

Refra[®]

KK Series units

Condensing unit for low and medium temperature



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KK Series units

Condensing unit for low and medium temperature
With scroll compressors

Low temperature application capacity range
from 10 kW to 38 kW



Medium temperature application capacity range
from 20 kW to 55 kW



FUNCTIONS AND FEATURES



Cooling



Scroll



R404A



R507A



Air cooled



UNIT DESCRIPTION

KK series air cooled condensing units are designed specially for medium and low temperature applications in foodservice or processing, supermarket MT< cabinets or food warehousing.

Our units are equipped with low noise and high energy efficiency scroll compressors specially designed for medium and low temperature applications. KK series units has wide variety of options which improves unit work and provides reliable operation.

For cooling capacity modulation from 10% to 100% we offer digital scroll compressor with no operating envelope restriction if compare with standard scroll compressor. EC axial fans could be used instead of AC axial fans to improve energy efficiency.

Our units are made specially for outdoor installation as compressor compartment is fully housed. KK series units has primed and polymer powder coated housing so it leads to good appearance and long life. All units could be rooftop or ground installed and has antivibrating mounts.

BASIC UNIT EQUIPMENT:

- > Scroll compressors with Rotalock shut-off valves and crankcase heaters
- > Oil separator receiver with electronic oil management system, oil line filter, liquid indicator and check valve on discharge line
- > Epoxy coated fin copper tube condenser equipped with HyBlade axial fans
- > Horizontal liquid receiver with single pressure relief valve, Rotalock shut-off valves and sight glasses
- > Discharge and suction line copper headers
- > Insulation on suction line
- > Polymer powder coated steel frame with compressor compartment housing, sound insulation, condensed protection grid and antivibrating mounts
- > Electrical board includes: Dixell/ Eliwell controller, phase rotation and phase loss monitoring relay, compressor and fan contactors, circuit breakers thermal overload relays and main switch.

| MT Unit Technical data | | | | | | | | | | |
|---|----------------------|-------------------|------------|---------|------------|------------|---------------|---------------|------------------|--------------------------------|
| KKMS1 | | 231900A | 232700A | 331900A | 332700A | 431900A | 432700A | 531900A | 432700A | 532700A |
| Cooling capacity ^[1] | kW | 20,00 | 24,20 | 27,36 | 32,85 | 37,28 | 43,80 | 45,60 | 48,20 | 55,25 |
| Unit power consumption | kW | 10,25 | 12,70 | 16,09 | 20,56 | 21,24 | 27,60 | 27,43 | 26,08 | 34,88 |
| EER | | 1,95 | 1,91 | 1,70 | 1,60 | 1,76 | 1,59 | 1,66 | 1,85 | 1,58 |
| Compressor | Type | Scroll | | | | | | | | |
| | Quantity | n° | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 |
| Condenser | Fans | n° | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 |
| | Surface area | m ² | 116,2 | 116,2 | 116,2 | 116,2 | 123,8 | 123,8 | 172,0 | 172,0 |
| | Air flow | m ³ /h | 12900 | 12900 | 12900 | 12900 | 20250 | 20250 | 22000 | 22000 |
| Connections ^[3] | Suction line | mm | 35 | 35 | 42 | 42 | 42 | 54 | 54 | 54 |
| | Liquid line | mm | 22 | 22 | 22 | 22 | 28 | 28 | 28 | 28 |
| System | Refrigerant | R404A/R507A | | | | | | | | |
| | Capacity range | % | 50/100 | 50/100 | 33/66 /100 | 33/66 /100 | 25/50 /75/100 | 25/50 /75/100 | 20/40/60 /80/100 | 25/50 /75/100 20/40/60 /80/100 |
| Electrical characteristics ^[4] | Power supply | V/Ph/Hz | 400/3+N/50 | | | | | | | |
| | Max. running current | A | 29,00 | 35,00 | 42,00 | 51,00 | 57,00 | 68,00 | 71,00 | 69,00 85,00 |
| | Inrush current | A | 93,00 | 114,00 | 106,00 | 130,00 | 121,00 | 147,100 | 135,00 | 149,00 164,00 |
| Sound pressure ^[5] | STD | dB(A) | 48,60 | 49,90 | 48,90 | 51,30 | 50,90 | 52,20 | 52,50 | 54,80 55,70 |
| Length | | mm | 1905 | 1905 | 1905 | 1905 | 2400 | 2400 | 2900 | 2900 |
| Width | | mm | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 |
| Height | | mm | 2150 | 2150 | 2150 | 2150 | 2050 | 2050 | 1900 | 1900 |
| Transportation weight ^[6] | | kg | 610 | 620 | 675 | 690 | 735 | 755 | 850 | 790 870 |

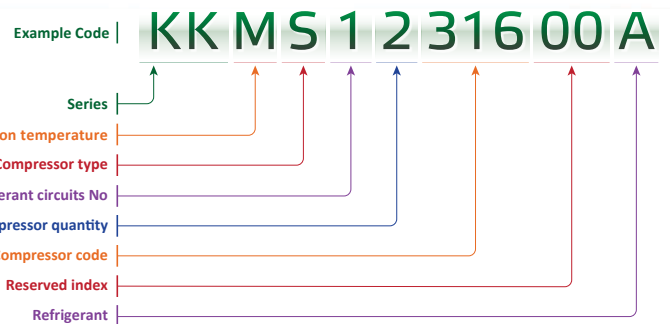
| LT Unit Technical data | | | | | | | | | | |
|---|----------------------|---------|-------------|---------|-----------|---------|------------|-----------|------------|---------------|
| KKLS1 | | | 334600A | 233700A | 333800A | 233800A | 333700A | 333800A | 333900A | 433800A |
| Cooling capacity ^[2] | | kW | 10,32 | 14,50 | 15,12 | 19,08 | 21,60 | 29,10 | 34,95 | 38,52 |
| Unit power consumption | | kW | 11,19 | 12,73 | 17,43 | 18,33 | 20,69 | 27,53 | 33,63 | 37,56 |
| EER | | | 0,92 | 1,14 | 0,87 | 1,04 | 1,04 | 1,06 | 1,04 | 1,03 |
| Compressor | Type | | Scroll | | | | | | | |
| | Quantity | n° | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 4 |
| Condenser | Fans | n° | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 |
| | Surface area | m² | 116,2 | 116,2 | 116,2 | 116,2 | 123,8 | 123,8 | 172,0 | 172,0 |
| | Air flow | m³/h | 8500 | 8500 | 8500 | 8500 | 20250 | 20250 | 22000 | 22000 |
| Connections ^[3] | Suction line | mm | 42 | 54 | 54 | 54 | 54 | 64 | 64 | 64 |
| | Liquid line | mm | 18 | 22 | 22 | 22 | 22 | 28 | 28 | 28 |
| System | Refrigerant | | R404A/R507A | | | | | | | |
| | Capacity range | % | 33/66/100 | 50/100 | 33/66/100 | 50/100 | 33/66 /100 | 33/66/100 | 33/66 /100 | 24/50 /75/100 |
| Electrical characteristics ^[4] | Power supply | V/Ph/Hz | 400/3+N/50 | | | | | | | |
| | Max. running current | A | 28,00 | 30,00 | 78,00 | 53,00 | 53,00 | 83,00 | 93,00 | 107,00 |
| | Inrush current | A | 90,00 | 120,00 | 156,00 | 129,00 | 142,00 | 162,00 | 185,00 | 184,00 |
| Sound pressure ^[5] | STD | dB(A) | 49,60 | 51,30 | 53,80 | 52,40 | 54,30 | 55,20 | 56,30 | 57,10 |
| Length | | mm | 1905 | 1905 | 1905 | 1905 | 2400 | 2400 | 2900 | 2900 |
| Width | | mm | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 |
| Height | | mm | 2150 | 2150 | 2150 | 2150 | 2050 | 2050 | 1900 | 1900 |
| Transportation weight ^[6] | | kg | 582 | 553 | 642 | 592 | 680 | 760 | 795 | 870 |

Note:

- [1] Calculations made due to -10 C evaporating, 10 K suction gas superheat, 0 K liquid subcooling and +32 C ambient air temperatures
- [2] Calculations made due to -35 C evaporating, 10 K suction gas superheat, 0 K liquid subcooling and +32 C ambient air temperatures
- [3] Calculated according to 20 m liquid and suction pipelines length
- [4] Calculation based on compressor and fan data only, data preliminary
- [5] Sound pressure level calculated at 10 m distance in a free field according to ISO 3344:2010
- [6] Preliminary basic unit equipment weight

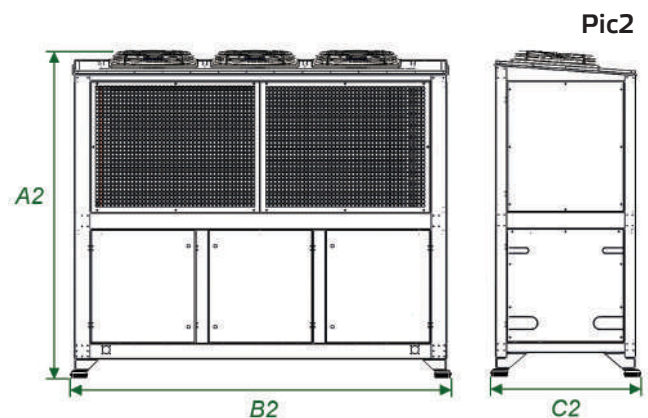
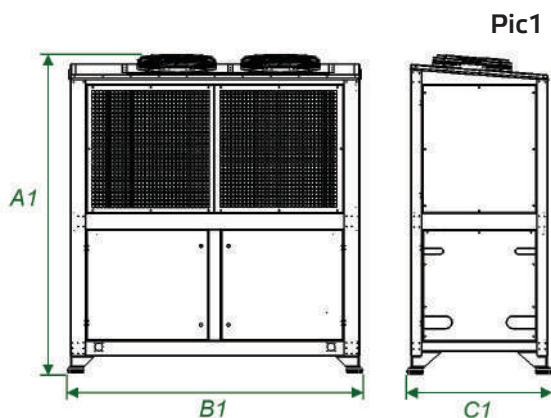
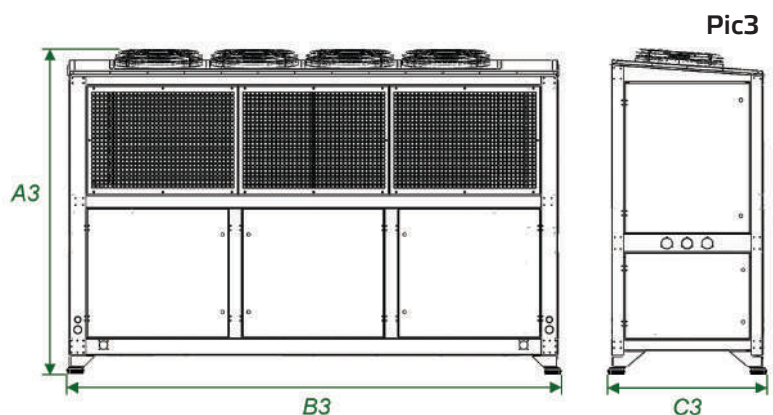
ADDITIONAL OPTIONS

- > Digital scroll compressor with Rotolock valves, crankcase heater and built-in check valve on discharge line
- > Pressure limiters for each compressor on high/low pressure sides
- > Sound jacket for each compressor
- > Oil management system replacement by oil equalizing line
- > Condensing pressure regulator on discharge or condensing lines
- > Discharge line muffler
- > Desuperheater with 3 shut-off valves
- > Check valve on condensing line
- > Double safety valve on liquid receiver
- > Receiver liquid level monitoring
- > Replaceable core filter drier, moisture indicator and ball valve on liquid line
- > Ball valve on suction line
- > Suction line accumulator
- > Replaceable core filter drier on suction line
- > Carel/Danfoss controller instead of Dixell/Eliwell controller
- > Fan speed controller
- > EC fans instead of AC axial fans



DIMENSIONS AND CLEARANCES

| Picture nr. | Pic1 | Pic2 | Pic3 |
|-------------|------|------|------|
| A (mm) | 2150 | 2050 | 1900 |
| B (mm) | 1905 | 2400 | 2910 |
| C (mm) | 900 | 900 | 900 |



KK MAC ON ZB ADDITIONAL OPTIONS DESCRIPTION

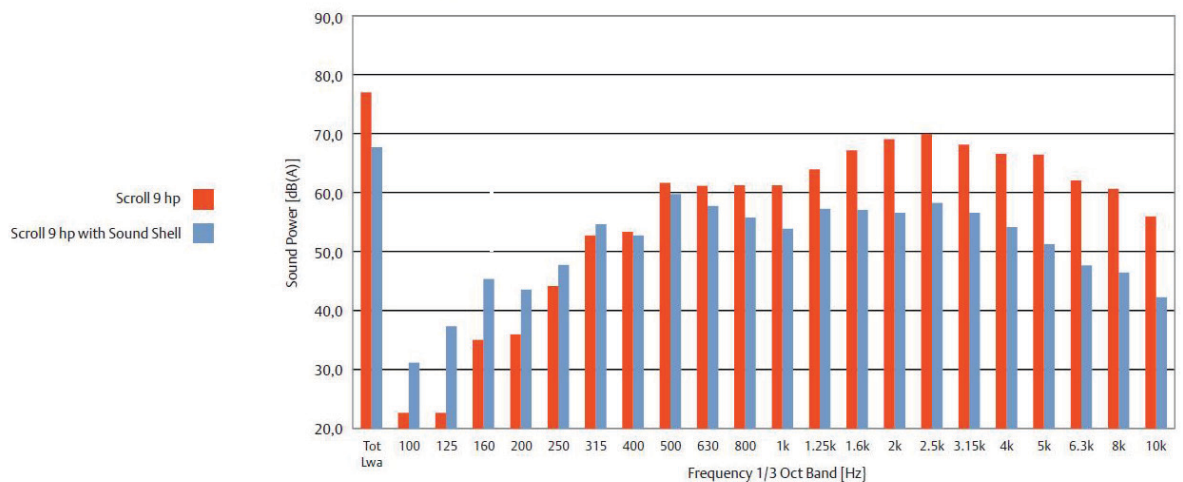


Sound Jacket - SJ

Copeland scroll compressors could be equipped with ground-breaking sound shells that provide outstanding sound reduction benefits:

- > 10 to 12 dBA sound attenuation
- > Removes the need to acoustically insulate the full cooling unit with associated cost reduction
- > Uncompromised compressor operation, performance, reliability
- > Ideal for sound sensitive applications such as urban shops and retailers in residential areas

Sound power with and without sound shell

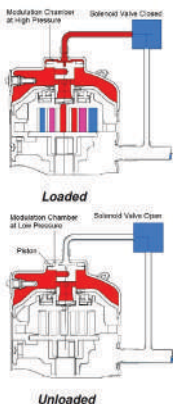


EC fans - EC

EC stands for Electronically Commutated which means it's a fan with a permanent magnet motor (PMM).

EC fans are generally recognised as being the latest thing in energy efficient air movement technology:

- > Can use as little as 30% the energy of industry standard fans
- > Offer easy, quiet, efficient speed control
- > Have all the electronics built into the fan
- > Make your other components more efficient
- > Saves your money

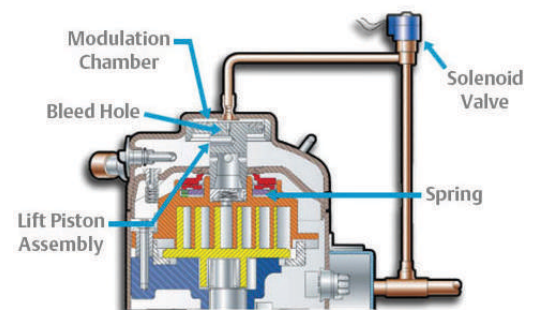


Digital scroll compressor - D

The Copeland Scroll Digital™ compressor utilizes axial scroll compliance, causing compression of the refrigerant to stop without stopping the compressor motor. In this "unloaded" state, the compressor output is at 0% capacity. When the scrolls are engaged in the "loaded" state, compressor output is at 100% capacity.

Copeland Scroll Digital compressors offer:

- > Precise, infinite capacity modulation from 10%–100%
- > Simple, variable modulation, for temperature control within 0.5°C
- > Reduced power consumption — up to 30% more efficient than using hot-gas bypass
- > Make your other components more efficient
- > longer cycle times to reduce wear and improve humidity control





Desuperheater - DH

Refrigeration plants with air-cooled condensers produce a lot of waste energy by dumping the condensation energy to the ambient air. By installing a CBE desuperheater, a large portion of this waste energy can be turned into hot water that may be used for many purposes such as:

- > Sanitary hot water
- > Room heating
- > Hot water for processes
- > Cleaning water



Condensing pressure regulation - K/K1

Condensing pressure regulators are used to prevent the condensing temperature in a refrigeration system from dropping too low, especially during cold weather.

- > Accurate, adjustable pressure regulation
- > Pulsation damping design
- > Wide capacity and operating range



Fan speed controller - FSC

The purpose of a condenser fan speed controller is to keep the condensing pressure in a compression refrigerating plant always at a constant level. This is achieved by adjusting the fan speed. When the condensing pressure in the system increases, the speed of the fan is increased. When the pressure decreases, the speed of the fan speed is reduced.



Liquid level monitoring - LL

The optical level switch has been designed for use in level monitoring applications for the control of the liquid presence/absence.



Check valve on discharge or condensing line - CHD/CHC

Hermetic scroll compressors require a check valve located in the discharge passage (CHD) to prevent the compressor from running as an expander due to the reversed pressure differential upon stopping. CHC protects system during cold periods from unwanted refrigerant migration from warmer receiver to colder condenser.



Liquid and suction line filters - FD/SF

When installed on liquid line provides refrigerant filtering, drying and acid neutralization (FD). Installation on suction line provides cleaning, decontamination and protection of the system (FD).



Ball valves on liquid and suction lines - BL/BS

Refrigeration ball valve isolates suction and liquid line pipework during maintenance shutdown periods and it comes with access valve.



Dual pressure relief valve with changeover device - PL

This option allows the user to work on the isolated valve, for periodic checking or replacement, while the system is completely operative and the other valve is in service.



Liquid and oil line sight glass - SG/OSG

Liquid and moisture indicators ensure fast and safe inspection of the regular refrigerant fluid flow or oil return to the compressor crankcase.



Oil return line filter - OF

Removes system debris from the refrigerant oil. Their purpose is to protect compressors and oil level regulators from damage.



Electronic oil level control - OL

This type of oil level control system calls active because provides oil level monitoring and balancing.



Suction line accumulator - SA

Suction line accumulator protects the compressors against an accidental return of refrigerant in its liquid phase, by the suction pipes, which could cause a "liquid hammer" with a risk of mechanical destruction of the compressor.