MITSUBISHI ELECTRIC
HYDRONICS & IT COOLING SYSTEMS S.p.A.

Data Book

T_CRCXROW_0523_EN - HFC R410A

CRCX ROW

8 - 40 kW

FULL INVERTER direct expansion air conditioners for IT Cooling application.
To be matched with remote air-cooled condenser.

The picture of the unit is indicative and may vary depending on the model

- In-row installation
- For high density rack and blade server
- Fully hermetic BLDC inverter compressor
- Single refrigerant circuit
- Frontal or side air delivery
- Back side air suction
- Plug fans with EC electric motor
- Electronic expansion valve

INDEX

CERTIFICATIONS

ISO 9001 CERTIFICATION
Quality Management System

ISO 14001 CERTIFICATION
Environmental Management System

BS OHSAS 18001 CERTIFICATION
Occupational Health and Safety Management System

CE MARKING

CCC – CQC CERTIFICATION
(People's Republic of China)

EAC CERTIFICATION
(Russian Federation, Belarus, Kazakhstan)

GENERAL CHARACTERISTICS

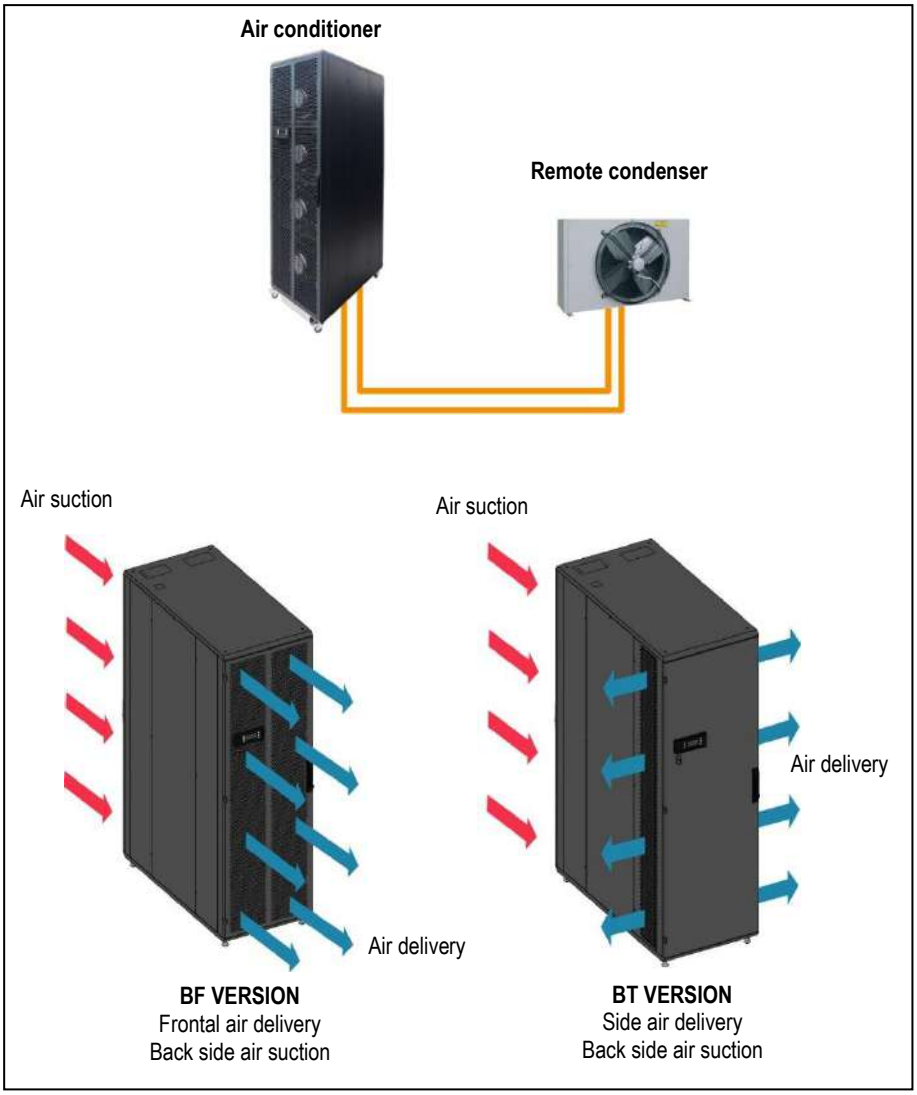
FULL INVERTER Air Conditioners for IT Cooling.

- Direct expansion, air cooled.
- For matching with remote air-cooled condenser.
- BLDC inverter compressors.
- Electronic expansion valve.
- Plug fans with EC electric motor.
- Single refrigerant circuit.

This series, for in-row installation, is offered in 2 models available in the following versions:

- Frontal air delivery, back side air suction
- Side air delivery, back side air suction.

Cooling capacity: 8 ÷ 40 kW



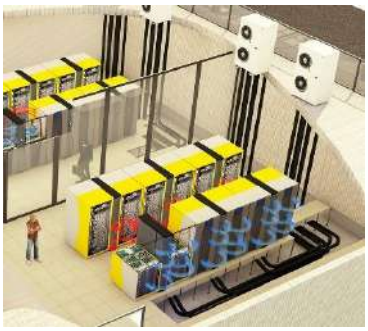
The machines are made for indoor installation.

The constructive solutions and the internal lay-out allow high application flexibility and the frontal access to the main components for the inspection and routine maintenance.

The installation requires refrigerant charge, electrical and hydraulic connections.

Final assembly on all machines before shipment including running test, reading and monitoring of operating parameters, alarms simulation and visual check.

INSTALLATION



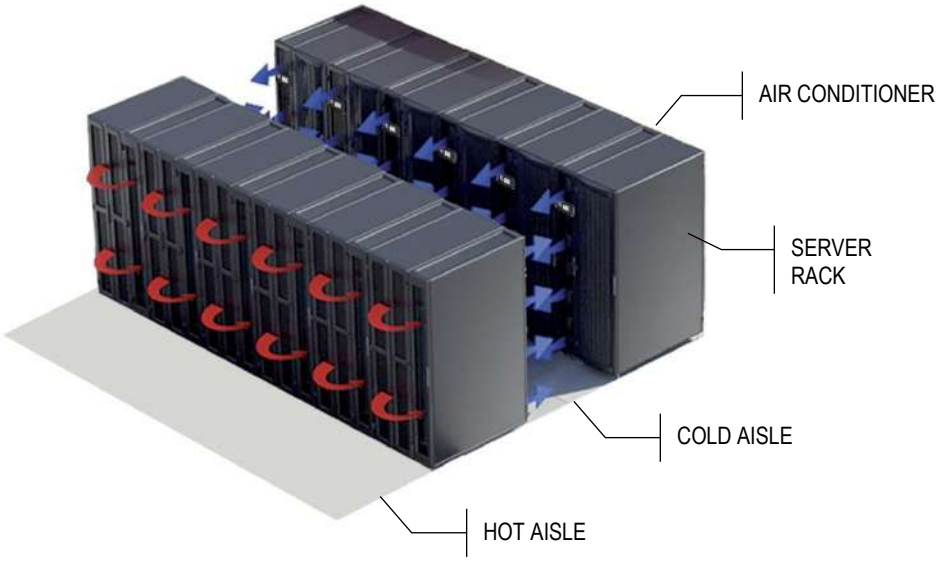
The series is particularly suitable for installation in Data Center with hot spot for high density racks and blade server cooling. It is able to cope the high density of the thermal load in a small space, **up to 40 kW on 0,7 m^2 floor space.**

For installation are not required underfloor plenum, ducts or false-ceilings; the installation foresee the direct insertion within the rows of racks to cool.
This allows to contrast the localized heat sources (hot spot) tailoring the installation to the actual situation of the plant. Another big advantage is the modularity and scalability of the system, characteristics that allow for quick adjustment and economic development of plant layout, according to the changing needs of the infrastructure.

IN ROW COOLING SYSTEM FOR ROWS OF RACKS (hot/cold aisles)
Units are placed in the rows of racks that are arranged so as to obtain alternate cold and hot aisles.
Electronic equipment contained in racks independently provide to aspire the necessary air for cooling.

- In the hot aisle rack expels the hot air used to cool the electronic components while the air conditioner draws the hot air to be cooled.
- In the cold aisle the air conditioner blow the filtered and cooled air while the rack draws cold air to cool the electronic components.

The series is suitable for application in modern IT infrastructure as telephone exchange, data bank, internet hotel and server rooms, all characterized by high thermal loads.

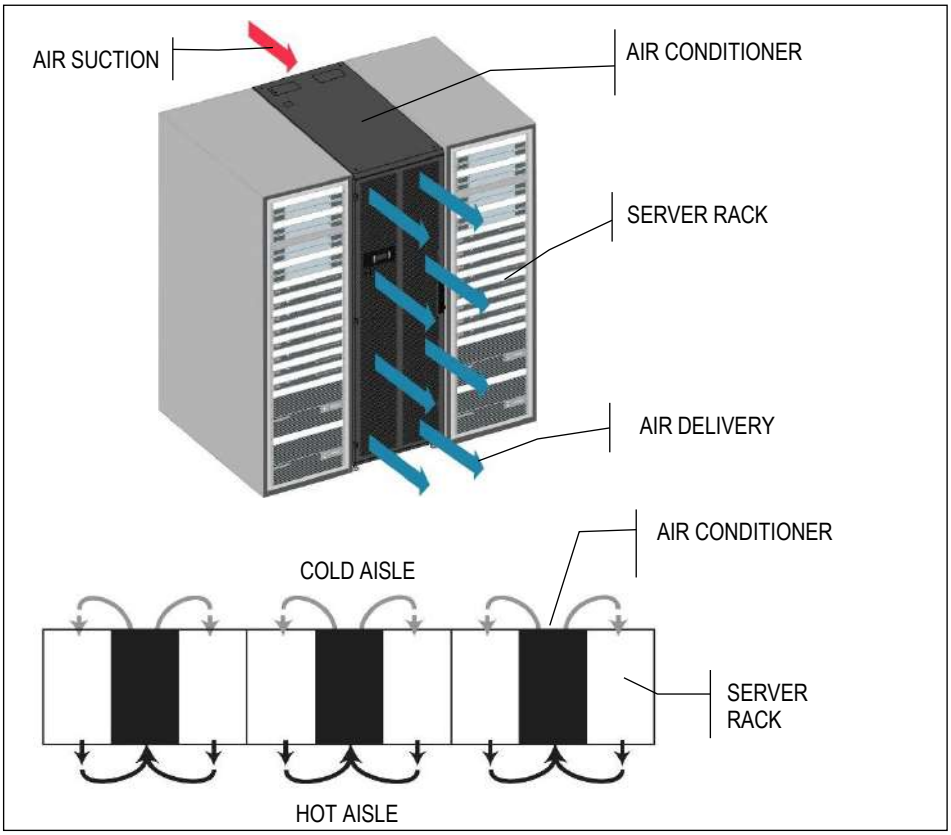


OPTIONAL
An extensive list of accessories allows the unit to adapt effectively to the real needs of the system, reducing the time and cost of installation.

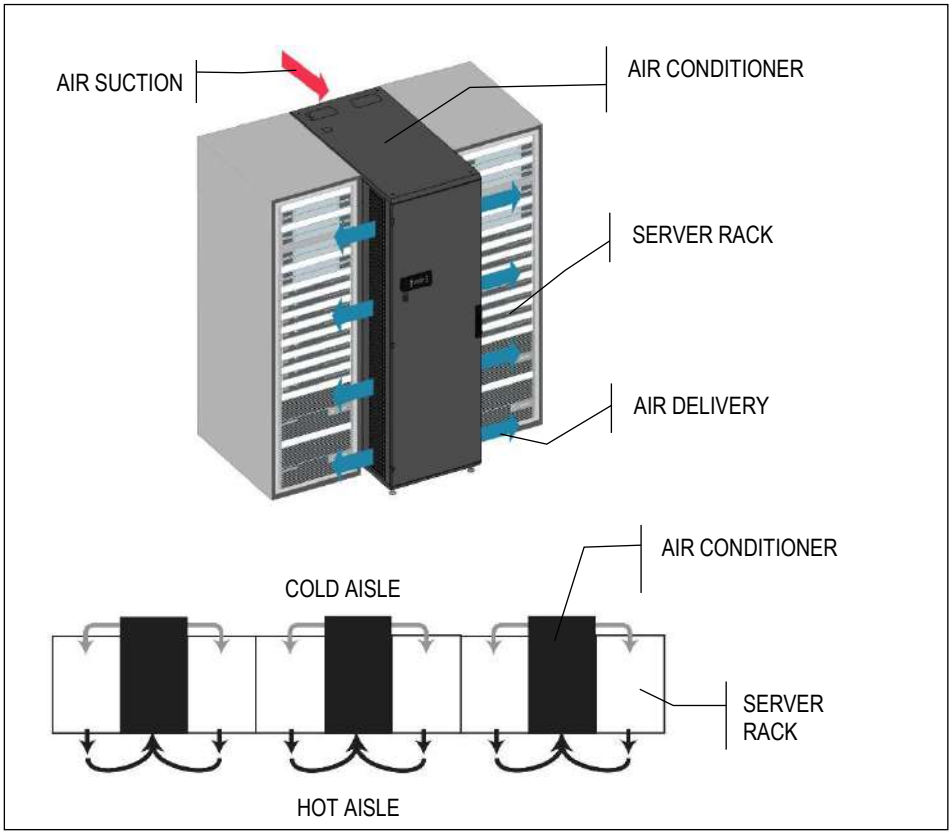
AIR DELIVERY

Two versions are available.

BF VERSION – Frontal air delivery. Back-side air suction.



BT VERSION – Side air delivery. Back-side air suction.



PRODUCT FEATURES AND BENEFITS

The series represents the state of the art of the air conditioning of Data Center with hot spots for high density racks and blade server cooling. The modularity of the system together with the adaptive logic of microprocessor control, make it the best solution for racks and the latest generation equipment cooling.

- EER up to 7,03 at partial load condition;
- High cooling density, **up to 40 kW on 0,7 m² floor space.**
- BLDC hermetic inverter compressor in order to provide always the best efficiency;
- New plug fans with EC electric motors and impeller in composite material, which guarantees a reduction of power consumption;
- New fans electric motor that do not require maintenance;
- Total modulating, FULL INVERTER;
- Improvement of the control software with advanced control logic;
- Single refrigerant circuit;
- Total frontal access and lateral panels fully removable to facilitate the operations of extraordinary maintenance;

F-GAS DIRECTIVE

These units contain <HFC R410A [GWP_{100} 2088]> fluorinated greenhouse gases.

MODEL IDENTIFICATION

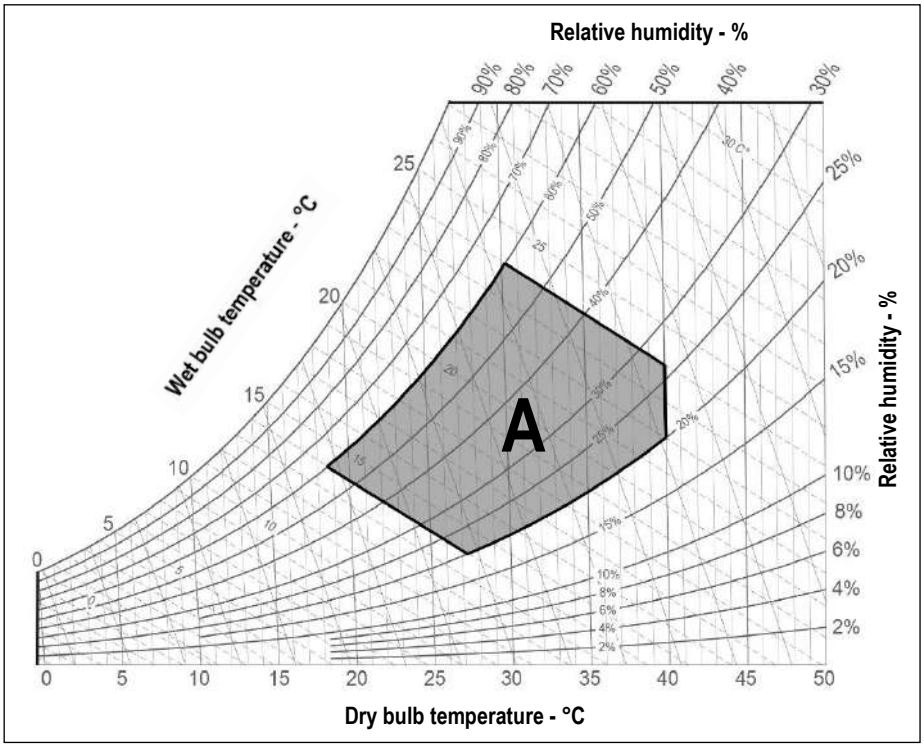
model: CRCX ROW BF 25 B 6

CRCX ROW	Series direct expansion, air cooled with BLDC hermetic inverter compressor
BF	**Air delivery** BF: Frontal air delivery BT: Side air delivery
25	**Model / Cooling capacity (kW) at nominal conditions**
B	**Cabinet length 1200 mm**
6	**Cabinet width 600 mm**

TRANSPORT AND STORAGE TEMPERATURE

During transport and if the machine is not installed at the reception, do not remove the packaging and place the machine in an enclosed, dry and protected from sunlight site at temperatures ranging between -30°C and 50°C in absence of superficial condensation.

WORKING LIMITS



ROOM AIR CONDITIONS
Room air temperature:
14°C minimum temperature with wet bulb.
24°C maximum temperature with wet bulb.
18°C minimum temperature with dry bulb
40°C maximum temperature with dry bulb.

AREA "A". Machine operating envelope.

Room air humidity:
20%RH minimum relative humidity.
60%RH maximum relative humidity.

AMBIENT AIR TEMPERATURE
45°C Maximum ambient air temperature
-20°C Minimum ambient air temperature

With "Kit for air -45°C" for low ambient temperature operation (optional)
-45°C minimum ambient air temperature with remote condensers with AC fans

All the values are indicative. The working temperatures are influenced by a series of variables as:

- Working conditions;
- Thermal load;
- Set of the microprocessor control.

HYDRAULIC CIRCUIT (Dual Fluid circuit)
ΔP 5-150kPa Pressure drop range of the hydraulic circuit.
10 Bar Maximum working pressure of the hydraulic circuit

POWER SUPPLY
± 10% Maximum tolerance of the supply voltage (V)
± 2% Maximum unbalancing of the phases.

MAIN COMPONENTS

FRAMEWORK

- Framework and base in galvanized steel sheet externally painted with epoxy powders.
- Panels in galvanized steel sheet externally painted with epoxy powders and internally insulated with noise absorption material.
- Total front and rear access for routine maintenance.
- Hinged front and rear panels with handle and security lock.
- Removable panels on lateral side.
- Holders for unit height adjusting.
- Colour RAL 7016 textured (anthracite grey).

AIR FLOW

Horizontal air flow for IN ROW cooling system application (for rows of racks):

- BF VERSION. Air intake from the back side and frontal air delivery through honeycomb type grilles.
- BT VERSION. Air intake from the back side and side air delivery through honeycomb type grilles.

FILTER SECTION

- Washable air filters with COARSE 40% efficiency (according to ISO EN 16890) efficiency, with cells in synthetic fibre, on air suction panel.

FANS SECTION

- Centrifugal fans with backward curved blades, single suction and without scroll housings (Plug-fans), directly coupled to electric motor.
  - Impeller in composite material exempt from rust formation.
  - Brushless type synchronous EC motor with integrated electronic commutated system and continuous variation of the rotation speed. The motor rotation control is obtained with the EC system (Electronic Commutation) that manage the motor according to signal coming from the microprocessor control.
- Fans control through ModBus. In case of failure, the control stops the fan indicating the type of fault. The machine is not stopped.
- Temperature sensor on air delivery.
- Temperature sensor on air intake.
- Adjustable External Static Pressure (ESP).
- Fan guard.

EVAPORATING SECTION

- Heat exchanger coil with copper tubes and high efficiency aluminium fins, specifically developed to provide high heat transfer and lower pressure drops.
- Finned pack with hydrophilic treatment that assure the condensate water drop, high thermal conductivity and does not favour the growth of micro-organisms.
- Frame in galvanized steel.
- Condensate tray in peraluman with connection (external diameter Ø16) for a discharge tube or for a pump for condensate drain (option).

COMPRESSORS

Model BF 25 B6:

- Rotary BLDC inverter compressor for R410A refrigerant

Model BF 40 B6:

- Scroll BLDC inverter compressors with spiral profile optimized for R410A refrigerant.
- Synchronous brushless inverter driven motor.
- Inverter for modulating capacity control.
- Filter for the reduction of electromagnetic noise and interference.
- Crankcase heater.
- Compressor soundproof cap.
- Rubber supports.

REFRIGERANT CIRCUIT

- Electronic expansion valve. The valve allows high performance and system efficiency thanks to a timely and accurate response to changes in temperature and pressure
- Sight glass.
- Filter dryer on liquid line.
- Pressure transducers with indication, control and protection functions, on low and high refrigerant pressure.
- High pressure safety switch with manual reset.
- Liquid receiver.
- Pressure relief valve on liquid receiver.
- Refrigerant circuit with copper tubing with anticondensate insulation of the suction line.
- Lubricant oil charge.
- Oil separator on gas discharge.
- Valves on gas delivery and liquid return placed on the bottom side of the unit for coupling to remote air-cooled condenser.
- 0÷10V proportional signal to manage the condensing control system of the remote air-cooled condenser.
- Condensing control by continuous variation of remote condenser fan rotation speed for operations with ambient temperature down to -20°C.

ELECTRICAL PANEL

Extractable electrical panel, in accordance with EN60204-1 norms, complete with:

- Magnetothermic switch for fans electric motor protection
- Magnetothermic switch for compressor inverter protection
- Inverter to drive the compressor motor.
- Transformer for auxiliary circuit and microprocessor supply.
- Terminals:
  OUTLETS
  - Voltage free deviating contact for General Alarm.
  - Voltage free contact for machine operating status.

  INLETS
  - Emergency unit stop with signalling on display (external alarm).
  - External enabling.
- Power supply 400/3+N/50

CONTROL SYSTEM

- Microprocessor control system with graphic display for control and monitor of operating and alarms status. The system includes:
  - Built-in clock for alarms date and time displaying and storing;
  - Built-in memory for the storing of the intervened events (up to 100 events recorded);
  - Integrated connectivity port MBUS RS485/JBUS;
  - Predisposition for additional connectivity board housing (MODBUS, LON, BACNET MS/TP RS485, BACNET OVER IP). The electronic cards are optional accessories.
  - Main components hour-meter;
  - Non-volatile “Flash” memory for data storage in case of power supply faulty;
  - Menu with protection password;

REMOTE AIR-COOLED CONDENSERS

The descriptions of these series can be found in Chapter REMOTE AIR-COOLED CONDENSERS.

.....**Remote air-cooled condenser**: Remote air-cooled condenser in PERALUMAN aluminium alloy with microchannel condensing coil:

OPTIONAL ACCESSORIES

The descriptions of these additional components can be found in Chapter OPTIONAL ACCESSORIES.

P251 ..... **Connections upwards.** Refrigerant / electrical connection on the upper side of the machine

A548 ..... **Constant prevalence**. Automatic system for the air pressure control in the aisle. The system controls the supply fans rotation speed to keep constant the air pressure via a differential pressure transmitter connected to the microprocessor control.

P091 ..... **Back-up module controller**. The system guarantees the microprocessor power supply for a few minutes, in case of supply voltage failure. (size E1 excluded).

P171 ..... **Kit for air -45°C MCH axial AC**. Kit for operations with low ambient air temperature down to -45°C. For machine start up and operation with very low ambient air temperatures (between -20°C and -45°C).

P191 ..... **Power supply for condenser.** Electrical power supply for remote condenser from the indoor machine electrical board. The optional includes magneto-thermic switches for condenser fans and the control/alarm signals.

383 ..... **Numbered wirings + UK requests;**

4181 / 4182 / 4184 / 4185 ... **Serial cards**:
4181 – Serial card MODBUS;
4182 – Serial card LON;
4184 – Serial card BACNET MS/TP RS485;
4185 – Serial card BACNET OVER IP.

A491 ..... **Water leakage detector**. Supplied in mounting kit.

A492 ..... **Water leakage detector + additional sensor**. Supplied in mounting kit.

A501 ..... **Clogged filter sensor.** Differential pressure switch on the air side for clogged filters alarm signal.

P183 ..... **Kit network analyser** (standard machine) Multifunction utility for calculating and displaying the machine electrical measurements.

P184 ..... **Kit network analyser + optional** (full optional machine) Multifunction utility for calculating and displaying the machine electrical measurements.

A431 ..... **Electric heater.** Heating with electric heaters.

4301 (2) ..... **Humidification**: Modulating steam humidifier with immersed electrodes with electronic control.

P051 (3) ..... **Dehumidification function**.

P161 ..... **T / rH air intake sensor.** Combined Temperature / Humidity sensor on air intake. The optional replace the standard temperature sensor on machine air intake.

P071 ..... **Remote T / rH probe.** Combined Temperature / Humidity sensor for remote installation. The optional is added to the standard temperature sensor on machine air intake.

P271 ..... **Electromechanical dual supply.** Double power supply with electromechanical change-over.

A381 ..... **Drain pump.** Supplied in mounting kit. The system includes pump with activation float and 10 linear meters long discharge pipe.

P083 ..... **Air filter COARSE 60%**: Washable high efficiency air filter (according to ISO EN 16890). Replace the standard filter.

P260 ..... **Handling kit:** The kit includes support wheels with safety brake and wheels cover (Baseboard

3601 ..... **Compressor operating signal contact.** Voltage free contact for compressor status signalling.

9973 ..... **Wooden cage packing.** The machines are delivered on wooden pallet, covered with shrink wrap and packaged in wooden cage.

WARNING

The Manufacturers reserves the right to accept the matching of the optional installed on the machine.

MANDATORY COMBINATIONS OF ACCESSORIES

1. When optional accessory “4301 Humidification” is present, it requires mandatory accessory “P161 T/rH air intake sensor“.
2. When optional accessory “P051 Dehumidification function” is present, it requires mandatory accessory “P161 T/rH air intake sensor“.

TECHNICAL DATA

VERSION		BF / BT					BF / BT				
MODEL		25					40				
SIZE		B6					B6				
COOLING CAPACITY (1)		100%	80%	60%	40%	30%	100%	80%	60%	40%	30%
Total	kW	28,8	23,0	17,3	11,5	7,92	39,9	31,9	23,9	16,0	12,1
Sensible	kW	28,7	22,9	17,2	11,4	7,82	39,9	31,8	23,9	16,0	12,1
SHR (2)		1	1	1	1	0,99	1	1	1	1	1
Total power input (Comp. + Fans)	kW	7,71	5,10	3,34	1,92	1,25	10,9	6,91	4,33	2,44	1,72
"EC" SUPPLY FANS	n.	4					4				
Air flow	m^3/h	7400	5822	4244	2666	1680	9400	7483	5565	3648	2720
Nominal external static pressure	Pa	0	0	0	0	0	0	0	0	0	0
Maximum external static pressure	Pa	624	--	--	--	--	466	--	--	--	--
Power input (3)	kW	0,41	0,23	0,10	0,04	0,01	0,75	0,41	0,21	0,08	0,04
COMPRESSOR		Rotative					Scroll				
BLDC compressor quantity	n.	1					1				
Proportional cooling capacity		Modulating					Modulating				
Compressor power input	kW	7,31	4,87	3,23	1,87	1,24	10,1	6,50	4,12	2,36	1,68
AIR FILTERS	n.	1					1				
Efficiency (ISO EN 16890)	COARSE	40%					40%				
GAS CIRCUIT	n.	1					1				
POWER SUPPLY	V/Ph/Hz	400/3+N/50					400/3+N/50				
ENERGY EFFICIENCY INDEXES (4)											
EER - Energy Efficiency Ratio	kW/kW	3,74	4,51	5,18	5,99	6,33	3,66	4,62	5,52	6,56	7,03
DIMENSIONS											
Length	mm	1200					1200				
Width	mm	600					600				
Height	mm	2000					2000				
NET WEIGHT	kg	290					290				
REMOTE CONDENSER (4)											
Quantity	n.	1					1				
Series T-MATE DX-A STD	Mod.	M35					M45				
REFRIGERANT CONNECTIONS											
Gas delivery	ODS Ø	16					18				
Liquid line	ODS Ø	16					16				
HYDRAULIC CONNECTIONS											
CONDENSATE DISCHARGE											
Rubber pipe – Outer diameter	Ø mm	16					16				

THE COOLING CAPACITY DOES NOT CONSIDER THE SUPPLY FANS MOTOR THERMAL LOAD

1. Gross value. Characteristics referred to entering air at 35°C with 27% rH, ambient temperature 35°C. ESP=0Pa.
2. SHR = Sensible cooling capacity / Total cooling capacity.
3. Corresponding to the external nominal static pressure.
4. The Energy Efficiency Index does not consider the remote air-cooled condenser (optional) indicated in table.

The units highlighted in this publication contain <HFC R410A [GWP_{100} 2088]> fluorinated greenhouse gas.

NOTE:
Below 30% of cooling capacity, the inverter compressor enters the "cycling" area in which the compressor operates with ON / OFF cycles below the minimum modulation frequency (operation only for short periods).
SELECT THE UNIT IN THE MODULATION FIELD.

REFRIGERANT CHARGE

The air conditioner is supplied with a minimum R410A refrigerant charge. **Refrigerant must be charged.** The following table shows the refrigerant charge that must be introduced for the air conditioner only. Remote condenser, connections pipes and optional are excluded.

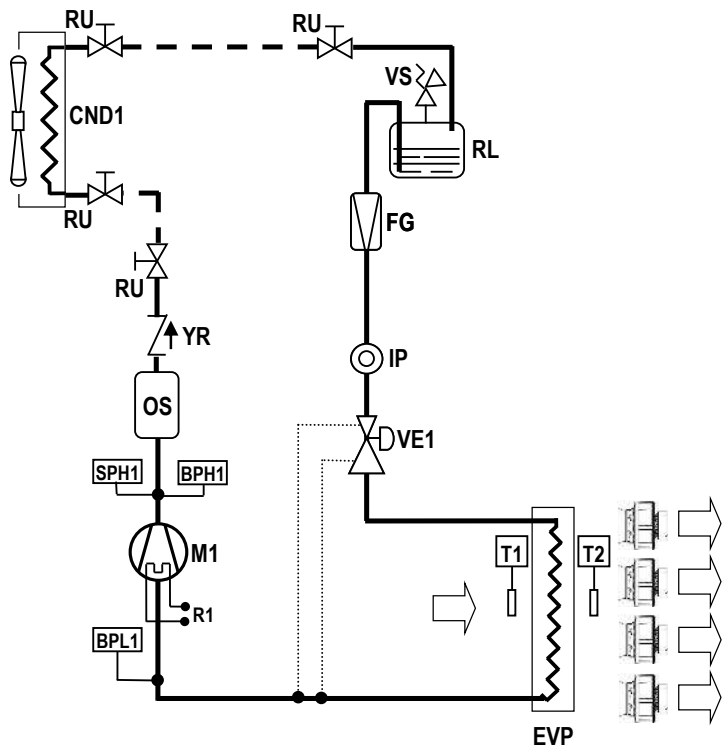
VERSION		BF / BT	BF / BT
MODEL		25	40
SIZE		B6	B6
REFRIGERANT		R410A	R410A
Refrigerant circuits x Refrigerant charge (1)	n x kg	1 x 4,5	1 x 4,6
HFC R410A - F Gas - CO_2 equivalent	t	9,39	9,60

1. Refrigerant charge required for the air conditioner only operation. Remote condenser, connections pipes and optional are excluded.

REFRIGERANT CIRCUIT

Below refrigerant diagrams for version with single or double refrigerant circuit. The diagrams refer to the standard configuration, without optional.

SINGLE REFRIGERANT CIRCUIT



LEGENDA

M1	BLDC inverter compressor	BPL	Low pressure transducer.	IP	Sight glass.
R1	Crankcase heater	SPH	High pressure switch	VE	Expansion valve.
CND	Condenser.	OS	Oil separator	T	Temperature probes.
EVP	Evaporator.	YR	Non-return valve	RU	Valves
BPH	High pressure transducer.	VS	Safety valve.	RL	Liquid receiver
		FG	Refrigerant filter.		

RECOMMENDED REFRIGERANT LINES

Please always refer to the "INSTALLATION DIAGRAM" to properly select all necessary components
Verify the need to use pressure limiting devices (safety valves) where not already provided for by Directive 2014/68 / EU.
Nominal diameter: Refrigerant connection of the indoor unit. In some cases, the diameter of the refrigerant lines may not correspond with the nominal diameter. This is completely normal. It is enough to provide a reduction fitting to adjust the diameter.

"SI" INTERNATIONAL SYSTEM PIPES DIAMETERS

SI system	Diameter	mm	6	8	10	12	16	18	22	28	35
	Thickness	mm	1	1	1	1	1	1	1	1,5	1,5

INVERTER COMPRESSOR

Model	Line	Nominal diameter Ø [mm]	EQUIVALENT LENGHT [m] FOR INVERTER COMPRESSOR R410A																			
			5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
25	Gas	**16**	18	18	18	18	18	18	18	22	22	22	22	22	22	22	22	22	22	22	22	22
	Liquid	**16**	16	16	16	16	16	16	18	18	18	18	18	18	18	18	18	18	18	18	18	18
40	Gas	**18**	18	18	18	18	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
	Liquid	**16**	16	16	16	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18

For equivalent lengths over 100m, please contact the Manufacturer's Sales Office.

"IMPERIAL" SYSTEM PIPES DIAMETERS

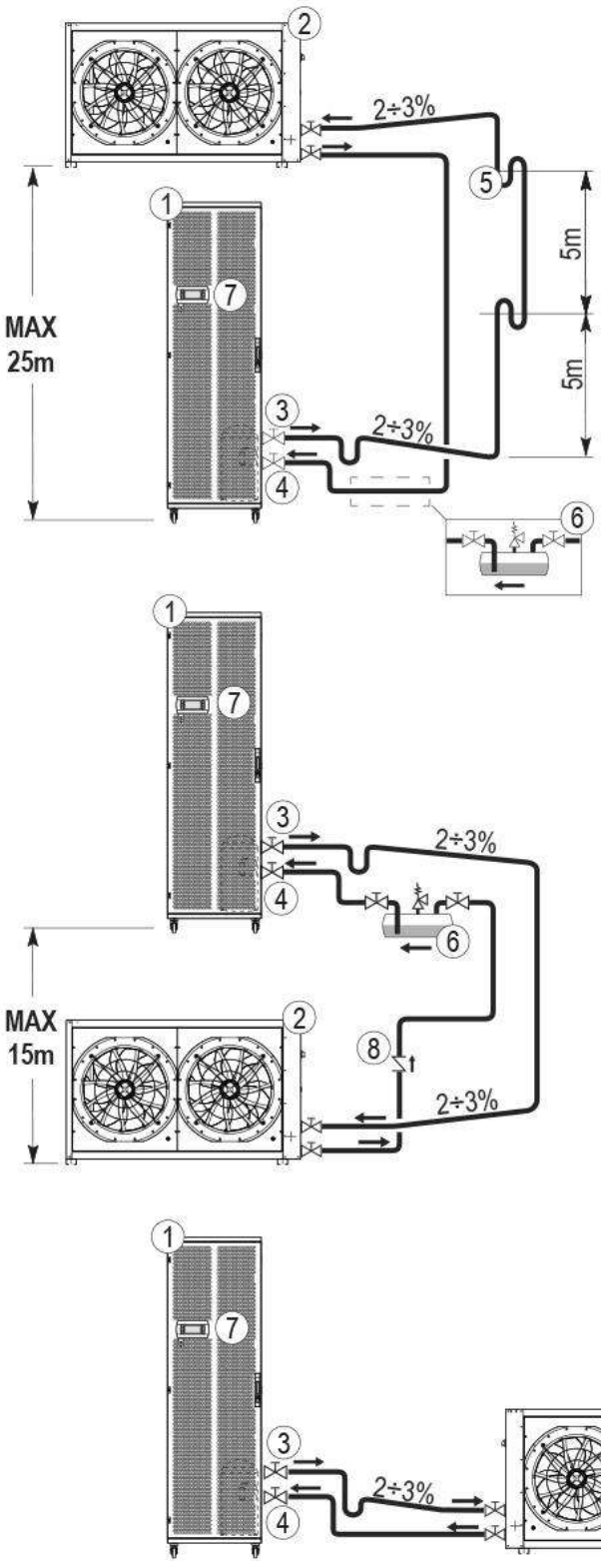
IMPERIAL system	Diameter	inch	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 3/8"
		mm	6,35	9,52	12,7	15,87	19,05	22,22	25,4	28,57	34,92
	Thickness	mm	1	1	1	1	1	1	1	1,25	1,25

INVERTER COMPRESSOR

Model	Line	Nominal diameter Ø [mm]	EQUIVALENT LENGHT [ft] FOR INVERTER COMPRESSOR R410A																			
			15	35	50	65	80	100	115	130	150	165	180	195	215	230	245	260	280	295	310	330
25	Gas	**16**	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"
	Liquid	**16**	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
40	Gas	**18**	3/4"	3/4"	3/4"	3/4"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"
	Liquid	**16**	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"

For equivalent lengths over 330ft please contact the Manufacturer's Sales Office.

INSTALLATION DIAGRAM



Difference in height between the machines in absolute value.

Maximum equivalent length of the connecting pipes: 100m

LEGENDA

1. Air conditioner.
2. Remote air-cooled condenser.
3. Gas discharge line.
4. Liquid return line.
5. Trap. Foresee a trap every 5m of the rising pipe.
6. Additional liquid receiver, external to the machine – By the installer.
   It is suggested for:
   - Plants with refrigerant lines with an equivalent length of more than 25 meters
   - Plants with refrigerant lines of any length and operating at outdoor temperatures below 0°C.
7. Temporary microprocessor power supply. Optional suggested for refrigerant lines with an equivalent length of more than 25 meters. In case of power failure the module ensures the closing of the electronic expansion valve preventing liquid return to the compressor.
8. Check valve – By the Installer. The valve must be installed on the liquid line close to the condenser. The valve prevents the return of liquid in the condenser, particularly in the case of plant shutdown during the winter season.

WARNING

It is necessary to provide the refrigerant charge for the connection pipes and for the remote air-cooled condenser.
Charge refrigerant in the suitable quantity and lubricant oil in 10% ratio of charged refrigerant.
Lubricant oil must be the same type as the charged one as shown on the compressor plate.

ACOUSTIC DATA

Acoustic data of the standard machine at full load working conditions.

WARNING:

In a closed room the noise produced by a sound source reaches the listener in two different ways:

- Directly
- Reflected from the surrounding walls, floor, ceiling, from furniture.

With the same sound source, the noise produced in a closed room is greater than that produced outdoors. In fact, the sound pressure level generated by the source, must be added to the one reflected from the room. Also, the shape of the room affects the sound.

Spectrum	Hz	63	125	250	500	1000	2000	4000	8000	Totale
		dB	dB	dB	dB	dB	dB	dB	dB	dB(A)
Model										
25 B6	Power [Lw]	64	66	67	68	66	62	56	51	70
	Pressure [L_{Pm}] (1)	48	50	51	52	50	46	40	35	54
40 B6	Power [Lw]	68	71	73	74	71	68	62	59	76
	Pressure [L_{Pm}] (1)	52	55	57	58	55	52	46	43	60

1. Average noise pressure level at 1 meters in free field – ISO 3744

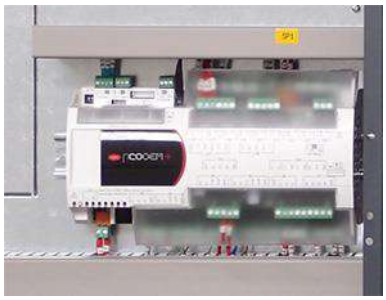
ELECTRICAL DATA

VERSION		**BF / BT**	**BF / BT**
MODEL		**25**	**40**
SIZE		**B6**	**B6**
Power supply	V/ph/Hz	400/3+N/50	400/3+N/50
Maximum engaged power (FLI)	kW	6,91	9,99
Maximum current input (FLA)	A	27,2	34,2
Starting current (SA)	A	13,2	14,2
Engaged power	kW	7,72	10,8

WARNING:

The electric data indicated refer only to the indoor unit.
Optional accessory electric data are included within the dedicated chapters and must be added.
Please refer to ELCA WORLD selection program to calculate the electrical data of the air conditioner according to the requested optional accessories.
The remote air-cooled condenser is not included because it has independent power supply.

MICROPROCESSOR CONTROL SYSTEM

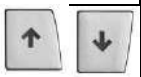


The microprocessor control system is equipped with 6 keys terminal and back lighted graphic display on which all information in different languages or easily identifiable symbols are displayed.
The system disposes of a "flash" memory that preserves the information even in absence of power supply. Part of memory is dedicated to the registration of intervened events - up to 100 events.

CHARACTERISTICS OF THE CONTROLLER:

- CPU: 32 bit – 100 MHz
- 4 Mbyte FLASH memory that preserves the information even in absence of power supply
  - 2Mbyte dedicated to the recording of intervened events (records up to 100 events)
- Acoustic and optical signal of alarms
- Integrated LAN connection that does not require additional hardware

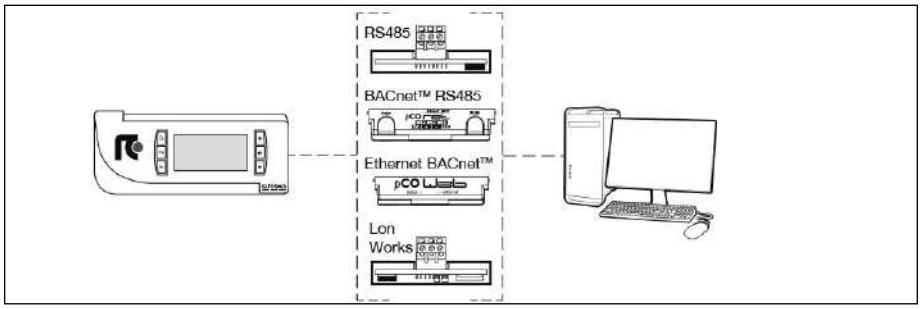
KEYBOARD FUNCTIONS

	ALARM	Alarm, Back-red light active – alarm presence, push to silence and to have alarm description. If more than one alarm(s), the others can be scrolled by Key UP / DOWN
	PRG	Menu list scrolled by key UP/DOWN: **Status; Set-point; Reset Alarm; Service set; Memo; Manual; Clock set; Communication; Switch unit (in LAN mode); Unit ON/OFF using the ENTER to execute the mode.**
	ESC	Home, main screen displayed
	UP DOWN	Used to change the pages and values of sets. When display is in main screen (HOME), pressing one of them (UP/DOWN) will display the synoptic of the main controls.
	ENTER	Moving the cursor on adjustable Program(s) fields, to confirm the changes, press the key (ENTER) to get out of the fields.

CONNECTIVITY

Through the integrated serial port MBUS/JBUS (RS485) and optional serial port, the microprocessor control enables communication with the modern buildings BMS systems with the following protocols:

- MBUS/JBUS (RS485) serial card;
- LON Works serial card;
- BACnet per Ethernet – SNMP – TCP/IP serial card;
- BACnet per MS/TP serial card;



PASSWORD

Level 1: On request of the End User. Allowing the changes of SETPOINT, RESET ALARM, SEASON, UNIT ON/OFF and COMMUNICATION.
Level 2: Asks to Service: Allowing the changes of SERVICE SET and MANUAL
Level 3: Asks to Service: Allowing the changes of MANUFACTURER SET.
No passwords request to enter into: STATUS, MEMO, CLOCK SET, SWITCH UNIT (LAN)

REMOTE CONTROLS/ALARMS

1 INLETS: External enabling	•
2 INLETS: Smoke/Fire alarm	•
1 OUTLETS: General alarm 1 – programmable deviating contact	••
2 OUTLETS: General alarm 2 – programmable deviating contact	••

• controls/alarms for remotization
•• voltage free controls/alarms for remotization

REMOTE AIR-COOLED CONDENSERS

Remote air-cooled condensers for matching to air conditioners for IT Cooling.
The constructive solutions allow high application flexibility.
Horizontal air flow, from coil to fan.
The series has an independent power supply from the indoor unit.
Among the indoor unit and the condenser is necessary the refrigerant connection and electrical connection of the condensing proportional control signal and the alarms.:
Is available the optional “P191 Power supply for condenser” from the indoor machine electrical board.

Remote air-cooled condenser:
Remote air-cooled condenser in PERALUMAN aluminium alloy with microchannel condensing coil:
- with AC axial fans and standard acoustic version
- with AC axial fans and low noise acoustic version
- with EC axial fans and standard acoustic version
- with EC axial fans and low noise acoustic version

Remote air-cooled condenser with condensing coil with copper tubes and aluminium fins:
- with AC axial fans and standard acoustic version
- with AC axial fans and low noise acoustic version
- with EC axial fans and standard acoustic version
- with EC axial fans and low noise acoustic version

Please refer to ELCA WORLD selection program to calculate the cooling capacity of the air conditioner according to the remote condenser.
The remote air-cooled condenser has independent power supply from the indoor unit.

OPTIONAL ACCESSORIES: A548 - CONSTANT PREVALENCE

The optional is a differential pressure sensor with a 0…20mA output signal. The device is installed in the machine. The sensor is connected to the microprocessor control of the indoor unit and allows the control of:
A548 - CONSTANT PREVALENCE
The system controls the air pressure in the aisle. Through the relief piping of the room pressure (low pressure side) and the air supply of the fan (high pressure side) the fan rotation speed is controlled to keep the air pressure constant.
Pressure control range from 0 to 100 Pa.

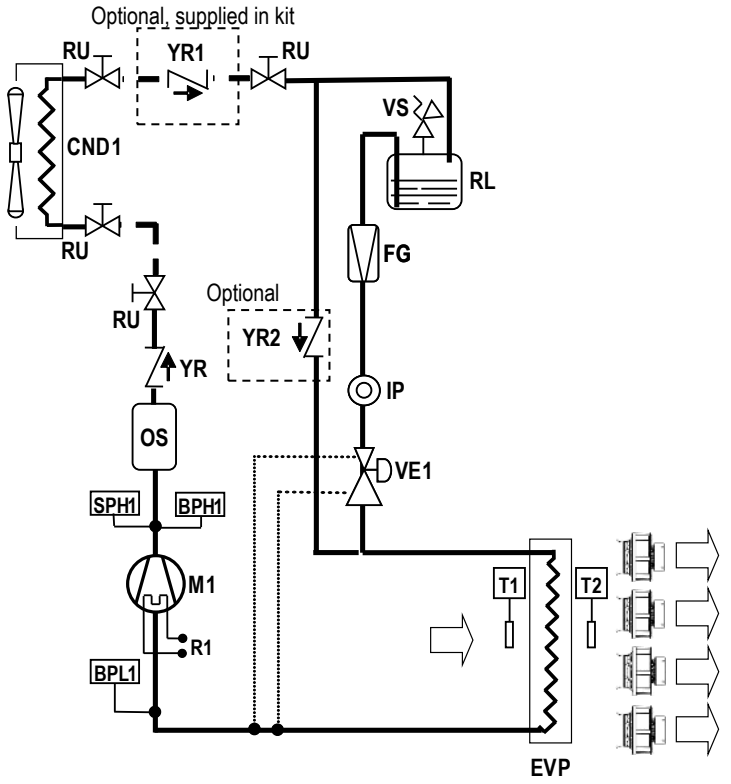
OPTIONAL ACCESSORIES: P091 - BACK-UP MODULE CONTROLLER

The optional is installed within the electrical panel.
The system powers the microprocessor for a few minutes in the event of a power failure or voltage surges, preventing the re-boot of the controller.

OPTIONAL ACCESSORIES: P171 – KIT FOR AIR -45°C MCH AXIAL AC

P171 – KIT FOR AIR -45°C MCH AXIAL AC

The optional is available only for air conditioners matched with remote air-cooled condensers with axial fans with AC electric motors:
The system is necessary for the correct machine start up and operation with very low ambient air temperatures: between -20°C and -45°C.
Components for each refrigerant circuit:
- A non-return valve (YR_1), supplied in kit. The valve must be installed indoor, near to the air conditioner, on the liquid line on the return of the remote condenser. This valve avoids the migration of the refrigerant at liquid state in presence of very low ambient air condition.
- A non-return valve (YR_2), with controlled opening, installed in factory within the unit. It limits the pressure raising on the liquid pipe between the expansion valve and the non-return valve (YR_1).



LEGENDA

M1	Compressor
R1	Crankcase heater
CND	Condenser
EVP	Evaporator
BPH	High pressure transducer
BPL	Low pressure transducer
SPH	High pressure safety switch
OS	Oil separator
YR	Check valve
VS	Pressure relief valve
FG	Drier filter
IP	Sight glass
VE	Expansion valve
T	Temperature probe
RU	Taps.
RL	Liquid receiver
YR1	Check valve to be installed on the liquid line close to the machine inside the room
YR2	Unidirectional check valve with controlled opening that limits pressure rising on the liquid line

OPTIONAL ACCESSORIES: A491 - WATER LEACKAGE DETECTOR

The system includes an electronic relay installed in the electrical panel of the machine and a water detector.
The electrical connections for the probe and the alarm contact are present in the machine's terminal board.
Sensor is supplied to be connected and installed at customer care.

OPTIONAL ACCESSORIES: A492 – WATER LEACKAGE DETECTOR + ADDITIONAL DETECTOR

The system includes an electronic relay installed in the electrical panel of the indoor machine and 2 water detectors to be connected in series.
The electrical connections for the probe and the alarm contact are present in the indoor machine's terminal board.
The sensors are supplied to be connected and installed at customer care.

OPTIONAL ACCESSORIES: A501 – CLOGGED FILTERS SENSOR

The system includes a differential pressure switch installed in the electrical panel or in the front of the indoor unit and the plastic hoses for the relief of the pressure upstream and downstream the air filters.

Control range:	0.3 … 4.0 mbar (30 … 400 Pa)
Differential for intervention:	0.15 mbar (15 Pa)

OPTIONAL ACCESSORIES: P183 – NETWORK ANALYZER
OPTIONAL ACCESSORIES: P184 – NETWORK ANALYZER + OPTIONAL

This device provides continuous measurement of power consumption, monitoring current, voltage and power. These values are sent to unit microprocessor via RS485 serial cable, as shown on the unit wiring diagram.
The displayed variables are:

- Phase to phase voltage, only for three-phase units;
- Phase voltage (phase-neutral);
- Phase current;
- Neutral current only for three-phase units;
- Active phase power, only for three-phase units;
- Total active power;
- Active energy;
- Hour counts

INSTALLATION

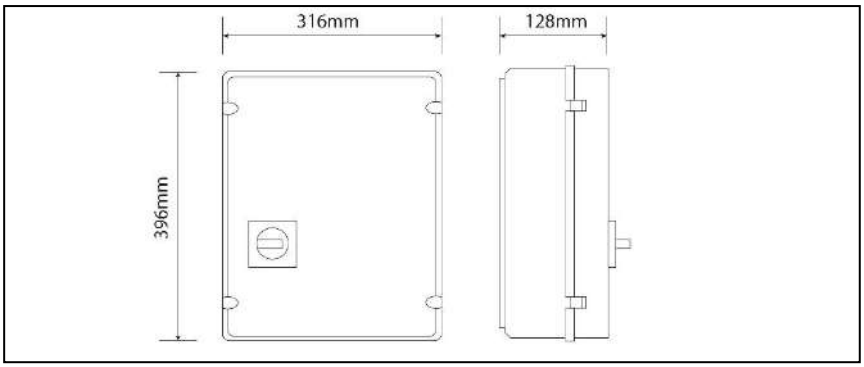
Frame	Power Supply	Installation	
BF B6	400/3+N/50	EXTERNAL to the unit, supplied in kit	P183 / P184 (*)
BT B6	400/3+N/50	EXTERNAL to the unit, supplied in kit	P183 / P184 (*)

(*) P184 for units with optional (with electric heaters and/or humidifier)

MOUNTING KIT

The optional is supplied in box for external installation to the machine with the dimensions showed in the figure below, and includes:

- Main switch with door lock safety;
- Fuse;
- Network transducer;
- Current transformers, one for each power supply phase cable;
- Terminals.



OPTIONAL ACCESSORIES: A431 – ELECTRIC HEATERS

The optional is not compatible with “Electromechanical dual supply (P271)” optional accessory.
Electric heater consisting of finned aluminum elements, ensuring low surface temperature and deleting the air ionization problems. The optional is installed downstream the main cooling coil.
In electric heaters with two working steps the activation is binary type.
Components:

- Electric heater in aluminium armoured elements with integral fins
- Electrical control
- Safety thermostat.

VERSION		BF / BT	BF / BT
MODEL		**25**	**40**
SIZE		**B6**	**B6**
THERMAL CAPACITY	**kW**	**1,7**	**1,7**
Absorbed current (OA)	A	3,0	3,0
First working step	kW	0,85	0,85
Second working step	kW	0,85 + 0,85	0,85 + 0,85
NET WEIGHT (1)	**kg**	5	5

1. Value to be added to the weight of the standard unit.

OPTIONAL ACCESSORIES: 4301 – HUMIDIFIER

The optional is not compatible with “Electromechanical dual supply (P271)” optional accessories.
The optional requires mandatory accessory “P161 T/rH air intake sensor“.
The optional is factory installed and requires only water filling connection.
It is recommended to install a filter and a shut-off valve on the pipe to the water inlet.
This humidifier produces non-pressurized steam by electrodes immersed in the water inside the cylinder: they bring the electric phase in the water that works as an electrical resistance and overheats. The steam so produced is distributed with dedicated distributors and used for ambient humidification or for industrial processes.

CHARACTERISTICS OF THE SUPPLY WATER
The quality of the used water influences the evaporation process, so the humidifier can be fed with **not-treated water, only when potable and non-demineralised.**

LIMIT VALUES

			Min	Max
Hydrogen ions	pH		7	8,5
Specific conductivity at 20°C	$\sigma_{R,\ 20\ °C}$	µS/cm	350	750
Total dissolved solids	TDS	mg/l	(1)	(1)
Dry residue at 180°C	R_{180}	mg/l	(1)	(1)
Total hardness	TH	mg/l $CaCO_3$	100 (2)	400
Temporary hardness		mg/l $CaCO_3$	60 (3)	300
Iron + Manganese		mg/l Fe + Mn	0	0,2
Chlorides		ppm Cl	0	30
Silica		mg/l SiO_2	0	20
Residual chlorine		mg/l Cl^-	0	0,2
Calcium sulphate		mg/l $CaSO_4$	0	100
Metallic impurities		mg/l	0	0
Solvents, diluents, soaps, lubricants		mg/l	0	0

(1) Values depending on specific conductivity; in general: TDS ≅ 0,93 * $\sigma_{R,\ 20\ °C;}$ R_{180} ≅ 0,65 * σ_R
(2) Not lower than 200% of the chloride content in mg/l di Cl^-
(3) Not lower than 300% of the chloride content in mg/l di Cl^-

WARNING:

- **Use only with drinking water.**
- **There is no reliable relationship between hardness and water conductivity**
- **Do not treat water with softeners! This could cause corrosion of the electrodes or the formation of foam, leading to potential operating problems or failures.**
- **Do not add disinfectants or corrosion inhibiters to water, as these substances are potentially irritant.**
- **Is absolutely forbidden to use well water, industrial water or water drawn from cooling circuits; in general, avoid using potentially contaminated water, either from a chemical or bacteriological point of view.**

VERSION		**BF / BT**	**BF / BT**
MODEL		**25**	**40**
SIZE		**B6**	**B6**
VAPOUR PRODUCTION	**kg/h**	**3,0**	**3,0**
Power input	kW	1,4	1,4
Absorbed current (OA)	A	6,1	6,1
Max absorbed current (OA)	A	8,8	8,8
Water content	l	3,9	3,9
Max water supply pressure	Bar	1÷8	1÷8
NET WEIGHT (1)	kg	3	3
HYDRAULIC CONNECTION			
WATER INLET - ISO 228/1 – G M	Ø	3/4"	3/4"
WATER OUTLET – external diameter	Ø mm	19	19

1. Value to be added to the weight of the standard unit. Does not include the weight of the water content.

OPTIONAL ACCESSORIES: P051 – DEHUMIDIFICATION FUNCTION

The optional requires mandatory accessory “P161 T/rH air intake sensor“.

Components:

- Temperature / Humidity sensor on the air intake.
- Electronic control system of the dew point temperature for the combined intervention of cooling capacity and air flow.

OPTIONAL ACCESSORIES: P161 - T/RH AIR INTAKE SENSOR
OPTIONAL ACCESSORIES: P071 - REMOTE T/RH PROBE

P161: T/RH AIR INTAKE SENSOR

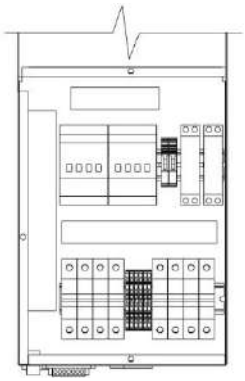
The accessory replaces the temperature sensor installed on the air intake in the unit and allows the displaying of the relative humidity room value.
The sensor is mandatorily required with following option:

- 4301 Humidifier;
- P161 Dehumidification function;

P071: REMOTE T/RH PROBE

The accessory is added to the standard temperature sensor or to the temperature / humidity sensor (optional) on the machine air intake. For indoor installation in a specific point of the room to be conditioned.

OPTIONAL ACCESSORIES: P271 – ELECTROMECHANICAL DUAL SUPPLY



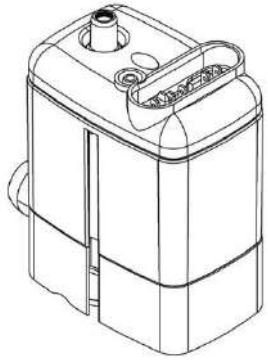
The optional is not compatible with “4301 Humidifier” and “A430 Electric Heaters”.
These devices are suitable for low voltage systems with interruption of the supply to the load during transfer.

OPEN TRANSITION TYPE TRANSFER SWITCH WITH A MINIMUM INTERRUPTION OF THE SUPPLY DURING TRANSFER.

To maintain the microprocessor powered and avoid its restarts it is suggested the “P091 Back-up module controller” optional accessory. The back-up module guarantees the microprocessor power supply for a few minutes, in case of supply voltage failure.

The remote condenser must be powered by the automatic transfer switch.
It is suggested the optional “P191 power supply for condenser” from the indoor machine electrical board.
The optional includes magnetothermic switches for condenser fans.

OPTIONAL ACCESSORIES: A381 - CONDENSATE DISCHARGE PUMP



A plastic case contains the pump motor, the thermal protection with automatic reset, the float with the trigger threshold and alarm threshold overflow and hydraulic and electric connection.
Together the pump 4 linear meters of rubber discharge tube is supplied.
Wiring includes power supply and an alarm signal displayed on microprocessor.
The condensate discharge pump operation is fully automatic.

The pump is placed in the condensate tray on the bottom unit side.

TECHNICAL DATA

Power supply		230/1/50
Power input	W	14
Discharge pipe	Ø mm	6x9
Maximum water flow	l/h	20
Discharge head:		
- With minimum water flow		mH_2O 14(*)

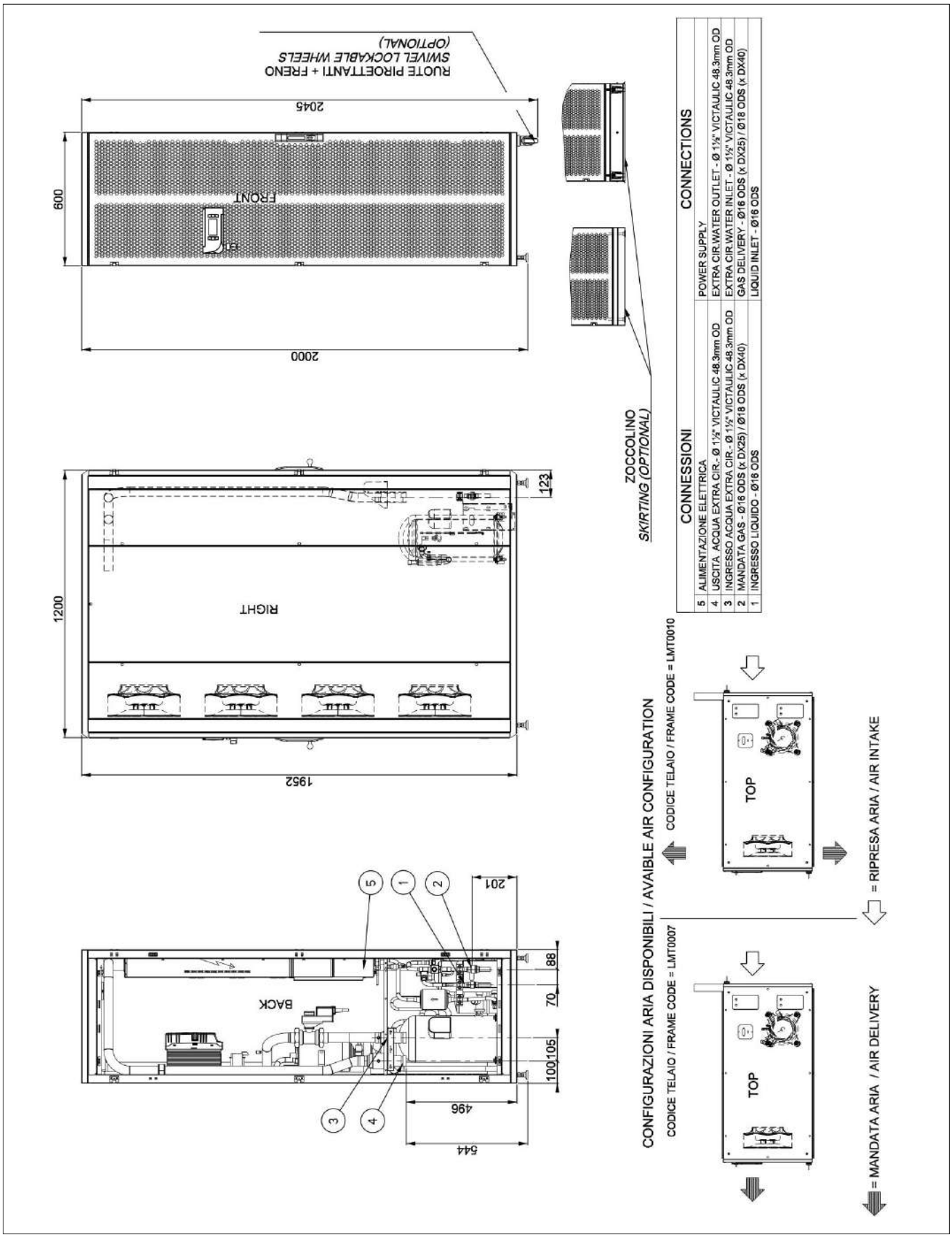
(*) with water flow 0 l/h

CONDENSATE DISCHARGE PUMP PERFORMANCE

Vertical discharge tube length	Water flow rate (l/h)
0m	20
2m	16
4m	11,5

MACHINE DRAWINGS

Dimensions in mm



CLIMAVENETA®

MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

Via Caduti di Cefalonia, 1 - 36061 Bassano del Grappa (VI) Italy
Ph. (+39) 0424 509 500 • Fax (+39) 0424 509 509
www.melcohit.com