

# COOLSIDE

INROW precision air cooling units

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Smart Cooling for Data Center



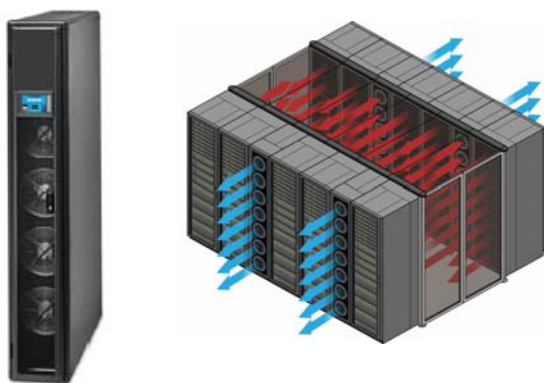




# COOLSIDE

## INROW precision air cooling units

COOLSIDE INROW precision air conditioner unit joins the efficiency of a new Direct Expansion system with the use of the high efficiency scroll compressor technology and the latest brushless DC electric motor. Good performance and high efficiency are the result of the adoption of advanced technologies. The system sucks hot air directly from the rear side of the racks, and, once cooled, enters it in the front or left and right of the rack. Thanks to the "closed" cooling system the electronic equipment contained in racks do not require fans for air circulation.



COOLSIDE with Hot or Cold aisle containment benefit:

- Separates supply and return airflow which provides a uniform and predictable to both IT temperature and AC equipment.
- Eliminates hot and cold air mixing.
- Increases cooling capacity up to 20%
- Saves energy and improves data center cooling efficiency.
- Reducing hot spots.
- Increasing savings if power consumption continues to grow.
- Reducing carbon footprint.
- Improving the power usage effectiveness (PUE)

COOLSIDE with Micro controller & LCD monitor

- 7" LCD touch screen.
- 2 level password setting.
- Control speed fan by manual or automatic.
- History alarm logging.
- Communication with MODBUS Protocol
- Basic information screen ( Temperature & Humidity graph).
- Temperature setting +/-0.1%.
- Humidity setting +/-1%.
- Alarm by Temperature high-low, Humidity high-low
- Filter Life Time, Leak Alarm, Smoke alarm, etc.
- Start/Stop, Temperature and Humidity setting.
- Master/slave mode rotation time setting.



COOLSIDE with high efficiency scroll compressor.

- HERMETIC SCROLL compressors.
- thermal overload protection and Rotolock fittings.
- Fitted on rubber vibration dampers and complete with oil charge.
- High efficiency Copeland Scroll compressors.
- High COP and EER.

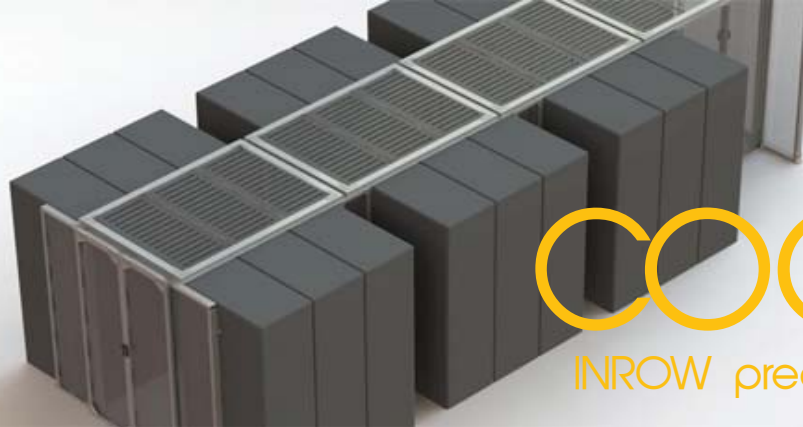
COOLSIDE with high efficiency fin heaters.

- Electric heaters 2 or 3 (optional) step is divided into a number of elements, each with a power of 1.5 or 3 kW.

COOLSIDE with high efficiency humidifier.(option)

- the air-conditioning unit can be fitted with an immersed electrode humidifier 3kg or 6kg.





# COOLSIDE

## INROW precision air cooling units

### REFRIGERANT CIRCUIT

- Liquid separator on suction line.
- Oil separator on delivery line with oil recovery capillary hose. (option)
- Check valve on gas delivery.
- Liquid receiver.
- Filter dryer on liquid line.
- Sight glass.
- Pressure transducers control and protection functions, on low and high refrigerant pressure.
- High pressure safety switch with manual reset.
- Refrigerant circuit with copper tubing with anticondensate insulation of the suction line.
- Thermal expansion valve.
- Refrigerant pressure transducer for expansion valve. (option)
- Refrigerant temperature sensor for expansion valve. (option)
- Refrigerant circuit with copper tubing with anticondensate insulation.
- Rotalock valves on liquid and suction line placed on bottom side of the unit.
- R 410A refrigerant charge.



**COOLSIDE** used R-410A refrigerant represents the most modern and look-ahead choice in refrigerant technology: it clearly contributes to make the ICT GREEN since it complies with environmental friendly policies and provide enhanced cooling efficiency. The R-410A represents the most efficient long-term solution; it contributes to increase the energy efficiency up to 5-6% compared to the R-407c refrigerant, avoiding air pollution.



### **COOLSIDE** with Electronic expansion valve control (EEV): (option)

- The valves wide adjustment range, it is possible to ensure the best cooling circuit operation even in the presence of varying thermal loads and under partialisation conditions of the cooling capacity delivered by the circuit.
- Efficiency by more than 40% compared to a system provided with a mechanical thermostatic expansion valve (TEV).

### **COOLSIDE** Fan technology

#### EC fans backward curved

- DC centrifugal fans with backward-curved blades are used primarily for intake suction.
- EC fan is driven by brushless DC motor.
- Fan speed can be adjusted directly from the user terminal in order to modify air flow volume or ESP
- Further noise level reduction 4-5 dB.
- Saves energy and efficiency up to 30%.
- Speed fans control by temperature ( hot air from back side of the unit).
- Impeller material is propylene with propylene with glass-fiber reinforced.
- Polymeric ultralight with soft start.
- Easily of maintenance.



#### EC axial fans (optional)

- DC axial fan is driven by brushless DC motor.
- Fan speed can be adjusted directly from the user terminal in order to modify air flow volume or ESP
- Reduced fan speed the noise produced by an axial fan can be kept at a minimum.
- Saves energy and efficiency up to 20%.
- Speed fans control by temperature ( hot air from back side of the unit).

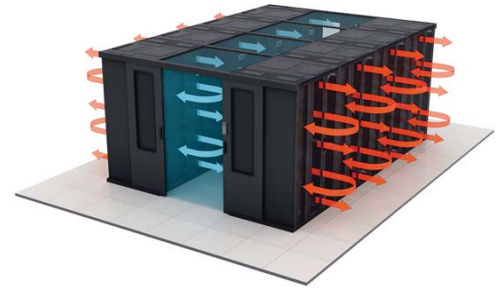


# COOLSIDE

INROW precision air cooling units

## STRUCTURE INDOOR UNIT

- Framework 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.
- Holders for unit height adjusting.
- Colour RAL 9005 (black) textured.



## AIR-SOURCE HEAT EXCHANGER

- Finned coil with large frontal surface area, made from mechanically expanded tubes and aluminium fins with hydrophilic treatment and high heat transfer area.
- The coil is placed upstream of the fans for optimum air distribution
- Panels in galvanized steel sheet externally painted with epoxy powders and internally insulated with noise absorption material.
- Holders for unit height adjusting.
- Colour RAL 9005 (black) textured.

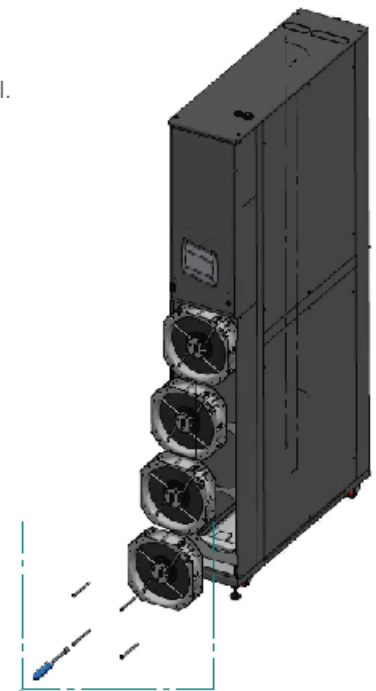
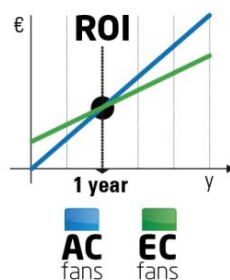
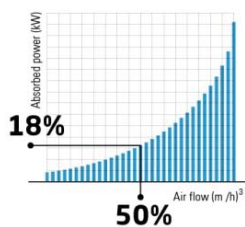
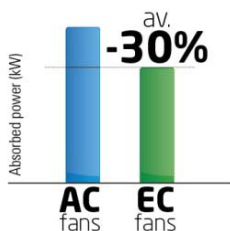
## ELECTRICAL PANEL & CIRCUIT

- The microprocessor, by managing the compressor for the direct expansion unit.
- Built and wired in compliance with IEC 204-1/EN60204-1 standards, complete with fan contactor and overload protection.
- Heater overload protection.
- Unit overload protection.
- Compressor overload protection.
- Built in surge power line protection.
- Separation DC power supply of EC fan with backward curved or Brushless DC- Axial fan ,Water leak, smoke sensor, LCD monitor for easy maintenance.

## FILTER SECTION

- Washable air filters with G2 efficiency, with cells in synthetic fibre, on air suction panel.
- Differential pressure switch on the air side for clogged filters signal.
- Filters with G4/EU4 (optional).

## COMPARISON OF AC AND EC FAN



## HOT SWAPPABLE FANS

- Hot swappable AC or EC fans from the front side.
  - Easy maintenance and removing.
  - Separated one power supply for dual fans.
  - N+1 dynamic management, operation at reduced flow-rate to optimise power consumption.
- Moreover, in the event of a fault on one fan, the other fans are operated at maximum speed to ensure the same cooling performance.



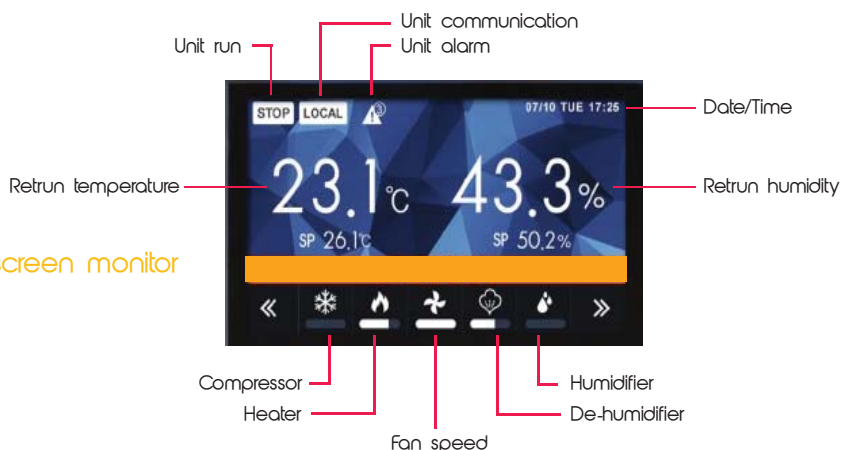
# COOLBASE

INROW direct expansion cooling units

## Alarm function

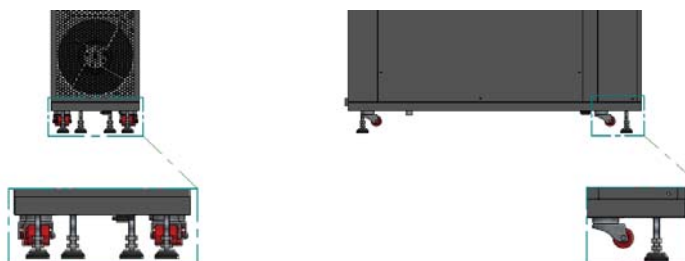
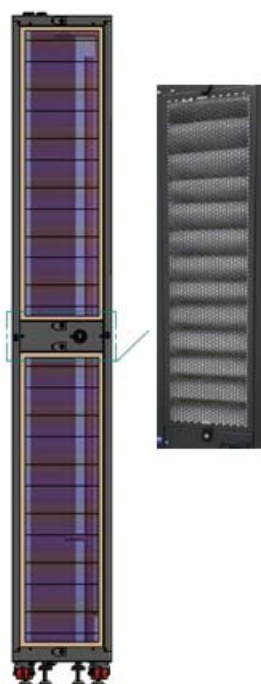
- Temperature high-low.
- Humidity high-low.
- Filter dirty.
- Water leak.
- Smoke detector
- Pressure high-low.
- Compressor current

## LCD touchscreen monitor



## Filter function

- G2/G4 efficiency according to CEN-EN 779 standard with average separation efficiency 90.1% ASHRAE (G4).
- Clogged sensor.
- Easy maintenance and removing on back side.
- Two air filter plate.

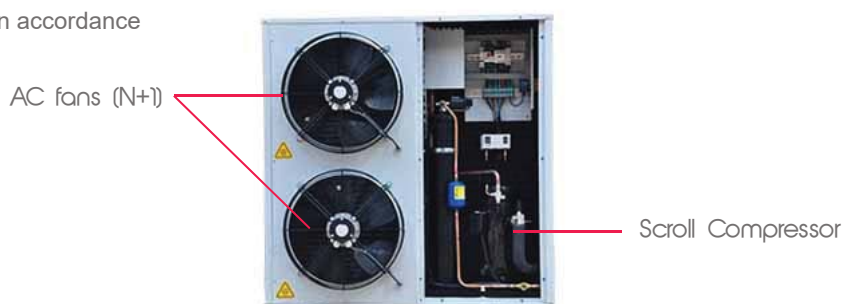


## Simplified handling

- Wheels allow the right and simply positioning of the unit in between racks.
- Once the unit has been positioned, adjustable feet can be unscrewed so to have a stable positioning for the unit on the floor and to adapt it to the height of the racks.

## Remote condensing unit

- High efficiency hermetic scroll compressor in outdoor unit for easy maintenance.
  - Powder coated metal plate base panelling and inside structure.
  - Made using copper tubes mechanically expanded onto aluminium fins with a high heat exchange area.
  - External impeller axial-flow fans, statically and dynamically balanced at low speed.
  - N+1 dynamic management, operation at reduced flow-rate to optimise power consumption.
- Moreover, in the event of a fault on one fan and easy to removing to maintenance.
- The unit comes with a protection grill on the condenser coil.
  - Power and control electrical panel constructed in accordance with IEC 204-1/EN60204-1,
  - Outdoor switch unit for emergency stop.
  - Next generation of AC fans for low noise.



# Win!



**40% FASTER COOLING**



# COOLSIDE

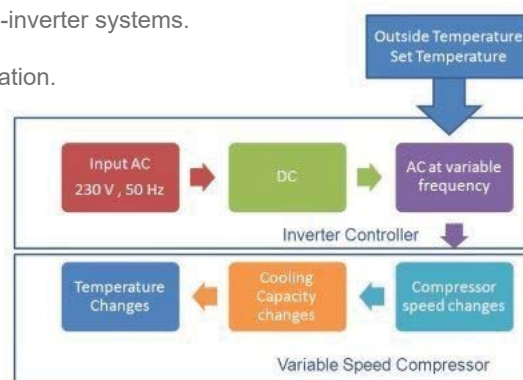
INROW precision air cooling units

**COOLSIDE model I series.** In the context of air conditioning, an inverter regulates voltage, current and frequency to control the operation of the air conditioning compressor, thereby also controlling the output of the unit. Essentially, it is a very sophisticated form of speed control – the higher the frequency the more the compressor works and the greater the output of the air conditioning. Similarly, the lower the speed of the compressor the lower the output of the conditioner.

It is the exceptional control provided by DC inverters that enables these air-conditioners to be highly responsive to changes of temperature in the space whilst delivering excellent energy efficiency.

## The Benefits Of DC Inverter Technology

- Faster response to variable heating and cooling loads.
- Significantly reduced running costs (up to 30% saving) compared to non-inverter systems.
- Improved comfort as set-point temperatures are achieved more quickly.
- Improved maintenance of design conditions with less temperature fluctuation.
- Lower noise levels, both inside and outside the building.
- Eliminates voltage peaks from compressor.
- Reduced risk of electromagnetic interference with other equipment.
- Completely sensible load (SHR=1).
- High heat removal on small footprint.
- High installation flexibility.
- Modular type.



## How does an inverter air conditioner work?

In an inverter Air Conditioner, the compressor and controller are different from normal non-inverter AC. The heart of Inverter AC is a variable speed compressor. This is driven by a control system which varies the speed of compressor by changing the AC frequency as per the heat load. Cooling capacity changes with varying compressor speed as per the heat load.

To be able to vary the frequency of power input, the controller first converts the AC power input to DC power. Thereafter based on the ambient temperature and heat load, the controller varies the AC frequency of power to compressor. This frequency variation changes the compressor speed and results in cooling capacity changes.

## Inverter drive for DC Inverter compressor

the inverter (variable frequency drive) in these compressors generates three phases, with the frequency for each phase being fully adjustable below or above the average of 50/60 Hz normally used in the power grid. When the frequency is changed, the speed and, therefore, the rotations per minute, are also altered. For example, the electronic controller selects a speed between 1000 rpm and 4000 rpm but this will be different in every electro mechanical system. In addition, the speed that a compressor sets can also alter its cooling capacity. Aside from a compressor's speed and capacity settings, it is also important to know about the relevant variable frequency drive (inverter) components. In the case of a variable speed compressor, the inverter is a small electronic unit with an input of 115/230 Vac (Voltage AC). The input is converted into three phases with efficiency levels being measured as high as 98 percent.





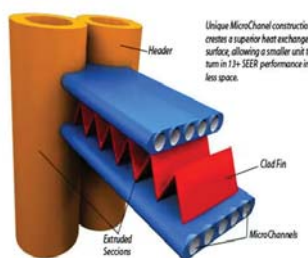


**COOLSIDE model X series** used the state of art to designed a high efficiency for INROW air conditon by microchannel condensers and evaporators significantly improve HVAC systems performance. the unit can save more than 30% energy and easy to repair compared to the use of old technology.

## What are microchannel aluminum coils technology for next-generation HVAC?

Microchannel coils are all aluminum coils with multiple flat tubes containing the microchannels through which refrigerant flows. Heat transfer is maximized by the insertion of angled or louvered fins inbetween the flat tubes. The components are joined together into a single coil using a controlled atmosphere brazing furnace. Product quality and integrity are maximized since only one braze is required compared to 50 plus manually brazed connections with traditional copper/aluminum coils.

High efficiency by \*\*  
Microchannel technology  
30% for energy saving



## Features to Increased efficiency

- Thermal performance is significantly better than a standard aluminum fin and copper tube coil due to higher air-side heat transfer, higher refrigerant-side heat transfer, and high fin-to-tube surface contact.
- Reduced size and weight.
- Increased efficiency results in the possibility to reduce surface sizes for same performance.
- Up to 40-60% less refrigerant charge.
- More than 30-40% higher HT efficiency.
- Up to 30% lower airside DP.
- Less material is used per coil which is also easier to recycle and reuse.
- The single-row coil design with smaller volume also contributes to lowering refrigerant volume from 20 up to 50%
- Corrosion Protection.
- The rate of the corrosion of the aluminum fins in the microchannel coil is lower than that of the standard copper tube, aluminum fin plate coil due to the material differences within the two designs.
- Minimum galvanic corrosion (100% Aluminum).
- The construction of the coil inherently leads to a more durable coil that is less likely to be damaged. In addition, the single row coil design provides a significant weight reduction opportunity.

## Easier to clean - Microchannel coils are easy to clean

You can actually wash the Microchannel coils with a high pressure sprayer without bending the fins – with a tube and fin coil that would bend all the fins flat! Now you have an opportunity to add condenser coil cleaning to your maintenance contracts; you can easily clean a coil to like-new condition in less than 10 minutes with a pressure spray; there is no other coil that is this easy to clean.



# COOLSIDE

INROW precision air cooling units



Front discharge

Left-Right discharge

COOLSIDE has 5 models of air conditioning system for customers to choose according to their suitability.

Model COOLSIDE C series used copper coils with Copeland Scroll Compressor.

- this model is economy air condition system for server room.
- cheap, easy to maintenance and installation.

Model COOLSIDE CX series used micro channel coils with Copeland Scroll Compressor.

- energy saving more than 20% comparison of aluminium fin coil with Scroll Compressor
- sizing less more than 20% comparison of aluminium fin coil.
- easy to maintenance and installation.

Model COOLSIDE iC series used copper coils with DC inverter Compressor.

- energy saving more than 40% comparison of copper fin coil with Scroll Compressor.
- sizing less more than 20% comparison of aluminium fin coil.

Model COOLSIDE iCX series used micro channel coils with DC inverter Compressor.

- energy saving more than 40% comparison of aluminium fin coil with Scroll Compressor.
- sizing less more than 20% comparison of aluminium fin coil.

Model COOLSIDE iCX-R series used micro channel coils with DC inverter Compressor.

- energy saving more than 40% comparison of aluminium fin coil with Scroll Compressor.
- sizing less more than 20% comparison of aluminium fin coil.
- EC fan on remote condensing unit for energy saving and powerful of transfer heat to air.

COOLSIDE has 5 types of air flow systems for efficient air flow to the equipment.

Model COOLSIDE /F

- Air flow for front release means that the air is sucked from the hot air from the back of the rack cabinet and the cool air from the front air conditioner is directly.

Model COOLSIDE /R

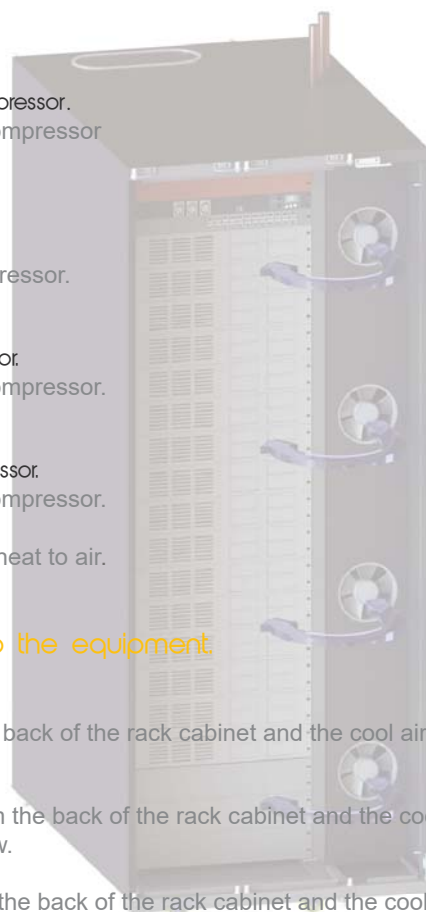
- Air flow for right side release means that the air is sucked from the hot air from the back of the rack cabinet and the cool air from the right side of air conditioner to the equipment that want direct of air flow.

Model COOLSIDE /L

- Air flow for left side release means that the air is sucked from the hot air from the back of the rack cabinet and the cool air from the left side of air conditioner to the equipment that want direct of air flow.

Model COOLSIDE /RL

- Air flow for left and right side release means that the air is sucked from the hot air from the back of the rack cabinet and the cool air from the left and right side of air conditioner to the equipment that want direct of air flow.







# COOLSIDE

INROW precision air cooling units



## C/CX series

C series is scroll compressors, copper fin coil on remote condensing unit.

CX series is scroll compressors, microchannel coil on remote condensing unit.

Standard G2 or G4 filtering section, F5-F8 optional, under CENEN 779 rule with the separation degree 90,1% ASHRAE.

Maximum resistance to rust thanks to galvanised sheet metal structures and panels with powder-coated paint finish.  
The panels are lined with sound-insulating material.

Ductable close control air-conditioners with capacities ranging from 12 to 26 kW for vertical installation and cooling only, with optional heating by means of heating element or hot water, optional humidifier and dehumidifier for precise temperature and humidity control. Particularly suitable for air-conditioning technological, server and CED rooms and all technological applications in general.

## COOLSIDE ECO SERIES (technical specification)

Model	C/CX-40	C/CX-60	C/CX-90
Indoor unit			
Power Supply	220/230V-1N-50/60Hz	380/400V-3N/50H/60Hz	380/400V-3N/50H/60Hz
Total Cooling Capacity(KW)	12.16	17.15	25.20
Sensible Cooling Capacity(KW)	11.8	16.64	24.19
Refrigerant	R410a	R410a	R410a
Power abs compressor(A)	19.8/1P	9.8/3P	14.4/3P
SHR	0.97	0.97	0.96
Air flow rate (m <sup>3</sup> /h)	1,878	2,504	3,630
No. of EC fans (backward curved)	3	4	5
Air flow rate (m <sup>3</sup> /h)	2,799	3,732	4,665
No. of EC fans (axial)	3	4	5
Indoor unit HxPxL, mm	300x1200x2050	300x1200x2050	300x1200x2050
Heat capacity(kw)	1.5	3	3
Heat step	2	3	3
Humidifier capcity(kg/h):option	3	3	6
Surge protection	Yes	Yes	Yes
Water leak/ Smoke sensor	Option	Option	Option
Outdoor unit			
Outdoor unit HxPxL, mm	1000x550x1450	1200x550x1450	1700x550x1450
No. of Axial fans	2	2	2

\*\* Performances at the following conditions: 46°/16% UR. and 35°C outdoor air temperature.

\*\* Hot gas reheat for ECO heater is available.



**Inverter  
Scroll Compressor**  
66cc/rev compressor

# COOLSIDE

DC inverter compressor air cooling units



**THE  
BENEFITS OF  
DC INVERTER  
TECHNOLOGY**



Smart Inverter  
Compressor

**Saves Energy Upto 36%\***



## iC/iCX/iCX-R series ( air cooled )

iC series is DC inverter compressors, copper fin coil on remote condensing unit.  
iCX series is DC inverter compressors, microchannel coil on remote condensing unit.  
iCX-R series is DC inverter compressors, microchannel coil, EC fan on remote condensing unit.

Standard G2 or G4 filtering section, F5-F8 optional, under CENEN 779 rule with the separation degree 90,1% ASHRAE.

Maximum resistance to rust thanks to galvanised sheet metal structures and panels with powder-coated paint finish.  
The panels are lined with sound-insulating material.

Ductable close control air-conditioners with capacities ranging from 12 to 26 kW for vertical installation and cooling only, with optional heating by means of heating element or hot water, optional humidifier and dehumidifier for precise temperature and humidity control.

Complete sensible load (SHR=1).  
HOT SWAPPABLE' EC fans from the front.  
New generation EC brushless fans ultralight.  
The electronic thermostatic valve: it allows to improve the inverter compressor performance, and the frigorific cycle optimisation (option).

## COOLSIDE NEXT GENERATION SERIES (technical specification)

Model	iC/iCX/iCX-R-40		iC/iCX/iCX-R-60		iC/iCX/iCX-R-90	
Indoor unit						
	Min	Max	Min	Max	Min	Max
Power Supply	220/230V-1N-50/60Hz		380/400V-3N/50H/60Hz		380/400V-3N/50H/60Hz	
Total Cooling Capacity(KW)	10.63	4.72	16.59	6.78	28.62	11.76
Sensible Cooling Capacity(KW)	10.63	4.72	16.59	6.78	28.62	11.76
Refrigerant	R410a		R410a		R410a	
Power abs compressor(A)	2.68/1P	0.73/1P	4.65/3P	1.15/3P	7.4/3P	1.18/3P
SHR	1		1		1	
Air flow rate (m³/h)	1,878		2,504		3,630	
No. of EC fans (backward curved)	3		4		5	
Air flow rate (m³/h)	2,799		3,732		4,665	
No. of EC fans (axial)	3		4		5	
Indoor unit HxPxL, mm	300x1200x2050		300x1200x2050		300x1200x2050	
Heat capacity(kw)	1.5		3		3	
Heat step	2 or 3		3		3	
Hmidifier capcity(kg/h):option	3		3		6	
Surge protection	Yes		Yes		Yes	
Water leak/ Smoke sensor	Option		Option		Option	
Outdoor unit						
Outdoor unit HxPxL, mm	1000x550x1450		1200x550x1450		1700x550x1450	
No. of Axial fans	2		2		2	

\*\* Performances at the following conditions: 46°/16% UR. and 35°C outdoor air temperature.

\*\* Hot gas reheat for ECO heater is available.



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