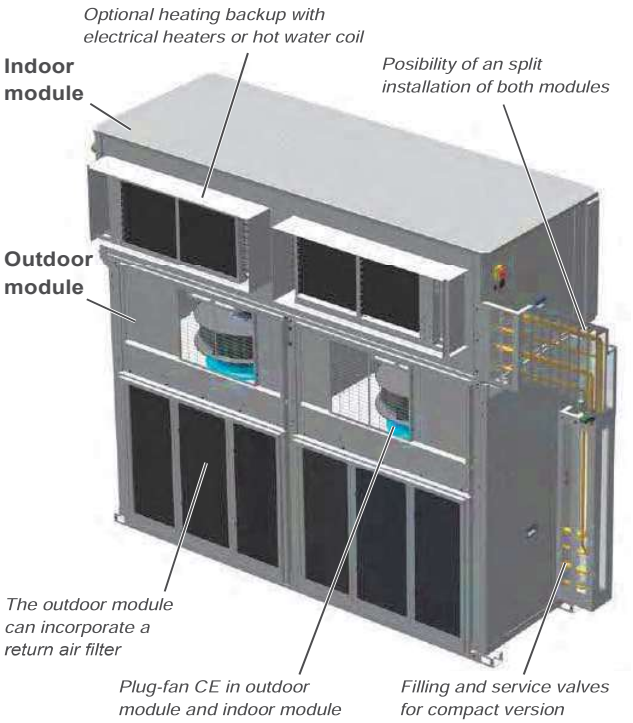
RoHS Directive 2011/65/EU (RoHS)

Eco-design Directive 2009/125/EC (ECO-DESIGN)

Energy Labelling Directive 2010/30/EU (ECO-LABELLING)

Harmonised Standard: EN 378-2:2012 (Refrigerating systems and heat pumps - Safety and environmental requirements).

UNIT COMPONENTS



Outdoor module

- Casing made of galvanised steel metal with polyester paint, white colour RAL 7035. Self-supporting frame.

Outdoor air circuit

- EC electronic supply plug-fans directly coupled with variable control speed and flow rate controller. In tertiary sector installation, a high percentage of the annual air conditioning energy consumption comes from the use of fans for transporting air. Using fans which are more efficient has a direct impact on reducing consumption.
- Coil(s) with copper pipes and aluminium fins.
- Condensate drain pan.

Cooling circuit

- Hermetic scroll-type compressors in tandem design that improves the management of stages and the part load efficiencies. Sound insulation, assembled over antivibration mounts. Control of phase equilibrium and the direction of rotation.
- Crankcase heater.
- Thermostatic expansion valve(s) with external equalisation.
- Four-way cycle reversing valve(s).
- Suction accumulator, anti-acid dehydrating filter(s), liquid receiver(s).
- Service valves for cooling connections and refrigerant charge, when the unit is supplied in Compact version. Posibilility of installation in split version, with optional service valves.
- Cooling connections for welding

Electric panel

- Complete and fully wired electric panel. Insulated panel cover to prevent condensation. Protection IP55.
- Transformer for power supply without neutral included in the electrical panel.
- Main ground connection.
- Compressor(s) and fan(s) motor contacts.

Protections

- High and low pressure pressostats.
- Compressor discharge temperature control.
- Non-return valve built into the compressor.
- Main door switch.
- Magnetothermic protection switches for the compressors power line and fans motor.
- Automatic switch in the control circuit.

Indoor module

- Casing made of galvanised steel metal with polyester paint, white colour RAL 7035. Self-supporting frame.

Indoor air circuit

- Coil(s) with copper pipes and aluminium fins.
- EC electronic supply plug-fans directly coupled with variable control speed and flow rate controller. In tertiary sector installation, a high percentage of the annual air conditioning energy consumption comes from the use of fans for transporting air. Using fans which are more efficient has a direct impact on reducing consumption. Plug-fans with direct drive and variable speed offer the following advantages:
  - Elimination of friction losses during transmission thanks to the direct drive.
  - Greater aeraulic efficiency of the rotor (reactive blades with an optimized profile), running at very high operating pressures.
  - Greatly increased motor efficiency. Permanent magnets DC motors activated using electronic switching integrated into the motor itself.
  - Variable speed to ensure a constant supply air flow rate, independent of the filters clogging level.
  - Measuring the flow rate thought a calibrated section at the fan intake and a differential pressure sensor allows the control to handle the flow rate reliably and precisely in both on CAV and VAV systems.
- Reusable air filters, assembled on a frame.
- Condensate drain pan.

Cooling circuit

- Thermostatic expansion valve(s) with external equalisation

Protections

- Main door switch.

OPERATING LIMITS

Inlet air conditions		Cooling	Heating
Indoor coil	Minimum	14 °C WB	10 °C
	Maximum	22 °C WB	27 °C
Outdoor coil	Minimum	12 °C ①	-10 °C WB
	Maximum	45 °C	15 °C WB

① With a condensation pressure control operating down to -10°C.

ELECTRONIC CONTROL

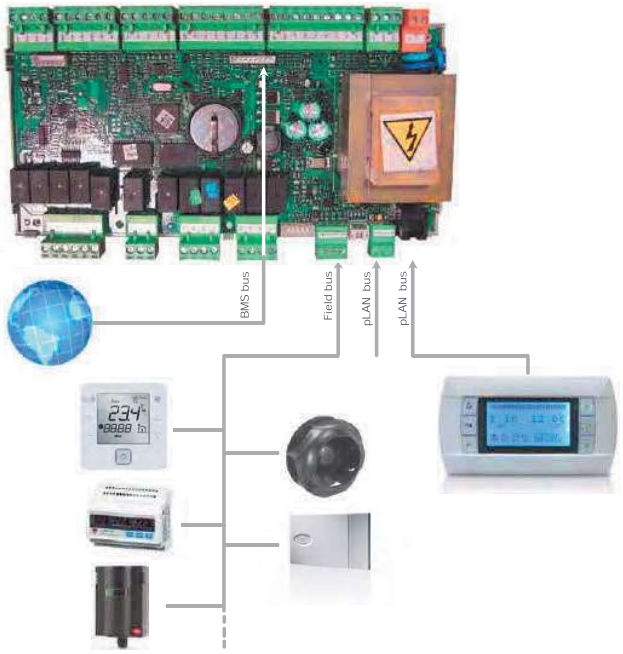
CARRIERrtc control

The **CARRIERrtc** control consist of a µPC MEDIUM control board, sensors, a pGD1 graphic terminal and a TCO user terminal (optional).

This system uses a RS485 field-bus to manage additional components.

A BMS card (optional) allows the control board to be connected to a centralised technical management system.

It also manages a local connection between units through a pLAN network (µPC MEDIUM Local Area Network), allowing data and information to be exchanged between units, for a maximum of 15 units.



Main functions:

- 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 time delays.
- Defrosting management (in heat pump units).
- 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 oudoor fans.
- Setpoint compensation based on the outdoor temperature.
- Hourly and weekly schedule.
- Fire protection.
- Diagnosis of faults and general alarm.

Optional function:

This control is used to manage addition components such as:

- External air damper for the renewal of fresh air, depending on the temperature of the mixed air or depending on the air quality sensor.
- Mixing box for thermal, enthalpic or thermoenthalpic free-cooling.
- Auxiliary electrical heaters: two-stage with on/off control or single-stage with proportional control.
- Hot water coil with 3-way valve, with proportional or on/off control.
- Humidifier with proportional or on/off control.
- Clogged filter pressostat.
- Refrigerant leak detector.
- Air quality sensor for measuring CO_2.
- Energy meter and calculation of the cooling and heating capacities.

pGD1 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.

TCO user terminal (optional):

This terminal can be installed on the electrical cabinet, instead of pGD1 terminal. In this case, the remote connection of the pGD1 terminal is posible. Please consult “Control options”.

TCO terminal is used to:

- Switch the unit ON / OFF.
- Select the operating mode.
- Adjust the setpoints.
- Display the installation’s temperatures and humidity, outdoor temperature, supply air temperature, CO_2 sensor and opening of the outdoor damper.
- Display alarms codes.

PHYSICAL DATA (EN-14511-2018)

Outdoor module 50NI		90	120	160	180	200	240	280	320	360	420	485
Cooling capacities	Cooling capacity (1) (kW)	19,10	25,33	33,94	39,74	47,23	52,07	60,59	69,66	81,52	104,61	114,90
	Power input (3) (kW)	7,72	9,97	14.26	16,03	20,10	18,75	22,00	25,97	32,28	37,70	41,20
	EER performance	2,47	2,54	2,38	2,48	2,35	2,78	2,75	2,68	2,53	2,77	2,78
	SEER	3,64	3,55	3,53	3,54	3,53	3,93	3,89	3,85	3,78	4,01	3,98
	ηs	143%	139%	138%	139%	138%	154%	153%	151%	148%	157%	155%
Heating capacities	Heating capacity (2) (kW)	19,27	27,63	37,16	44,64	51,99	57,49	64,65	74,07	84,77	108,00	121,40
	Power input (3) (kW)	6,43	9,74	13,05	15,68	18,42	17,77	20,07	23,75	29,41	36,20	41,10
	COP performance	3,00	2,84	2,84	2,85	2,82	3,23	3,22	3,12	2,88	2,98	2,95
	SCOP	3,25	3,29	3,33	3,31	3,21	3,25	3,21	3,25	3,21	3,22	3,20
	ηs	127%	129%	130%	129%	125%	127%	125%	127%	126%	126%	125%
Outdoor fan	Nominal air flow (m^3/h)	7.000	10.000	13.000	13.000	19.000	23.000	23.000	24.400	24.400	30.000	35.000
	Available static pressure (mm.w.c)	20	20	20	20	20	20	20	20	20	20	20
	Type	Electronic plug-fan										
	Number / Diameter (mm)	1 / 500	1 / 500	1 / 560	1 / 560	2 / 500	2 / 560	2 / 560	2 / 560	2 / 560	2 / 500	4 / 500
	Motor output (kW)	2,6	2,6	3,0	3,0	2 x 2,6	2 x 3,0	2 x 3,0	2 x 3,0	2 x 3,0	2 x 4,6	4 x 2,6
	Power input (kW)	1,35	2,24	2,90	2,90	2 x 2,37	2 x 2,06	2 x 2,06	2 x 2,38	2 x 2,38	2 x 3,61	4 x 1,88
	Speed (r.p.m.)	1.700	1.700	1.495	1.495	1.700	1.495	1.495	1.495	1.495	2.100	1.700
Compressor	Type	Scroll										
	No. compress. / circuits / stages	2 / 1 / 2				4 / 2 / 4						
	Oil type	Copeland 3MAF 32cST, Danfoss POE 160SZ, ICI Emkarate RL 32CF, Mobil EAL Artic 22CC										
	Volume of oil (l)	2,5	2,5	3,5	3,5	5,0	4,8	6,8	7,1	7,2	13,2	13,2
Cooling connections	Circuit 1: Liquid line	1/2"	5/8"	5/8"	5/8"	1/2"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"
	Circuit 1: Gas line	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 3/8"	1 3/8"
	Circuit 2: Liquid line	-	-	-	-	1/2"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"
	Circuit 2: Gas line	-	-	-	-	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 3/8"	1 3/8"
Refrigerant	Type	R-410A										
	Global warming potential (GWP) (4)	2.088										
	Load up to 7,5 m in split version (kg)	9,0	11,1	13,0	14,2	17,3	19,1	24,9	25,9	26,4	38,7	39,3
	Environment impact (tCO2 e)	18,8	23,2	27,1	29,6	36,1	39,9	52,0	54,1	55,1	80,8	82,1
	Load in compact version (kg)	8,4	10,5	12,0	13,2	15,3	17,1	22,9	23,9	24,4	36,7	37,3
	Environment impact (tCO2 e)	17,5	21,9	25,1	27,6	31,9	35,7	47,8	49,9	50,9	76,6	77,9
Electrical features	Mains voltage	400 V / III ph / 50 Hz (±10%)										
	Power supply	3 wires + gnd										
	Maximum absorbed current (A)	18,7	21,8	29,6	34,5	43,5	44,7	52,0	59,3	69,0	89,3	97,4
Dimensions	Length (mm)	1.191	1.471	1.471	1.471	2.186	2.746	2.746	2.746	2.746	3.484	3.484
	Width (mm)	860	860	860	860	860	860	860	860	860	860	860
	Height (mm)	1.437	1.717	1.717	1.717	1.437	1.717	1.717	1.717	1.717	1.717	1.717
Weight	(kg)	300	364	378	383	588	737	782	789	793	1.043	1.052

Indoor module 50NI		90	120	160	180	200	240	280	320	360	420	485
Indoor supply circuit fan	Nominal air flow (m^3/h)	4.000	5.200	7.000	8.000	9.200	10.300	12.500	14.000	15.500	21.000	21.000
	Available static pressure (mm.w.c)	15	15	15	15	15	20	20	20	20	20	20
	Type	Electronic plug-fan										
	Number / Diameter (mm)	1 / 500	1 / 500	1 / 500	1 / 500	2 / 500	2 / 500	2 / 500	2 / 500	2 / 500	3 / 500	3 / 500
	Motor output (kW)	2,7	2,7	2,7	2,7	2 x 2,7	2 x 2,7	2 x 2,7	2 x 2,7	2 x 2,7	3 x 2,6	3 x 2,6
	Power input (kW)	0,63	0,86	1,32	1,38	2 x 0,71	2 x 0,95	2 x 1,10	2 x 1,32	2 x 1,58	3 x 1,40	3 x 1,40
	Speed (r.p.m.)	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700
Max. absorbed current	Fan (A)	4,2	4,2	4,2	4,2	8,2	8,2	8,2	8,2	8,2	12,0	12,0
Dimensions	Length (mm)	1.190	1.190	1.520	1.520	2.183	2.144	2.804	2.804	2.804	2.974	2.974
	Width (mm)	950	950	1.028	1.028	950	950	1.028	1.028	1.028	1.209	1.209
	Height (mm)	731	731	731	731	731	731	800	800	800	1.091	1.091
Weight	(kg)	175	175	204	204	303	303	389	389	389	536	536

(1) Cooling capacity calculated in accordance with the EN-14511-2018 standard given for indoor temperature conditions 27ºC, (19ºC WB) and 35ºC outdoor T.
(2) Heating capacity calculated in accordance with the EN-14511-2018 standard given for indoor temperature conditions 20ºC and 6ºC 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.

OPTIONS

Options for the outdoor module

Outdoor environment

Corrosion

- Coil with copper pipes and copper fins.
- INERA® coil with copper pipes and fins of an aluminium alloy, of high performance and great resistance to the corrosion.
- Coil with copper pipes and aluminium fins with polyurethane and Blygold® coating.

Humidity

- Tropicalised electric panel.
- Tropicalised motors and fans (please consult).

Installation

- Antivibration mounts made of rubber.
- Service valves for cooling connections and refrigerant charge, when the unit is supplied for installation as split version.
- Oil separator for cooling connections with maximum equivalent length of the cooling line greater than 50 metres, optional only available when the units are supplied in 2 modules, **outdoor module** and **indoor module** for installation as split version.
- Position of air supply of the outdoor unit:
  - Lateral: by default
  - Upper: only available when the units are supplied for installation as split version.
- Gravimetric filters in the return air. The filters frame is removable, and upon request, it is possible to supply the frame separately with the unit SP, to be joined on site (width = 53 mm)

Acoustic

- Acoustic insulating cover for compressor.

Electric panel

- Electrical power supply with neutral.
- Energy meter for monitoring of the power consumption of the installation.

  Available if the unit does not incorporate electrical heaters (optional upon request).

Options for the indoor module

Outdoor environment

Humidity

- Stop-drop in the indoor air coil. Recommended in cases where a high moisture content in the air is foreseen or when the air flow is high.
- Stop-drop in the outdoor air intake.

Corrosion

- Coil with copper pipes and copper fins.
- INERA® coil with copper pipes and fins of an aluminium alloy, of high performance and great resistance to the corrosion.
- Coil with copper pipes and aluminium fins with polyurethane and Blygold® coating (indoor unit and/or hot water coil).
- Condensates drain pan in stainless steel.

Comfort / heating options

- Hot water auxiliary coil, with three-way valve and proportional control.

  If the unit includes hot water coil and free-cooling, and works with negative temperatures of outdoor air, an anti-freeze thermostat as safety system is mandatory.
- Electrical heaters with assembly in two stages and proportional control.

Comfort / indoor air quality options

- Filtration of the supply air:
  - Gravimetric filter G4.
  - Gravimetric filter G4 + creased opacimetric filters M6 to F9.

  Classification of the filters according to the new **ISO 16890 Standard:**
  - G4 → ISO Coarse 60%
  - M6 → ISO ePM10 60%
  - F7 → ISO ePM1 50%
  - F8 → ISO ePM1 65%
  - F9 → ISO ePM1 80%
- Air quality sensor to enable measuring CO_2 for installation in the environment or duct-mounted (attached picture).

Security

- Differential pressostat for the detection of clogged filters.
- Smoke detecting station in accordance with the NF S 61-961 standard.
- Refrigerant leak detector (in ppm). This allows prompt identification of gas leaks, guaranteeing the safety of any people in the vicinity. This detector allows the number of periodic revisions to the unit to be reduced.

Installation

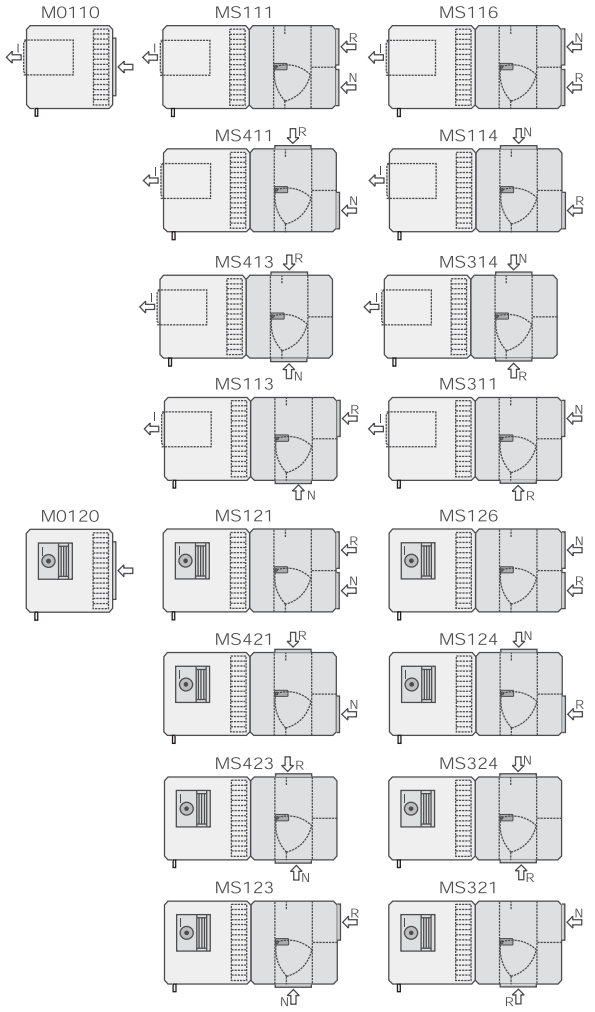
- Antivibration mounts made of rubber
- Position of supply and/or return of the indoor unit air.

OPTIONS (...CONTINUATION)

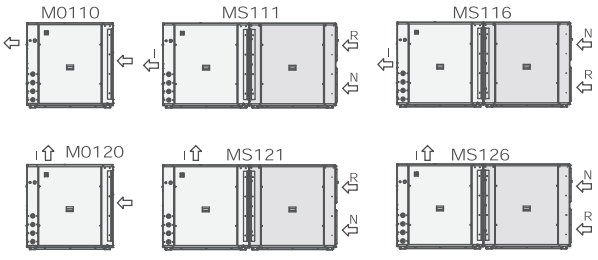
■ Assemblies **with mixing** box with 2 motorised damper for air renewal and free-cooling:

Assemblies with mixing box

Models 90 to 360 (plan view)



Models 420 and 485 (raised view)



Air circulation

I = Supply
R = Return
N = Fresh air inlet
E = Air extraction
Air inlet
Air outlet

Designation

Mwxyz

Assembly:	Return:	Supply:	Fresh air:
0 = Standard	1 = Rear	1 = Front	1,6 = Rear
S = Outdoor air intake with damper	2 = Top	2 = Top	3 = Right-hand side (*)
	3 = Right-hand side (*)		4 = Left-hand side (*)
	4 = Left-hand side (*)		

(*) Seen in the direction of airflow

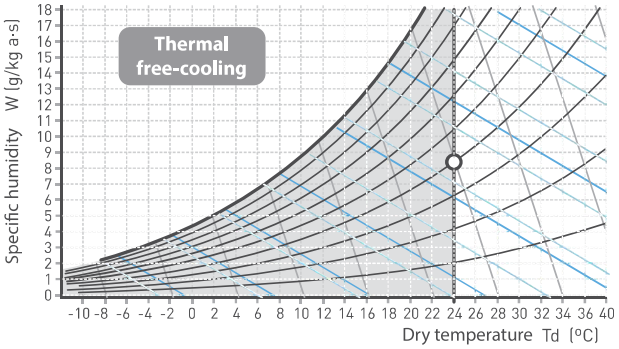
Important: In compact version, the connection of the mixing box with its structural support is under the responsability of the installer.

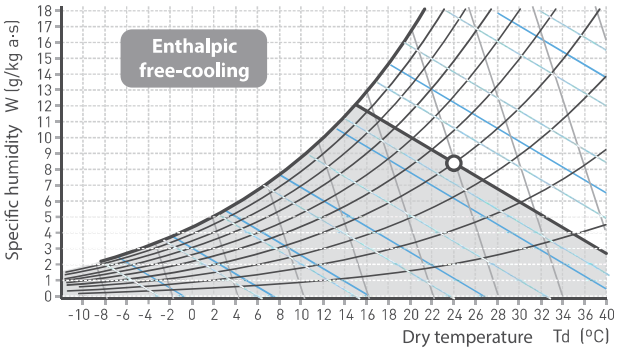
■ **Free-cooling** management:

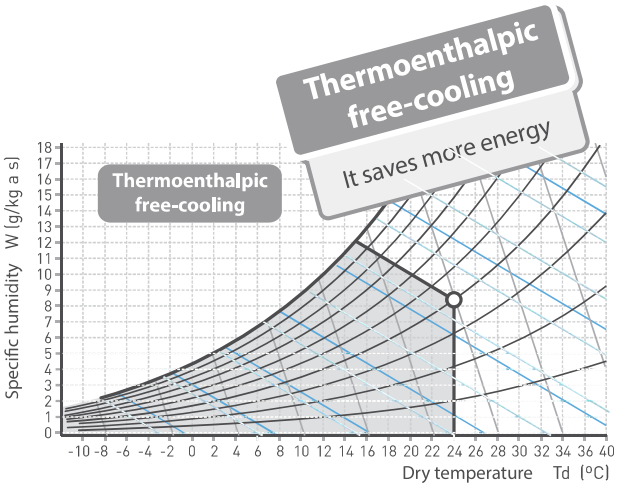
Running the unit in free-cooling mode allows it to make best use of outdoor air conditions when these are more favourable than the return air conditions. This allows the cooling capacity to be reduced. The percentage of outdoor air can vary between 0% and 100%.

There are three options for free-cooling management:

- 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.







OPTIONS (...CONTINUATION)

Options for electronic control

CARRIERrtc options

- TCO user terminal, for installation on the electric panel, instead of pGD1 terminal.
- Control without pGD1 terminal (for units with shared terminal).
- Kit remote control to 200 meters with pGD1 terminal (pGD1 terminal + 2 TCONN bypass cards). In this case it´s possible to install the TCO terminal on the electric panel.
- Ambient temperature probe with RS485 communication. By default the control incorporates a NTC probe.

  Note: An ambient probe with RS485 communication is required for installation to more than 30 m.
- Two to four ambient temperature probe with RS485 communication.
- Ambient T+RH probe with RS485 (compulsory in units with enthalpic or thermoenthalpic free-cooling as optional). In this case also added outdoor air humidity probe.
- Air quality probe for installation in the environment or in duct to enable measuring CO_2.

Communication options

CARRIERrtc 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.

Carel y Modbus

Ethernet pCO Web

Supervision solutions

Different solutions of supervision are available according to the dimensions of the installation.

- **pCO Web**

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

- **PlantWatchPRO3**

  It is a solution designed for the monitoring of installations of medium - small dimensions, with ability to manage up to 30 units. Suitable for technical environments, it has no parts in movement. It's available in two versions: panel and wall.

  Includes: 7 " touch display, buzzer for notify cations, 1 USB port and 1 SD card slot for downloading reports, charge devices models and applying service packs.

  In this case, each unit needs one RS485 Carel / Modbus board.

- **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.

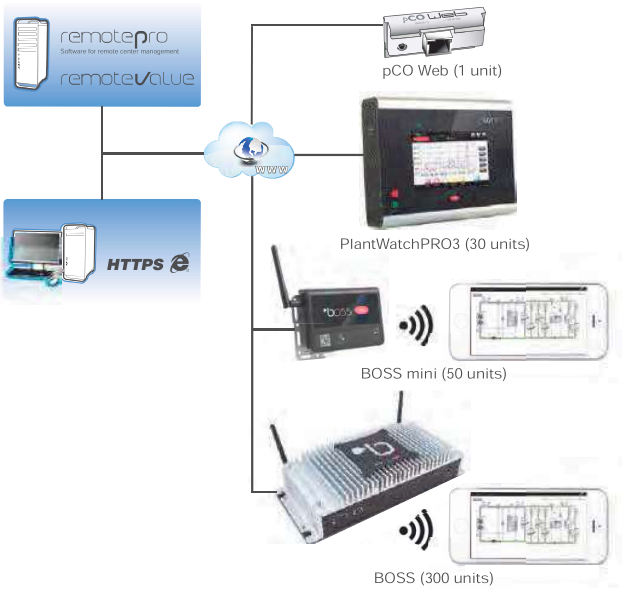
  For this option, each unit needs one RS485 Carel / Modbus board.

- **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 allow the installation in remote management. Through a single connection to the Internet is accessed the information system. The Web interface, which is available for the local user, allows the monitoring and the complete configuration of the installation: from the office or any other user's current location.

For remote control of multiple sites, there are dedicated tools for centralized management as **RemotePRO** and **RemoteValue**.

SOUND LEVELS dB(A)

Sound power level 50NI compact version

50NI compact	90	120	160	180	200	240	280	320	360	420	485
63 Hz	45,7	59,8	57,0	60,4	63,5	62,1	62,1	58,8	68,5	68,2	68,5
125 Hz	60,4	66,5	66,3	74,7	66,5	71,6	71,6	73,5	72,2	74,5	74,6
250 Hz	73,8	72,9	73,7	73,7	73,3	78,5	78,1	75,8	77,4	82,4	85,2
500 Hz	76,3	80,6	81,2	81,2	81,0	82,8	83,7	82,3	82,4	84,5	87,4
1000 Hz	80,7	83,8	83,9	84,0	85,0	84,7	84,9	85,8	85,8	86,4	88,5
2000 Hz	79,4	83,3	83,9	83,9	84,9	82,3	82,5	83,8	83,7	84,2	85,8
4000 Hz	73,0	77,5	77,5	77,3	79,1	77,5	77,7	76,6	77,7	79,7	80,0
8000 Hz	64,0	69,0	68,2	72,2	72,9	71,5	71,8	69,0	73,1	72,2	73,0
Total dB(A)	84,7	88,2	88,5	88,8	89,5	89,1	89,4	89,5	89,8	91,1	93,3

Sound pressure level 50NI compact

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

50NI compact	90	120	160	180	200	240	280	320	360	420	485
Total dB(A)	56,6	59,9	60,3	60,5	61,1	62,2	62,5	62,6	62,8	63,9	66,1

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.

Sound power level 50NI outdoor module

Outdoor module	90	120	160	180	200	240	280	320	360	420	485
63 Hz	42,7	56,84	53,96	57,39	60,47	59,1	59,1	55,8	65,5	65,2	65,5
125 Hz	57,4	63,55	63,34	71,75	63,55	68,6	68,6	70,5	69,2	71,5	71,6
250 Hz	70,8	69,86	70,71	70,71	70,31	75,5	75,1	72,8	74,4	79,4	82,2
500 Hz	73,3	77,58	78,24	78,20	78,00	79,8	80,7	79,3	79,4	81,5	84,4
1000 Hz	77,7	80,80	80,86	80,96	82,02	81,7	81,9	82,8	82,8	83,4	85,5
2000 Hz	76,4	80,32	80,95	80,93	81,88	79,3	79,5	80,8	80,7	81,2	82,8
4000 Hz	70,0	74,46	74,46	74,29	76,08	74,5	74,7	73,6	74,7	76,7	77,0
8000 Hz	61,0	65,99	65,23	69,21	69,88	68,5	68,8	66,0	70,1	69,2	70,0
Total dB(A)	78,7	82,2	82,5	82,8	86,5	86,1	86,4	86,5	86,8	88,1	90,3

Sound pressure level 50NI outdoor module

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

Outdoor module	90	120	160	180	200	240	280	320	360	420	485
Total dB(A)	53,6	56,9	57,3	57,5	58,1	59,5	59,8	60,0	60,2	61,4	63,5

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.

Sound power level 50NI indoor module

Sound power level in the indoor fan supply to be taken into account for the silencer calculation:

Indoor module	90	120	160	180	200	240	280	320	360	420	485
Total dB(A)	68,2	72,4	78,8	82,1	71,6	78,7	79,2	81,7	84,2	81,8	81,8

RECOMMENDATIONS FOR THE COOLING CONNECTION IN SPLIT VERSION

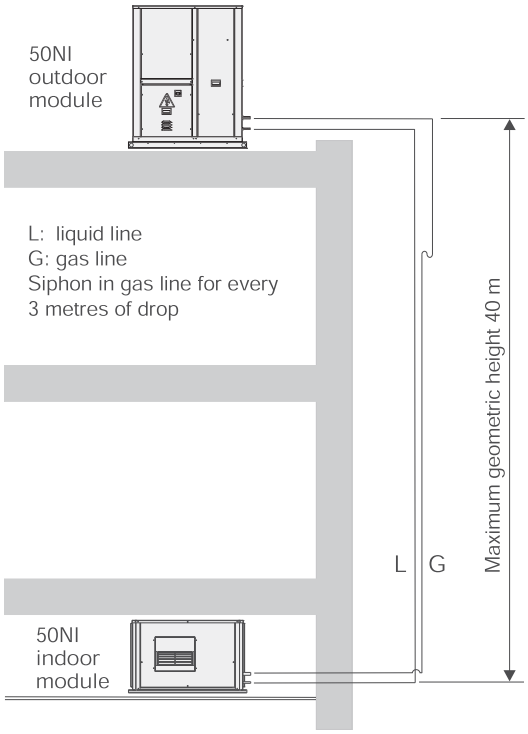
In split version, the outdoor module and indoor module must follow some recommendations

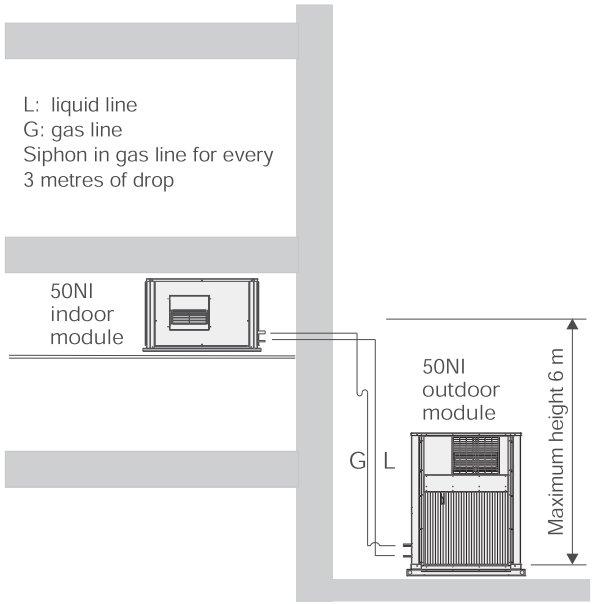
Outdoor unit top

Maximum equivalent length of the cooling line: 50 metres
For longer lenghts an oil separator must be user

Outdoor unit bottom

Maximum equivalent length of the cooling line: 30 metres





Note: when the unit is supplied for split version with the outdoor and indoor modules, can include optionally filling and service valves for the circuit connections and the charge of refrigerant until 7 m of distance.

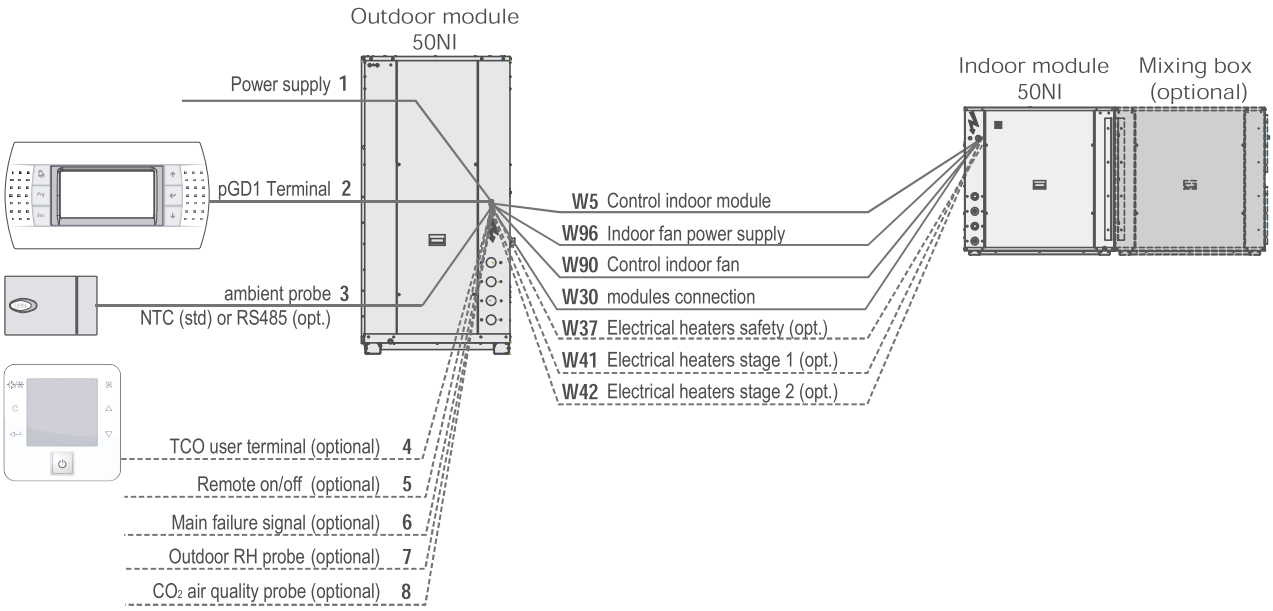
ADDITIONAL LOAD OF R-410A REFRIGERANT

Additional load per linear metre of piping for equivalent maximum lengths exceeding 7 metres:

Nominal diameter (inches)	1/4”	3/8”	1/2”	5/8”	3/4”	7/8”	1”	1 1/8”
Interior section (cm²)	0,149	0,444	0,900	1,505	2,282	3,120	4,290	5,346
Liquid line charge (g/m)	19,3	57,0	115,0	193,5	292,3	404,1	550,3	685,7
Gas line charge (g/m)	--	0,2	0,4	0,7	1,0	1,4	2,0	2,5

ELECTRICAL CONNECTIONS BETWEEN THE MODULES

CARRIERrtc control



No.	50NI		90	120	160	180	200	240	280	320	360	420	485
1	Power supply	400 III (±10%)	3 + GND										
2	pGD1 terminal connection (standard in electrical panel)		Telephone cable 6 wires standard (RJ12 connector) (until 50 m)										
3	Ambient probe (1)	NTC	2 wires										
		RS485 (2)	5 wires										
4	TCO user terminal connection (3)		2 wires for power supply 230V + 1 shielded cable for communication type AGW20 / 22 (1 braided pair + drainwire + shielding)										
5	Remote on/off (optional)		2 wires										
6	Main failure signal (optional)		2 wires										
7	Outdoor RH probe (optional) (1)		3 wires										
8	CO_2 air quality probe (optional) (1)		3 wires										
W5 (5)	Control indoor module		5 wires										
W96 (5)	Indoor fan power supply		4 wires										
W90 (5)	Control indoor fan		7 wires										
W30 (5)	Modules connection	without free-cooling (std)	2 wires										
		free-cooling (opt.)	7 wires										
W37 (5)	Safety thermistors of electrical heaters (optional)		2 wires										
W41 (5)	Electrical heaters. stage 1 (optional) (4)		4 wires										
W42 (5)	Electrical heaters. stage 2 (optional) (4)		4 wires										

(1) Connection of probes by client

(2) It is possible connect from 1 to 4 ambient probes RS485 in series in the Field-bus of the control board

(3) If the unit is going to be installed in an industrial environment with a high level of electromagnetic interference, it is recommended to shield the cables of the thermostat control.

(4) The power supply for the electrical heater must be protected by an automatic switch and/or fuses to be foreseen by the installer.

(5) Connection hose to connect the modules supplied to work in compact version.

OPTIONS FOR THE INDOOR MODULE

High pressure plug-fan

Indoor module 50NI		420	485
Nominal air flow	(m^3/h)	21.000	21.000
Available static pressure	(mm.w.c.)	20	
Maximum vailable static pressure	(mm.w.c.)	60	
Number / Diameter	(mm)	2 x 500	
Motor output	(kW)	2 x 4,6	
Power input	(kW)	2 x 3,6	
Speed	(r.p.m.)	2.100	
Maximum absorbed current	(A)	2 x 7,2	

Stop-drop in the indoor air coil

Air flow as from which it is recommended to install a stop-drop in the indoor coil.

Indoor module 50NI		90	120	160	180	200	240	280	320	360	420	485
Air flow for stop-drop	(m^3/h)	5.246	5.246	7.283	7.283	11.110	11.110	16.566			16.949	

Note: for operating conditions with high dehumidification in the indoor coil (example. 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: with hot water coil it is not possible to assemble the stop-drop.

Electrical heaters

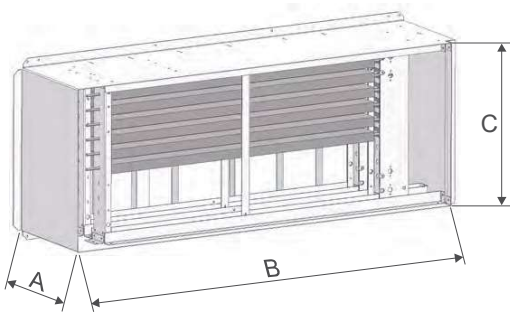
Standard assembly in two stages (optional assembly in one stage with no over price)

Available capacities

Indoor module 50NI	Total output (kW)	6	9	12	15	18	24	30	36	45	54
	Stage power (kW)	3 + 3	3 + 6	6 + 6	6 + 9	9 + 9	12 + 12	15 + 15	18 + 18	18 + 27	27 + 27
90 / 120	Current (A) (400V / IIIph / 50Hz)	8,7	13,0	17,3	Unavailable						
160 / 180		Unavailable		17,3	21,7	26,0	Unavailable				
200 / 240 / 280 / 320 / 360		Unavailable			21,7	26,0	34,6	43,4	52,0	Unavailable	
420 / 485		Unavailable							52,0	65,0	78,0

Frame for assembly of the auxiliary heater in the indoor supply fan

Indoor module 50NI	Total output	Dimensions (mm)		
		A	B	C
90 / 120 (1 frame)	6 / 9 kW (1 row)	150	482	443
	12 kW (2 rows)	262	482	443
160 /180 (1 frame)	12 kW / 15 / 18 kW (1 row)	189	1.142	443
200 / 240 (1 frame)	15 / 18 kW (1 row)	189	1.142	443
	24 / 30 / 36 kW (2 rows)	297	1.142	443
280 / 320 / 360 (2 frames)	15 / 18 / 24 / 30 / 36 kW (1 row)	189	1.142	443
420 / 485 (2 frames)	36 / 45 / 54 kW (1 row)	189	1.142	443



This frame is designed with side access for maintenance purposes. In models with two supply fan outlets (two frames), the electrical heaters are distributed as symmetrically as possible between both frames.

OPTIONS FOR THE INDOOR MODULE

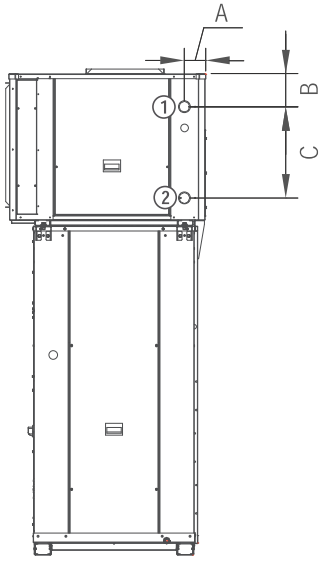
Auxiliary hot water coil

Hot water coil assembled inside the unit with a three-way valve managed by the unit control for back-up during heating in heat pump units. In this case the air inlet temperature matches the air supply temperature of the indoor coil..

Indoor module 50NI			90	120	160	180	200	240	280	320	360
Air pressure drop		(mm.w.c.)	2,9	4,5	4,2	4,2	3,4	4,0	5,5	6,6	7,8
Water 80/60ºC	Heating capacity	(kW)	12,9	14,9	23,0	23,0	31,6	33,6	38,6	40,9	43,7
	Water flow	(m^3/h)	0,6	0,7	1,0	1,0	1,4	1,5	1,7	1,8	1,9
	Water pressure drop	(m.c.a.)	0,1	0,2	0,5	0,5	0,5	0,5	0,7	0,8	0,9
Water 90/70ºC	Heating capacity	(kW)	17,9	20,8	31,5	31,5	43,5	46,5	53,1	56,3	60,1
	Water flow	(m^3/h)	0,8	0,9	1,4	1,4	1,9	2,0	2,3	2,5	2,6
	Water pressure drop	(m.w.c.)	0,2	0,3	0,8	0,8	0,9	1,0	1,2	1,4	1,6
Weight (empty)		(kg)	7,8	7,8	11,0	11,0	16,3	16,3	16,3	16,3	16,3
Diameter of hydraulic connections			3/4"		1"						

Note: with stop-drop in the indoor air coil it is not possible to assemble the hot water coil.

Position of hydraulic conections for auxiliary hot water coil



① Inlet ② Outlet

Dimensions (mm)	A	B	C
90 and 120	108	172	413
160 to 200	108	172	380
240	112	140	413
280 to 360	112	173	476