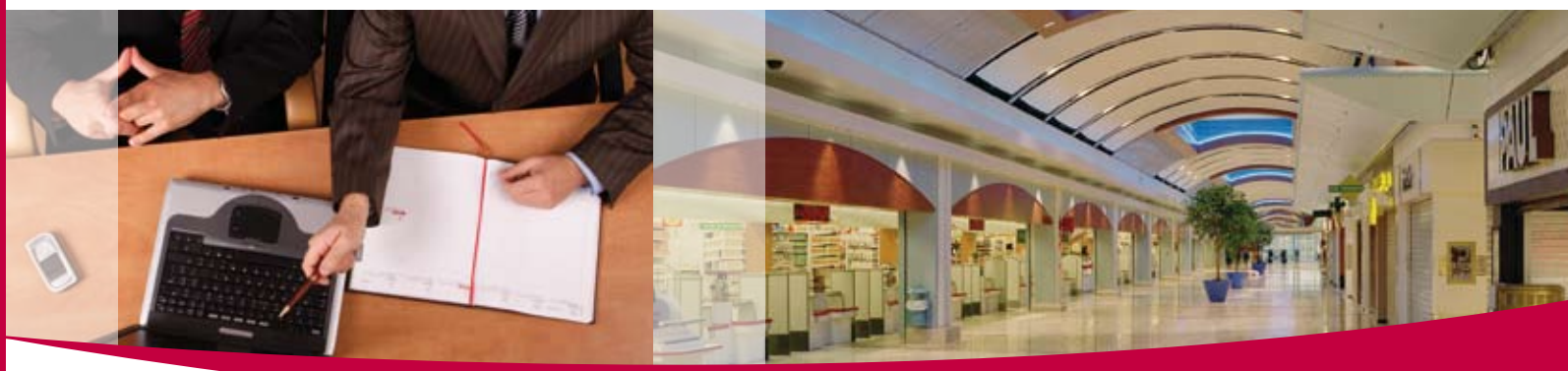
LENNOX

Product catalogue **2008/09**



• • • Providing indoor climate comfort

C&E version

LENNOX Product catalogue 2008/09

Product tested and rated in accordance with Eurovent certification program

Product complying with the European standard

Cooling only unit

Heat pump unit

Cooling only unit with gas fired burner

Heat pump unit with gas fired burner (Dual fuel/Multi fuel)

Heating only unit

Unit with gas burner only

Heat recovery

Water cooled condenser

Electrical heater

R407C refrigerant

R410A refrigerant

Hermetic scroll compressor

Axial condenser fan

Centrifugal fan

25 mm pannel thickness

50 mm pannel thickness

Low noise unit

Architectural integration

Easy maintenance

Communication

Cost reduction, energy saving

Easy installation

Long lifecycle

Environment friendly

Content

Introduction

Lennox: a long history

- **European Production Facilities:**
  Burgos (Spain) • Longvic, Mions (France) • Prague (Czech Republic).

- **Direct Sales Offices:**
  Belgium and Luxembourg, Czech Republic, France, Germany, Netherlands, Poland, Portugal, Russia, Slovakia, Spain, Ukraine, United Kingdom and Ireland.

- **Distributors and Agents:**
  Algeria, Austria, Belarus, Bulgaria, Cyprus, Denmark, Estonia, Finland, Georgia, Greece, Hungary, Israel, Italy, Kazakhstan, Latvia, Lebanon, Lithuania, Morocco, Near East, Norway, Romania, Serbia, Slovenia, Sweden, Switzerland, Tunisia, Turkey.

LENNOX was founded in 1895 in Marshalltown, Iowa (USA) by Dave Lennox. Today the international headquarters are based in Dallas, Texas. LENNOX is a leading provider of climate control solutions with net sales of over 2,5 billion Euros. The company designs, manufactures and markets a broad range of products for the heating, ventilation, air conditioning and refrigeration markets. LENNOX employs approximately 15000 employees throughout the world including 1700 in Europe.

LENNOX Europe covers Europe, Africa, the Near and Middle East, and is widely present in these territories through a network of its own agencies and independent distributors.
LENNOX wishes to give you an overview of global and coherent solutions to meet the requirements of all applications in commercial and industrial markets.

The 4 European industrial sites all have ISO 9001 certification.

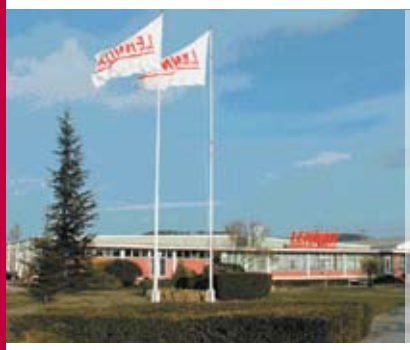
As of today the majority of our products have Eurovent certification. With this program we remain resolutely committed to reinforcing integrity and transparency in our commercial relationships with our customers.

The LENNOX products have been optimized to use ecological fluids (R407C, R410A) in order to meet stringent laws and regulations concerning the environment.

LENNOX sharpens its focus on developing a wide range of services to ensure optimum and long term running of our equipment. We have also invested in specific training programs to help our personnel and authorized service dealers deliver the highest quality service to our customers.

with an international culture

Lennox **factories**



Burgos (Spain)

The Burgos factory is located on the highway from Madrid to Hendaye (France) 240 km, with 128 employees and 7.500 m^2 of built surface in a LENNOX property of 50.000 m^2 of land. The total covered surface is 15.000 m^2 and it could be extended.

This factory mainly produces unitary products for cooling only and heatpump applications such as:

- Vertical or horizontal packaged air conditioners
- Water cooled packaged air conditioners
- Chillers
- Chilled water cassettes

BURGOS factory laboratories, allows development of Air conditioning products to be accurately tested.

People in Burgos are very concerned about Total Quality, therefore we are certified ISO 9001.

Longvic (France)

The Longvic factory is located on the outskirts of Dijon, with a surface of 12000 m^2 and over 200 employees.

This factory is dedicated to the production of Rooftops with an output of 3000 machines per year.
With 30 years experience in Rooftops we offer the widest range on the European market, from 20 to 234 kW with an extensive choice of options including gas burners.

Special applications to satisfy customer requests represent 30% of the turnover.

The LENNOX European test laboratory is also located in Longvic and provides the local R&D team with a fabulous tool for developing competitive machines.

Focused on customer satisfaction, the Longvic plant is certfied ISO 9001and ISO 14001.

Mions (France)

The Mions factory represents a workforce of 155 employees at your service on a completely renovated industrial site covering some 9.000 m^2. On the outskirts of Lyons, this site is extremely well-situated beside one of France's main motorways and near the Saint-Exupery airport.
This is where qualified teams design and produce the LENNOX range of chillers you require. LENNOX chillers built at the Mions plant include:

- Air cooled chiller
- Water cooled chiller
- Heat pump units

It offers the customers the quality assurance they are entitled to expect ISO 9001 certified since 1993.

Prague (Czech Republic)

The Radotin factory is located on the suburb of the capital city with the production area of 14000 m^2. The factory employes 219 qualified people.

The main goal of the factory is to built products for Eastern Europe:

- Air handling units
- Fans
- Industrial coolers
- Heating ventilation and air conditioning products

The service centre in the factory carry out quick and qualified support to the customers.

The factory test room is one of the most modern in Europe today. Moreover, this factory offers surface treatment of the products by coating components in it's own paint facility.

High quality of the products warrants certificate ISO 9001.

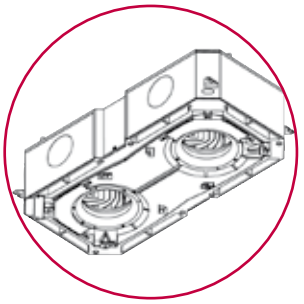
ISO 9001

Air to air Systems

Providing indoor climate comfort

Comfort™ + • 5 ➔ 11 kW

Split cassette



Introduction to the range

The Lennox split cassette is designed to fit in **false ceiling structures:**

- **COMFORT™ +** 18 and 24 have embedment dimensions equivalent to one false ceiling plate
- **COMFORT™ +** 36 and 48 have embedment dimensions equivalent to two false ceiling plates

The calorific inlet is done by a centrifugal unit prepared for indoor installation. This allows hidden operations in false ceiling or techninal room.
This unit is ideal for small structures with false ceilings where individual air conditioning is required. We recommend it for cooling and heating **small shops, individual offices, bars or restaurants...**

-
-

Comfort Friendly

- Auto swing: 4 motorized louvers move air uniformly
- Fresh air: dedicated intakes pre-punched
- Remote control with weekly time program
- Quiet operation with compressors fixed on anti-vibration system
-
-

Architectural Integration

- Compact centrifugal condensing unit for indoor installation

Easy installation

- High static pressure available on Outdoor unit
- Ceiling fixture supports included
- 4 configurations on air inlet and outlet of the Outdoor unit

Extended lifecyle

- Condensing fan protection grid on **COMFORT™ +:** the unit is isolated from external hazards (small animals, leaves…)

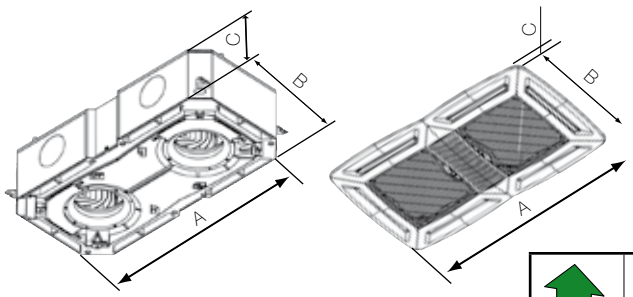
General Data

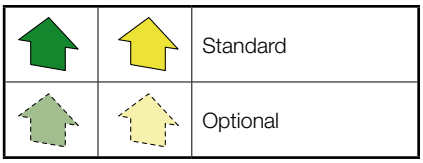
COMFORT™ +		CXHK	018	024	036	036	048
Cooling mode							
Cooling capacity		kW	5,50	6,50	9,60		11,30
EER		kW	2,75	2,6	2,53		2,57
Outdoor operating limits		°C	+19 (0 (1), -10 (2)) / +45				
Heating mode							
Heating capacity		kW	5,30	6,80	9,00		11,10
COP		kW	2,83	2,66	2,84		2,71
Outdoor operating limits			-10 / +18				
INDOOR UNIT		**LCXO**	**024**		**048**		
Airflow	Min / Max	m^3/h	650 / 920		1200 / 1650		
Voltage		V/Ph/Hz	230/1/50				
Condensate drain pan diameter		mm	16		16		
Indoor unit sound power (3)		dB(A)	51		64		
OUTDOOR UNIT		**KCHK**	**018**	**024**	**036**	**036**	**048**
Shut-off valve diameter	Liquid		1/4"		3/8"		
	Gas		1/2"	5/8"	3/4"		
Refrigerant pipework	Max. vertical	m	15				
	Total	m	25				
Refrigerant charge (suitable for 7 m piping)		g	1450	2200	3200		4000
Airflow	Min / Max	m^3/h	1800 / 2600	1750 / 2500	2000 / 3100		2400 / 3400
Available static pressure		Pa	70	90	100		90
Voltage		V/Ph/Hz	230/1/50			400/3/50 + N	
Outdoor unit sound power (4)		dB(A)	68		69		

(1) With ON/OFF low ambient kit
(2) With Proportionnal low ambient kit
(3) Eurovent conditions

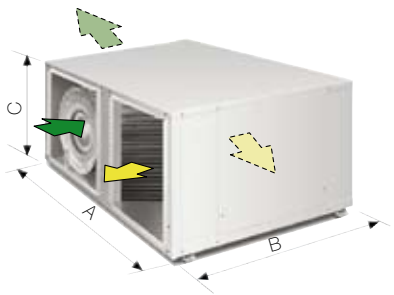
Physical Data

Indoor unit





Outdoor unit



COMFORT™ +	CXHK	018	024	036	036	048
INDOOR UNIT	**LCXO**	**024**		**048**		
A	mm	575		1175		
B	mm	575		575		
C	mm	298		298		
Weight	kg	24		45		
DIFFUSER	**LCXO**	**024**		**048**		
A	mm	720		1320		
B	mm	720		720		
C	mm	48		48		
Weight	kg	3		5		
OUTDOOR UNIT	**KCHK**	**018**	**024**	**036**	**036**	**048**
A	mm	975	975	1050		1250
B	mm	625	625	750		820
C	mm	485	485	505		495
Weight	kg	78	81	92		140

Ductair™ II • 5 ➔ 17 kW

Ductable split for installation in false ceilings

DUCTAIR ™II

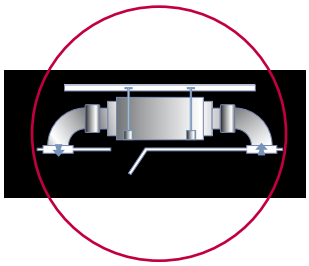
AVAILABLE IN
MAY 2008

Introduction to the range

- **DUCTAIR™ II** is a 100% discreet air conditioning solution **for small shops, restaurants and bars.**
- The ultra-flat design of the Indoor unit allows for easy installation in false ceilings up to 17kW.

Architectural integration

- Up to 50m of piping
- Easy to hide in false ceilings
- Less than 50 kg indoor unit: makes installation easier



Comfort

- Low noise level for quiet operation
- Simple controller display
- Weekly programmer
- Winter operations as standard

Environmentally friendly

- High COP for less consumption
- Reversible: fully adapted to new building thermal norms
- Ductable units needs less refrigerant than multisplit systems

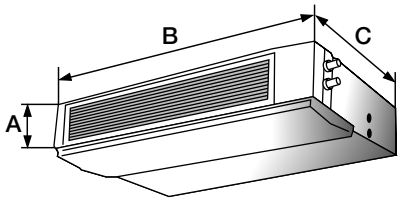
General Data

DUCTAIR™ II		NHM	18	24	30	36	48	60
Cooling mode								
Cooling capacity		kW	5,1	6,8	8,5	10,3	13,7	17,1
EER			2,54	2,47	2,32	2,61	2,77	2,79
Heating mode								
Heating capacity		kW	5,8	7,9	10,3	11,4	15,1	18,5
COP			2,90	2,95	2,94	3,18	2,94	2,93
Specifications - Indoor unit								
Airflow		m^3/h	1160	1460	2070	2070	2400	2800
Available static pressure		Pa	40	40	70	70	70	100
Voltage		V/Ph/Hz	280/1/50			280/1/50 380/3/50	380/3/50	
Specifications - Outdoor Unit								
Maximum Airflow		m^3/h	2400	3000	5000	5000	6000	6000
Voltage		V/Ph/Hz	280/1/50			280/1/50 380/3/50	380/3/50	
Pipe diameter	Liquid		1/4"	3/8"	1/2"	1/2"	1/2"	1/2"
	Gas		1/2"	5/8"	3/4"	3/4"	3/4"	3/4"
Refrigerant charge		kg	2,05	2,6	3,45	3,45	40	42
Refrigerant pipework	Max pipe lenght	mm	25	30	30	30	50	50
	Max vertical difference	mm	15	15	20	20	30	30
Acoustic								
Outdoor unit sound level (1)		dB(A)	55,5	58	63	63,5	59	60
Indoor unit sound level (1)		dB(A)	45	49	49	49	51	52

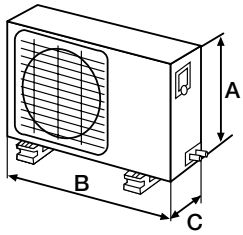
(1) Sound pressure level measured at 1m - Indoor unit ducted

Physical Data

Indoor unit



Outdoor unit



DUCTAIR™ II	NHM	18	24	30	36	48	60
Indoor Unit							
A	mm	298	298	298	298	298	320
B	mm	1000	1000	1350	1350	1350	1350
C	mm	800	800	800	800	800	800
Weight	kg	36	38	48	48	50	100
Outdoor unit							
A	mm	695	860	960	960	1245	1245
B	mm	845	895	990	990	940	940
C	mm	335	355	360	360	370	370
Weight	kg	37	37	52	53	67	74

Ductair™ +• 5 ➔ 18 kW

Ductable split for installation in false ceilings

Introduction to the range

- **DUCTAIR™ +** series are small capacity air conditioners designed for 100% discreet and hidden operation:
- Flat design indoor units **for installation in false ceilings.**
- Centrifugal Outdoor unit for installation in technical room

Flat & Flexible design

- 4 airflow configurations on indoor units
- 4 airflow configurations outdoor units
- Condensate drip tray can be drained from both sides of the unit

Easy installation, operation and maintenance

- Retractable electrical panel for easy access for service engineers
- Rapid connections of flared type refrigerant pipes
- Ceiling fixture supports included
- Direct access to the filters for easy operation change and more hygiene
- Condensing fan protection grid on **DUCTAIR™ +**: isolates the unit from external hazards (small animals, leaves…)

Comfort friendly

- Low noise level inside with multi-speed fans
- Intuitive control display with a weekly programmer
- 2- or 3-speed adjustable airflow, as the user prefers

General Data

DUCTAIR™		NCCK/HK	18	24	30	36	36	48	60	70	80
Cooling mode											
Cooling capacity (1)		kW	5,10	6,6	7,7	9		11	13,5	16,1	18,3
EER			2,52	2,54	2,33	2,33		2,34	2,33	2,40	2,33
Heating mode											
Heating capacity (5)		kW	5,4	6,85	8,4	9,2		11,4	14,4	16,5	19
COP			2,62	2,70	2,60	2,63		2,71	2,55	2,74	2,60
Specifications - Indoor unit		**LNXO**	**18**	**24**	**30**	**36**	**36**	**48**	**60**	**70**	**80**
Airflow	Max	m^3/h	915	1200	1350	1725		2150	2450	3400	4450
	Min	m^3/h	600	740	920	1000		1630	2060	2250	3050
Available static pressure		Pa	60	60	100	120		100		140	160
Voltage		V/Ph/Hz	230/1/50								
Specifications - Outdoor unit		**KCCK/HK**	**18**	**24**	**30**	**36**	**36**	**48**	**60**	**70**	**80**
Airflow	Max	m^3/h	2 600	2 500	3 150	3 100		3 400	4 950		5 900
	Min	m^3/h	1 800	1 750	2 000			2 400	3 750		4 350
Available static pressure		Pa	70	90	100			90	120		150
Voltage		V/Ph/Hz	230/1/50				400/3/50				
Compressor		Type	Scroll								
Connection		Type	Flared							Soldered	
Shut-off valve diameter	Liquid		1/4"		3/8"					1/2"	
	Gas		1/2"	5/8"		3/4"				7/8"	
Refrigerant charge		kg	1,37	2	2,64	2,95		3,72	4	5,6	5,6
Refrigerant pipework	Max. vertical	m	15								
	Total	m	25								
Acoustic											
Outdoor unit sound power level (1)		dB(A)	68		69				73		80
Indoor unit sound power level (1)		dB(A)	64	66		68		66	72	74	77

Operating limits

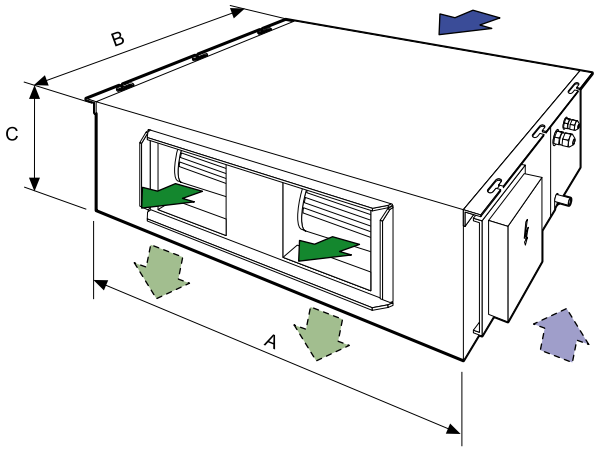
Cooling mode	Outdoor air temperature	Indoor air temperature
	°C	°C
Maximum	45	32
Minimum	19	21
Minimum with ON/OFF CPC (1)	0	-
Minimum with proportional CPC (1)	-10	-

Heating mode	Outdoor air temperature	Indoor air temperature
	°C	°C
Maximum	18	27
Minimum	-10	15

(1) CPC: Low ambient kit (ON/OFF or proportional)

Physical Data

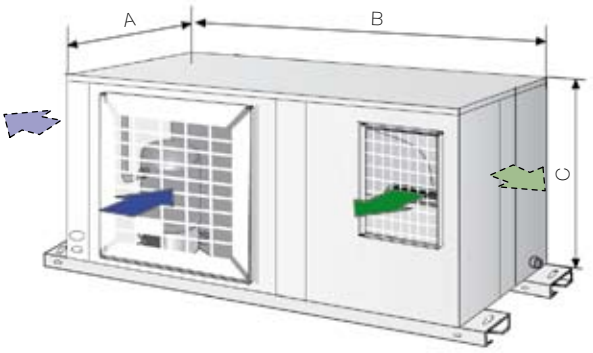
Indoor unit



	Standard
	Optional

DUCTAIR™	LNXO	018	024	030	036	048	060	070	080
A	mm	1000				1195		1300	
B	mm	535		700		750		850	
C	mm	235	235	287		315		415	
Weight	kg	35		43	44	57	58	85	86

Indoor unit



	Standard
	Optional

DUCTAIR™	KCCK/KCHK	018	024	030	036	048	060	070	080
A	mm	625	625	750	750	820	830	830	900
B	mm	975	975	1050	1050	1250	1300	1300	1450
C	mm	470	470	490	490	495	595	595	595
Weight	kg	78	81	92	92	140	185	190	200

Options and accessories

Outdoor units:

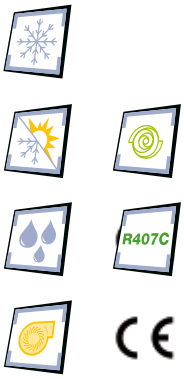
- **Low ambient kit 0°C with ON/ OFF condensing fans:** Allows cooling operation to 0°C outdoor air temperature.
- **Low ambient kit -10°C:** Allows cooling operations to -10°C outdoor air temperature
- **Low noise kit:** we provide compressor jacket to reduce the noise level to an average of 3dB
- **Main switch**

Indoor units:

- **Electrical heater:** 1 stage of auxiliary heating power provided as an accessory
- **Hot water coil heater:** 1 stage of auxiliary heating power provided as an accessory
- **Condensate pump:** Evacuate the condensate water from the condensate drip tray to avoid the growth of micro-organisms
- **Return air plenum:** To connect 3 to 5 return ducts depending on the sizes
- **Supply air plenum:** To connect 3 to 5 supply ducts depending on the sizes

FWCK/FWHK • 4 ➔ 20 kW

Horizontal water cooled packaged air conditioner



Introduction to the range

The water cooled **FLATAIR™** has been designed for **small to large sized** air conditioning installations **with zoning requirements** and **electricity invoicing split** between several participants.
This is particularly suitable where water source temperature is regulated by **Cooling Towers** or **Dry Coolers.**
The compact horizontal design allows the unit to be fitted in **false ceilings,** thus avoiding the loss of commercial floor space. Typical installations are the **small shops in malls** and the **offices of multi-company buildings.**
Air is supplied through a system of ducts.

Architectural integration

- Sized for installation in false ceilings
- Vertical or horizontal air supply

Easy installation and service

- Easily exchangeable and washable air filter
- Control panel separate from the air stream
- General alarm indication
- High and low pressure sensors

Comfort friendly

- 3-speed fans for air supply
- Intuitive OLTX-1 type controller display
- Weekly programmer

Environmentally friendly

- High energy efficiency in heating or cooling

Options

Auxiliary heating
- Electrical heater
- Hot water coil

Hydraulic options
- Flow switch
- Water filter
- Water regulating valves

Comfort
- Low noise compressor jacket

Installation, service and security
- Main switch (up size 08)
- Return lock for the three phases models

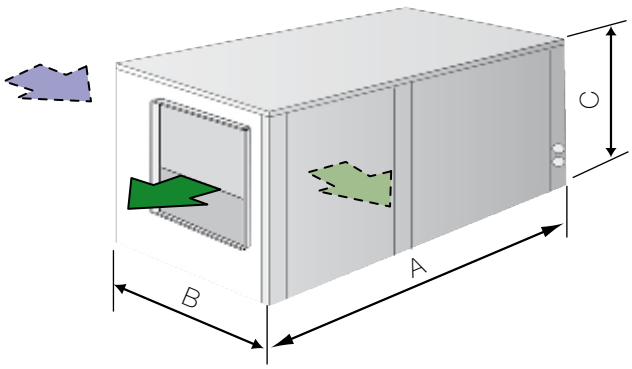
General data

FWCK/FWHK		4	6	7	8	10	10	12	16	22
Cooling mode										
Cooling capacity (1)	kW	4	5,7	7,3	8,4	10,2		13	14,9	20,1
EER		3,54	3,77	3,76	3,51	3,72		3,74	3,48	3,4
Heating mode										
Heating capacity (2)	kW	5,7	7	8,6	10,4	12,3		15	18,5	24,5
COP		4,01	4,04	3,86	3,78	3,9		3,83	3,83	3,68
Electrical data										
Voltage	V / Ph / Hz	230/1/50					400/3/50			
Maximum power	kW	1,59	2,63	3,23	3,86	4,51		5,53	6,61	8,7
Refrigerant circuit data										
Compressors	Type	Rotary	Scroll							
Number of compressors	Nb	1								
Water cooled condenser data										
Nominal water flow	l/h	713	1019	1307	1505	1829		2340	2664	3618
Water pressure drop - Cooling	kPa	16	35	61	83	45		75	35	72
Water pressure drop - Heating	kPa	17	35	64,5	87,6	47,5		78,8	38,1	75,9
Centrifugal fan										
Minimum airflow	m^3/h	450	600	800	1000	1200		1500	1800	2250
Maximum airflow	m^3/h	1050	1550	1400	2350	2250		3100	3100	4500
Maximum available static pressure (3)	Pa	80	140	100	120	100		120		210
Acoustic										
Sound pressure level - Cooling (low/high speed)(4)	dB(A)	44/47	42/49	44/45	51/52	49/50		47/50	46/49	-/56,5
Sound pressure level - Heating (low/high speed)(4)	dB(A)	44/47	47/49	44/45	51/52	50/50		47/50	46/49	-/56,5

(1) Air inlet temperature : 27°C DB/19°C WB - Water inlet temperature : 30°C - With nominal water flow.
(2) Air inlet temperature : 20°C DB - Water inlet temperature : 20°C - With nominal water flow.
(3) For minimum airflow
(4) Measured at 2 meters from the unit

Physical data

		Standard
		Optional



FWCK/FWHK		4	6	7	8	10	12	16	22
A	mm	792	792	792	1083	1083	1503	1503	1503
B	mm	492	492	492	623	623	703	703	703
C	mm	440	440	440	465	465	505	505	505
Weight	kg	56	77	80	103	106	150	158	171

Seconair™ • 8 ➔ 12 kW

Vertical water cooled packaged air conditioner

Introduction to the range

The water cooled **SECONAIR™** has been designed for **small sized** air conditioning installations with **zoning requirements** and **electricity invoicing split** between several participants.
This is suitable particularly where water source temperature is regulated by **Cooling Towers** or **Dry Coolers.**
The compact vertical design makes the unit particularly **easy for installation** and **service operations.** Typical installations are **small shops in malls** and **offices of multi-company buildings.**
Air is supplied through a system of ducts.

Architectural integration

- Sized for installation in false ceilings
- Vertical or horizontal air supply

Easy installation and service

- Easily exchangeable and washable air filter
- Control panel separate from the air stream
- General alarm indication
- High and low pressure sensors

Comfort friendly

- 3-speed fans for air supply
- Intuitive OLTX-1 type controller display
- Weekly programmer
- Compressor mounted on anti-vibration system

Environmentally friendly

- High energy efficiency in heating or cooling

Options

Auxiliary heating
- Electrical heater
- Hot water coil

Hydraulic options
- Flow switch
- Water filter
- Water regulating valves

Comfort
- Low noise compressor jacket

Installation, service and security
- Main switch (up size 08)
- 3 phase detector

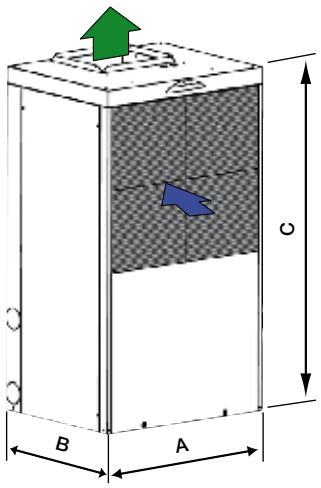
Architectural Integration
- Air discharge plenum
- Air inlet plenum

General data

SECONAIR	SNCK/SNHK	8	10	10	12
Cooling mode					
Cooling capacity (1)	kW	8,4	10,5		11,8
EER		3,84	4,06		3,77
Heating mode					
Heating capacity (2)	kW	10,4	12,7		13,7
COP		4,14	4,27		3,85
Electrical data					
Voltage	V / Ph / Hz	230/1/50	230/1/50	400/3/50	400/3/50
Maximum power	kW	3,73	4,51		5,16
Refrigerant circuit data					
Compressor	Type	Scroll			
Number of compressor	Nb	1			
Water cooled condenser data					
Nominal water flow	l/h	1505	1883		2131
Water pressure drop - Cooling	kPa	83	48		62
Water pressure drop - Heating	kPa	86,5	58,2		78,9
Centrifugal fan					
Minimum airflow	m^3/h	950	1100		1450
Maximum airflow	m^3/h	1800	2050		
Maximum available static pressure (3)	Pa	120	100		80
Acoustic					
Sound pressure level - Cooling (low/high speed)(4)	dB(A)	49,5/52	41/50		40/49
Sound pressure level - Heating (low/high speed)(4)	dB(A)	49,5/52	47,5/50		46,5/49

(1) Air inlet temperature : 27°C DB/19°C WB - Water inlet temperature : 30°C - With nominal water flow.
(2) Air inlet temperature : 20°C DB - Water inlet temperature : 20°C - With nominal water flow.
(3) For minimum airflow
(4) Measured at 2 meters from the unit

Physical data



SECONAIR	SNCK/SCHK	8	10	12
A	mm	635	635	635
B	mm	515	515	515
C	mm	1125	1125	1125
Weight	kg	103	111	120

Flatair™ • 10 ➔ 28 kW

Horizontal convertible packaged air conditioner

Introduction to the range

FLATAIR™ is a 100% Indoor air conditioning unit equipped with ductable airflow on the Indoor section and on the outdoor section. This equipment also comes in Heat Pump or Cooling only versions.
For further options of integration in your building, Lennox provides **FLATAIR™** as monobloc or split equipment.
FLATAIR™ is the perfect air conditioning solution **for banks, restaurant, bars and shops where outdoor access is difficult or prohibited by local regulations.**
In Lennox, we consider **FLATAIR™** as a business optimization solution for smaller premises: no floor area necessary for your air conditioning means a larger selling area.

Flat & Flexible design

- Optimized design for installation in false ceilings
- Monobloc or split versions for more integration possibilities
- Designed for 100% Indoor installation, **FLATAIR™** casing is weatherproofed with polyester paint and insulated electrical board.
- 2 airflow configurations are possible for each air inlet and outlet

Easy installation and service

- Includes frame for ceiling or floor fixture
- Variable airflow
- Exchangeable and washable air filters

Environmentally friendly

- High COP for lower energy consumption
- Energy savings solution with freecooling

Comfort friendly

- Intuitive control display with an optional weekly programmer
- Low airflow speed at air diffuser for lower concentration of cold air
- Low noise level of the unit together with noise attenuation in the duct network makes **FLATAIR™** the best solution for a quiet environment

Air quality management

- Manual fresh air settings
- G2 class air filters

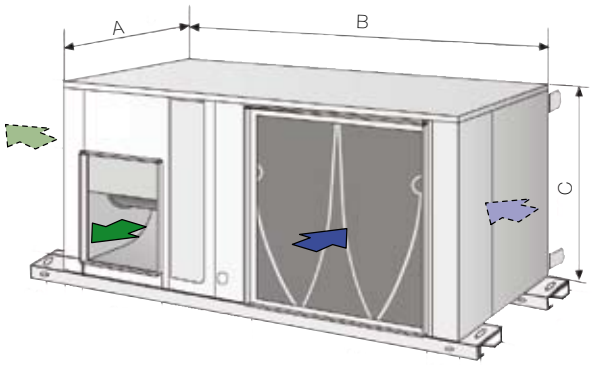
General data

FLATAIR™	FLCK / FLHK	10	10	12	16	22	24	28	30
Cooling mode									
Cooling capacity (1)	kW	9,8		11,8	15,3	19,5	22	26,3	28,1
EER		2,66		2,58	2,39	2,41	2,44	2,53	2,30
Heating mode									
Heating capacity (2)	kW	10		12	15,6	20	22,8	27	29,8
COP		3,16		2,92	3,16	3,03	2,92	3,20	3,16
Electrical data									
Voltage	V / Ph / Hz	230/1/50		400/3/50					
Refrigerant circuit data									
Number of circuits	Nb	1							
Number of compressors	Nb	1							
Refrigerant charge - Cooling only - Packaged	kg	2,24		2,56	3,55	5	6,7	7	
Refrigerant charge - Heat pump - Packaged	kg	2,62		2,92	4	5,5	7,5	8	8,2
INDOOR UNIT	**LFXO / LFCK / LFHK**	**10**	**10**	**12**	**16**	**22**	**24**	**28**	**30**
Capacity									
Absorbed power	kW	0,38			0,9	1,3	1,35		
Electrical data									
Voltage	V / Ph / Hz	230/1/50			400/3/50				
Ventilation									
Minimum airflow	m^3/h	1500		1650	2400	3200	4000	4250	4500
Maximum airflow	m^3/h	2350		2300	3700	5350	6300	6000	6000
Maximum available static pressure	Pa	120		110	160	180	240	200	180
Acoustic									
Sound power level (3)	dB(A)	65			69	80	83	84	81
OUTDOOR UNIT	**KFCK / KFHK**	**10**	**10**	**12**	**16**	**22**	**24**	**28**	**30**
Absorbed power									
Absorbed power - cooling mode (1)	kW	3,30		4,19	5,50	6,79	7,67	9,05	10,9
Absorbed power - heating mode (1)	kW	2,78		3,73	4,7	5,44	7,25	7,85	8,97
Electrical data									
Voltage	V / Ph / Hz	230/1/50		400/3/50					
Ventilation									
Minimum airflow	m^3/h	2350		2400	3750	4350	4500	5000	5250
Maximum airflow	m^3/h	3500		3400	4950	5900	6600	6400	
Available static pressure	Pa	100		90	120	150	160	120	100
Acoustic									
Sound power level (3)	dB(A)	69			73	80	81	83	80
Operating limits (cooling only / heat pump)									
Maximum inside temperature	°C	32 / 23							
Minimum inside temperature	°C	21 / 15							
Maximum outside temperature	°C	45 / 24							
Minimum outside temperature (4)	°C	19/-8				0/-8			

(1) Indoor air: 27°C DB, 19°C WB - Outdoor air: 35°C DB, 24°C WB
(2) Indoor air: 20°C DB, 12°C WB - Outdoor air: 7°C DB, 6°C WB
(3) Eurovent conditions
(4) For models 10, 12 and 16, temperature 0°C with «All-Season Kit (ON/OFF)»

Physical data

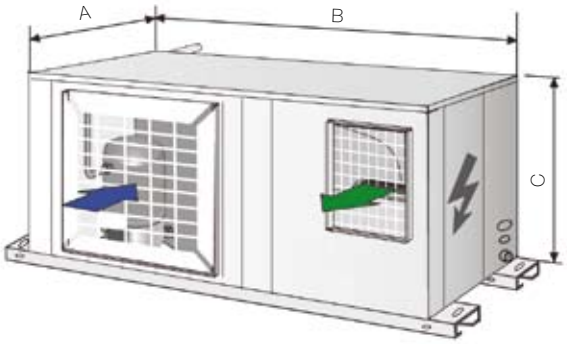
Indoor unit



	Standard
	Optional

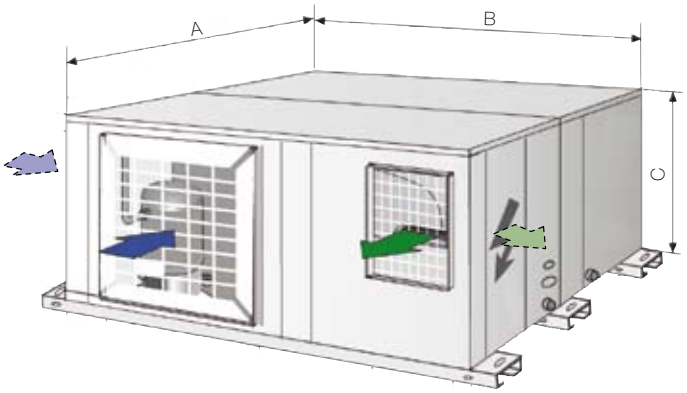
INDOOR UNIT	LFXO / LFCK /LFHK	10	12	16	22	24	28	30
A	mm	430	430	500	620	775	775	775
B	mm	1250	1250	1300	1450	1500	1500	1500
C	mm	495	495	595	595	645	645	645
Weight	kg	70	70	100	130	140	150	150

Outdoor unit



OUTDOOR UNIT	LFXO / LFCK /LFHK	10	12	16	22	24	28	30
A	mm	820	820	830	900	1025	1025	1025
B	mm	1250	1250	1300	1450	1500	1500	1500
C	mm	495	495	595	595	645	645	645
Weight	kg	130	135	180	195	265	275	285

Packaged unit



	Standard
	Optional

FLATAIR™- PACKAGED UNIT	FLCK/FLHK	10	12	16	22	24	28	30
A	mm	1250	1250	1330	1520	1800	1800	1800
B	mm	1250	1250	1300	1450	1500	1500	1500
C	mm	495	495	595	595	645	645	645
Weight	kg	200	205	280	325	405	425	430

Options

Auxiliary heating

- **Electrical heater (1 stage):** Add an auxiliary heating stage to heat pump or cooling units. 2 sizes available on each model
- **Hot water coils:** Add an auxiliary heating stage to heat pump or cooling units. 2 rows available on each model.

Architectural Integration

- **External air filter equipment:** Air filter for the condensing unit. This allows the condensing coil to be kept clean, especially when the unit is installed in dirty and polluted environments such as city centres or industrial areas.
- **Outdoor installation kit:** This option equips the **FLATAIR™** with extra casings, hoods and air filters to protect it from rain and dust when the unit is installed outdoor.
- **Sound muffler:** This option is installed on the exhaust air duct and helps to reduce the noise level of the condensing unit. The sound muffler is particularly recommended when the condensing exhaust air is freely discharged

Indoor Air Quality

- **Freecooling equipment:** Energy saving solution that uses outdoor air for cooling when outdoor air temperature is low. The freecooling equipment also allows the amount of fresh air to be set manually.

Security & Extended lifecycle

- **Three phase protection:** Electrical circuit protection to avoid wrong wiring of 400 volts power supply. This protects the compressor on 1st start.
- **Crankcase heater (cooling only):** The crankcase heater heats the Compressor oil when the Outdoor temperature is low and the unit is not operating. This is a safety measure to ensure that the compressor is lubricated on start-up.
- **Main switch:** The main switch is a safety option: : it prevents service operations from being performed on the **FLATAIR™** electrical panel when it is operating.

Comfort and energy efficiency accessories

- **Remote ambient sensors / Remote duct sensor:** This option can be chosen when the the control display is installed in a room with no air conditioning.
- **Winter cooling operation down to 0°C:** This option makes cooling operations available with Outdoor temperature down to 0°C.
- **Hot gas by-pass valve:** Flatair can operate in cooling mode down to -10°C outdoors.
- **Programmable thermostat:** Control display that includes a weekly program for more comfort. The controller can program 4 stages in 6 periods a day.
- **Remote ON/OFF:** Remote switch to start and stop the unit manually.

Compactair™ • 20 ➔ 99 kW

Vertical convertible packaged air conditioner

Introduction to the range

COMPACTAIR™ range is vertical air-to-air type air conditioning units for 100% indoor installation.
This design has been designed **for small and medium sized commercial premises in city centres where the roof is not accessible and the building's architecture is preserved.** The cabinet style construction helps to limit the space required for the air conditioning system.
COMPACTAIR™ consists of 2 sections that may be supplied as a packaged unit, or a split or multi-split system. Both sections are ductable

Architectural Integration

- Air diffusion with vertical or horizontal flow
- Wide range of airflow settings for air diffusion and calorific intake
- Possibility of installing one or both section outdoor

Easy installation and service

- Sized to pass easily through standard doors
- Removable panels for easy access
- Operating mode signals
- Alarm and failure signals
- Easily exchangeable and washable air filters

Comfort friendly

- Fans mounted on antivibration system for more comfort
- Weekly programmer
- Fresh air setting possibility

General data

COMPACTAIR™	LVCK / LVHK	22E	24E	28E	32E	38E
Cooling mode						
Cooling capacity (1)	kW	19,5	19,8	26,5	28,7	36,5
EER		2,29	2,32	2,30	2,21	2,28
Heating mode						
Heating capacity (2)	kW	20,2	22,5	27	30,2	36,9
COP		2,62	2,62	2,7	2,63	2,71
Electrical data						
Voltage	V / Ph / Hz	400/3/50				
Refrigerant circuit data						
Number of circuits	Nb	1				
Number of compressors	Nb	1				
Refrigerant charge - Cooling only - Packaged	kg	5	5,7	6,65	7,6	9,45
Refrigerant charge - Heat pump - Packaged	kg	5,5	6,3	7,4	8,5	10,5
INDOOR UNIT	**LECK / LEHK**	**22E**	**24E**	**28E**	**32E**	**38E**
Absorbed power						
Max. absorbed power	kW	1,3	1,4	1,5	1,8	2
Electrical data						
Voltage	V / Ph / Hz	400/3/50				
Ventilation						
Minimum airflow	m^3/h	3500	3900	4500	4750	5800
Maximum airflow	m^3/h	4700	5100	5850	6000	7300
Maximum available static pressure	Pa	205	195	250	220	240
Acoustic						
Sound power level (3)	dB(A)	80	82	82	85	86
OUTDOOR UNIT	**KVCK / KVHK**	**22E**	**24E**	**28E**	**32E**	**38E**
Absorbed power						
Max. absorbed power	kW	9,8	10,8	13,4	15,4	18,4
Electrical data						
Voltage	V / Ph / Hz	400/3/50				
Ventilation						
Minimum airflow	m^3/h	5600	5600	5600	6500	9000
Maximum airflow	m^3/h	7550	7350	7100	8000	11000
Maximum available static pressure	Pa	170	160	140	300	300
Acoustic						
Sound power level (3)	dB(A)	82	82	82	84	85
Operating limits (cooling only / heat pump)						
Maximum inside temperature	°C	32 / 27				
Minimum inside temperature	°C	21 / 15				
Maximum outside temperature	°C	45 / 27				
Minimum outside temperature (4)	°C	18 / -8				

(1) Indoor air: 27°C DB, 19°C WB - Outdoor air: 35°C DB, 24°C WB
(2) Indoor air: 20°C DB, 12°C WB - Outdoor air: 7°C DB, 6°C WB
(3) Eurovent conditions
(4) For cooling only, temperature 0°C with «All-Season (ON/OFF) kit» option

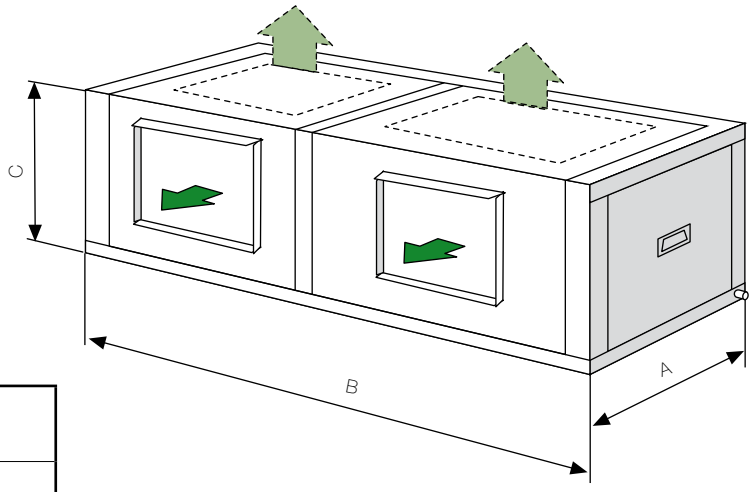
General data

COMPACTAIR™	LVCK/LVHK	44D	44D2	48D	48D2	56D	56D2	64D	64D2	76D	76D2	86D	86D2	100D	100D2
Cooling mode															
Cooling capacity (1)	kW	39		40,2		53		57,4		73		83		98,5	
EER		2,29		2,32		2,30		2,21		2,28		2,14		2,10	
Heating mode															
Heating capacity (2)	kW	40,4		45		54		60,6		73,80		89		102	
COP		2,62		2,62		2,7		2,63		2,71		2,55		2,5	
Electrical data															
Voltage	V/Ph/Hz	400/3/50													
Refrigerant circuit data															
Number of circuits	Nb	2													
Number of compressors	Nb	2												4	
Refrigerant charge - CO - Packaged	kg	10	2x5	11,4	2x5,7	13,3	2x6,65	15,2	2x7,6	18,9	2x9,45	21	2x10,5	23,4	2x11,7
Refrigerant charge - HP - Packaged	kg	11	2x5,5	12,6	2x6,3	14,8	2x7,4	17	2x8,5	21	2x10,5	23,4	2x11,7	26	2x13,0
INDOOR UNIT	**LECK/LEHK**	**44D**	**2X22E**	**48D**	**2X24E**	**56D**	**2X28E**	**64D**	**2X32E**	**76D**	**2X38E**	**86D**	**2X43E**	**100D**	**2X50E**
Absorbed power															
Max. absorbed power	kW	2,6		2,8		3		3,6		4		5		5,5	
Electrical data															
Voltage	V/Ph/Hz	400/3/50													
Ventilation															
Minimum airflow	m^3/h	7000	2x3500	7800	2x3900	9000	2x4500	9500	2x4750	11600	2x5800	13000	2x6500	14500	2x7250
Maximum airflow	m^3/h	9400	2x4700	10200	2x5100	11700	2x5850	12000	2x6000	14600	2x7300	17500	2x8750	18000	2x9000
Max. available static pressure	Pa	205	2x205	195	2x195	250	2x250	220	2x220	240	2x240	270	2x290	280	2x300
Acoustic															
Sound power level (3)	dB(A)	83	83	84	85	85	85	88	88	89	89	90	90	91	92
OUTDOOR UNIT	**KVCK/KVHK**	**44D**	**44D2**	**48D**	**48D2**	**56D**	**56D2**	**64D**	**64D2**	**76D**	**76D2**	**86D**	**86D2**	**100D**	**100D2**
Absorbed power															
Max. absorbed power	kW	19,6		21,6		26,7		30,8		36,7		46,1		54,6	
Electrical data															
Voltage	V/Ph/Hz	400/3/50													
Ventilation															
Minimum airflow	m^3/h	11200		11200		11200		13000		18000		21000		23000	
Maximum airflow	m^3/h	15100		14700		14200		16000		22000		26000		28000	
Max. available static pressure	Pa	170		160		140		300				270		360	
Acoustic															
Sound power level (3)	dB(A)	85						87		88		91		92	
Operating limits (cooling only / heat pump)															
Maximum inside temperature	°C	32 / 27													
Minimum inside temperature	°C	21 / 15													
Maximum outside temperature	°C	45 / 27													
Minimum outside temperature	°C	18 / -8													

(1) Inside air temperature : 27°C DB, 19°C WB - Outside air temperature : 35°C DB, 24°C WB
(2) Inside air temperature : 20°C DB, 12°C WB - Outside air temperature : 7°C DB, 6°C WB
(3) Eurovent conditions

Physical data

Indoor unit



	Standard
	Optional

COMPACTAIR™ - INDOOR UNIT	LECK/LEHK	22E	24E	28E	32E	38E
A	mm	750	750	750	750	750
B	mm	1195	1195	1195	1195	1320
C	mm	640	640	640	640	640
Weight	kg	105	105	110	110	145

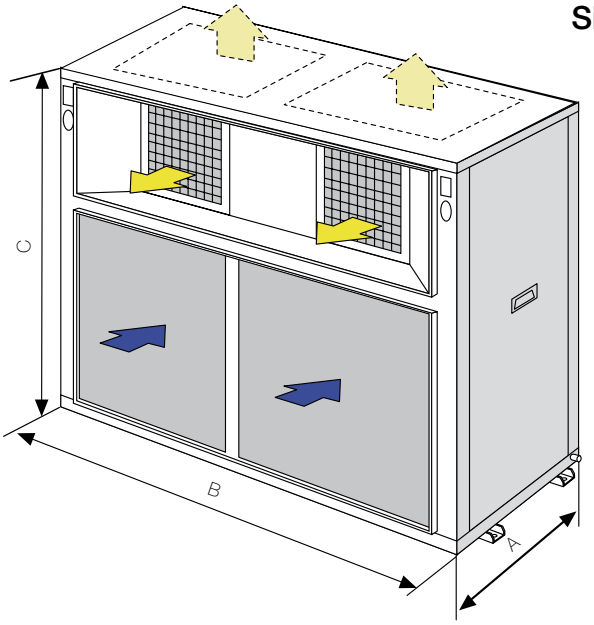
COMPACTAIR™ - INDOOR UNIT	LECK/LEHK	2 x 22E	2 x 24E	2 x 28E	2 x 32E	2 x 38E	2 x 43E	2 x 50E
A	mm	2 x 750	2 x 750	2 x 750	2 x 750	2 x 750	2 x 750	2 x 750
B	mm	2 x 1195	2 x 1195	2 x 1195	2 x 1195	2 x 1570	2 x 1570	2 x 1570
C	mm	2 x 640	2 x 640	2 x 640	2 x 640	2 x 640	2 x 640	2 x 640
Weight	kg	2x105	2x105	2x110	2x110	2x145	2x280	2x305

COMPACTAIR™ - INDOOR UNIT	LECK/LEHK	44D	48D	56D	64D	76D	86D	100D
A	mm	750	750	750	750	750	750	750
B	mm	2250	2250	2250	2250	3140	3140	3140
C	mm	640	640	640	640	640	640	640
Weight	kg	220	220	240	240	265	270	295

Physical data (Cont'd)

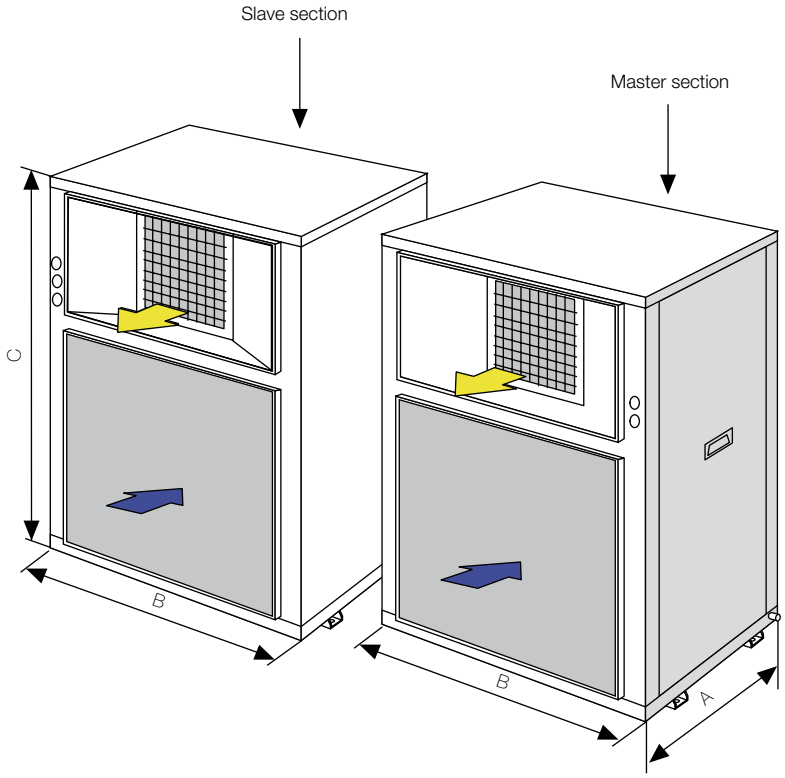
Outdoor unit

Sizes 22E to 76D2



	Standard
	Optional

Sizes 86D, 86D2, 100D and 100D2

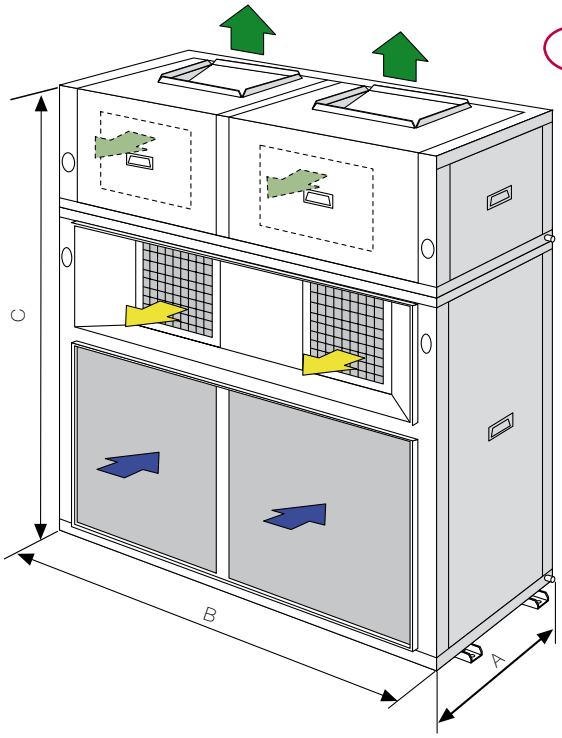


COMPACTAIR™ - OUTDOOR UNIT	KVCK/KVHK	22E	24E	28E	32E	38E
A	mm	750	750	750	750	750
B	mm	1195	1195	1195	1195	1320
C	mm	1350	1350	1350	1350	1415
Weight	kg	210	270	280	285	365

COMPACTAIR™ - OUTDOOR UNIT	KVCK/KVHK	44D/D2	48D/D2	56D/D2	64D/D2	76D/D2	86D/D2	100D/D2
A	mm	750	750	750	750	750	750	750
B	mm	2250	2250	2250	2250	250	2 x 1570	2 x 1570
C	mm	1350	1350	1350	1350	1415	1440	1440
Weight	kg	410	530	550	555	680	860	910

Physical data (Cont'd)

Packaged unit



COMPACTAIR™ - PACKAGED UNIT	LVCK/LVHK	22E	24E	28E	32E	38E	44D	48D	56D	64D	76D
A	mm	750	750	750	750	750	750	750	750	750	750
B	mm	1195	1195	1195	1195	1320	2250	2250	2250	2250	2500
C	mm	1900	1900	1900	1900	2055	1900	1900	1900	1900	2055
Weight	kg	315	375	390	395	510	630	750	790	795	945

Options

Auxiliary heating

- **Electrical heater:** 2 to 4 power sizes depending on the unit size – 1 or 2 heating stages. Mounted in the indoor unit.
- **Hot water coil heater:** Includes valves and a proportional potential with Climatic™ 50 advanced control. Mounted in the indoor unit.

Artchitectural Integration

- **Vertical supply:** For vertical airflow supply
- **Vertical exhaust:** Vertical exhaust airflow on the calorific intake section. Only available for split version.
- **Indoor high static pressure fan:** Up to 400Pa static pressure available of air supply. Designed for long or curved duct network.
- **Supply section outdoor installation:** Water insulation of the Air box on the Indoor unit.
- **Return module:** Installed with freecooling module, it providing exhaust air pressure relief when high levels of fresh air are being introduced in the system.

Indoor Air Quality

- **Dirty air filter indication:** Sensors measure the drop through the filters and warn the user when the measurement is not standard.
- **Thermostatic freecooling:** Uses fresh air when the outside temperature is close to the set point. Allows minimum fresh air level to be set manually.

Safety & Extended Lifecycle

- **Main switch:** Located on the Electrical panel of the outdoor unit. The unit is shut off when the board panel is opened.
- **Pre-coated coil:** anticorrosion treatment on outdoor coils
- **Phase sequencer:** this prevents the unit from starting if the phases are reversed.
- **Soft-starter:** this limits the peak starting current to 40% to protect the unit and the electrical circuit of the building and reduce energy consumption.

Comfort and energy efficient accessories

- **Duct remote sensor:** this measures the temperature and pressure in the duct.
- **Ambient remote sensor:** this measures the temperature and pressure in the room.
- **Crankcase heater:** this consists of an electrical heater that keeps the oil at optimal operating temperature. (Standard on Heat Pump version).
- **Low Ambient cooling operation to 0°C:** ON/OFF control for the condensing fan. This helps the unit to work in cooling mode down to 0°C. Cooling only units require Crankcase heater.
- **Low Ambient cooling operation to -10°C:** Proportional control of the condensing fan. This helps the unit to work in cooling mode down to -10°C. Cooling only units require Crankcase heater.
- **Hot gas by-pass valve:** this allows the unit to operate in cooling mode down to -10°C by reducing compressor capacity.

Advanced control

- **Gateway for Modbus Communication:** This board is a modbus interface, which is needed for anyone who would like a BMS system to talk to the COMPACTAIR™ with «Modbus protocol». Up to 16 Compactair™ can be connected to one Gateway.
- **Weekly programmable controller display:** Allows between 3 ambient settings to be set for 6 periods per day.

Aircoolair™ • 19 ➔ 134 kW

Large ductable split / dual split units

AIRCOOLAIR ™

Introduction to the range

- The large **AIRCOOLAIR™** range of split air conditioning units, are air-to-air type for cooling only or heat pump. . Air is distributed through ducts.
- **AIRCOOLAIR™** is designed for the comfort of **small and medium sized commercial premises or industry with more than one floor or with light roof structure resistance.**
- The R410A unit consists of an outdoor section and an indoor section as a remote split or multi- split systems.
- Climatic™ 40 control pack handles the units for standard usage.
- Climatic™ 50 advanced control pack for large installations: this handles the unit when fine control is necessary. Climatic™ 50 provides large communication capabilities: connection to BMS through the major protocol, multi-unit control with a single display and communication with other Lennox Chillers or Rooftops.

Sexy and Resistant

- Attractive design for easier architectural integration
- Polyester paint finish for outdoor installation
- Low-speed supply fan for longer lifecycle of motors and transmission pulley

Flexible design

- Horizontal or vertical supply airflow
- Mono or dual split for larger sizes
- Adjustable supply airflow to fit constraints of the installation
- Multiple configuration for freecooling module

Easy installation and service

- Integrated service control on the outdoor unit
- Unit designed for easy transportation
- Refillable filter and washable air filters
- Concentration of organic components in the condensing unit
- Adjustable airflow on site

Environmentally friendly

- R410A refrigerant and Scroll compressors
- High Energy Efficiency EER/COP
- Low noise levels, both indoors and outdoors
- Energy spares solution with freecooling module

Comfort friendly

- User remote display supplied as standard for every day settings
- Management of air quality level with CO_2 control and minimum fresh air setting
- G4 filters

General data

AIRCOOLAIR™	ANCM/HM	22E	26E	32E	38E	43E
Cooling mode						
Cooling capacity (1)	kW	19,5	23,5	27	35,5	40,5
EER		2,9	2,78	2,75	2,86	2,75
Heating mode						
Heating capacity (2)	kW	19,5	25	28,5	36	40
COP		3	3	2,95	3,03	3,03
Electrical data						
Voltage	V/Ph/Hz	400-N/3/50				
Refrigeration circuit						
Number of circuits (cooling mode)	Nr	1				
Compressor	Nr	1				
Capacity steps	Nr	1				
INDOOR UNIT	**LECM/HM**	**22E**	**26E**	**32E**	**38E**	**43E**
Maximum absorbed power	kW	0,74	1,45	1,45	1,89	2,69
Electrical data						
Voltage	V/Ph/Hz	400/3/50				
Ventilation						
Minimum airflow	m^3/h	3150	4250	4650	6200	6950
Maximum airflow	m^3/h	4100	5500	6000	8050	9050
Maximum available static pressure (3)	Pa	162	148	153	161	231
Total motor power input	kW	0,55	1,1	1,1	1,5	2,2
Acoustic						
Sound power level (4)	dB(A)	73	78	80	80	83
OUTDOOR UNIT	**KNCM/HM**	**22E**	**26E**	**32E**	**38E**	**43E**
Maximum absorbed power	kW	8,55	10,79	12,49	16,39	17,74
Electrical data						
Voltage	V/Ph/Hz	400-N/3/50				
Acoustic						
Sound power level (4)	dB(A)	76	78	81	80	81

AIRCOOLAIR™	ANCM/HM	52D	52D2	64D	64D2	76D	76D2	86D	86D2
Cooling mode									
Cooling capacity (1)	kW	46,5	47	55,5	54	69,5	71	82	81
EER		2,73	2,78	2,8	2,75	2,8	2,86	2,75	2,76
Heating mode									
Heating capacity (2)	kW	49,5	50	56,5	57	72,5	72	80	80
COP		2,9	3	3	2,95	3	3,03	3,01	3,01
Electrical data									
Voltage	V/Ph/Hz	400-N/3/50							
Refrigeration circuit									
Number of circuits (cooling mode)	Nr	2							
Compressor	Nr	2							
Capacity steps	Nr	2	1+1	2	1+1	2	1+1	2	1+1
INDOOR UNIT	**LECM/HM**	**52D**	**26E-26E**	**64D**	**32E-32E**	**76D**	**38E-38E**	**86D**	**43E-43E**
Maximum absorbed power	kW	2,69	1,45-1,45	2,69	1,45-1,45	3,63	1,89-1,89	5,06	2,69-2,69
Electrical data									
Voltage	V/Ph/Hz	400/3/50							
Ventilation									
Minimum airflow	m^3/h	7950	4250+4250	9950	4650+4650	12450	6200+6200	14000	6950+6950
Maximum airflow	m^3/h	9750	5500+5500	12850	6000+6000	15090	8050+8050	16725	9050+9050
Maximum available static pressure (3)	Pa	216	148+148	175	153+153	197	161+161	237	231+231
Total motor power input	kW	3	3	2,2	2,2	3	3	4	4
Acoustic									
Sound power level (4)	dB(A)	86	78/78	80	80/80	85	80/80	87	83/83
OUTDOOR UNIT	**KNCM/HM**	**52D**	**52D2**	**64D**	**64D2**	**76D**	**76D2**	**86D**	**86D2**
Maximum absorbed power	kW	21,6	21,6	25	25	32,8	32,8	35,5	35,5
Electrical data									
Voltage	V/Ph/Hz	400-N/3/50							
Acoustic									
Sound power level (4)	dB(A)	81	81	84	84	83	83	84	84

General data

AIRCOOLAIR™	ANCM/HM	112D	112D2	128D	128D2	152D
Cooling mode						
Cooling capacity (1)	kW	100	98,5	111	109	135
EER		2,80	2,84	2,85	2,85	2,80
Heating mode						
Heating capacity (2)	kW	108	108	118	118	137
COP		3,13	3,10	3,05	3,10	2,82
Electrical data						
Voltage	V/Ph/Hz	400-N/3/50				
Refrigeration circuit						
Number of circuits (cooling mode)	Nr	2				
Compressor	Nr	3				
Capacity steps	Nr	2	2+1	2	2+1	2
INDOOR UNIT	**LECM**	**112D**	**68E-43E**	**128D**	**76E-43E**	**152D**
	LEHM	**112D**	**68E-44E**	**128D**	**76E-44E**	**152D**
Maximum absorbed power	kW	5,06	2,69-2,69	6,38	3,63-2,69	6,38
Electrical data						
Voltage	V/Ph/Hz	400/3/50				
Ventilation						
Minimum airflow	m^3/h	17350	9950+6950	19300	12450+6950	21000
Maximum airflow	m^3/h	22450	12850+9050	24950	15090+9050	24750
Maximum available static pressure (3)	Pa	187	175+231	269	197+231	276
Total motor power input	kW	4	4	5,5	5,5	5,5
Acoustic						
Sound power level (4)	dB(A)	85	80/83	87	85/83	89
OUTDOOR UNIT	**KNCM/HM**	**112D**	**112D2**	**128D**	**128D2**	**152D**
Maximum absorbed power	kW	45,6	45,6	48,7	48,7	59,9
Electrical data						
Voltage	V/Ph/Hz	400-N/3/50				
Acoustic						
Sound power level (4)	dB(A)	87	87	87	87	90

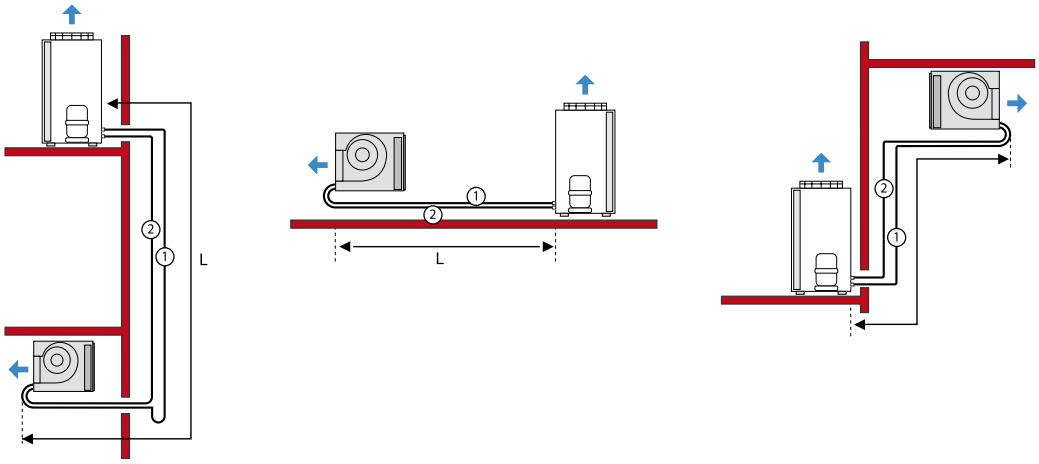
(1) Inside temperature: 27ºC DB,19ºC WB-Outside temperature: 35ºC DB, 24ºC WB
(2) Inside temperature: 20ºC DB, 12ºC WB Outside temperature: 7ºC DB 6ºC WB
(3) For minimum airflow
(4) Eurovent conditions

General data - High static fan option (FP1/FP2)

KNCM/HM+FP1 / FP2 OPTION (OUTDOOR UNIT)	KNCM/HM	112D	112D2	128D	128D2	152D
Condenser high static fan						
Number	Nr	2				
Voltage	V/Ph/Hz	400-N/3/50				
FP1 version						
Max. available static pressure (3)	Pa	125				
Nominal airflow	m^3/h	44000				
Total motor power input	kW	9,2				
Fan speed	rpm	1450				
FP2 version						
Max. available static pressure (3)	Pa	250				
Nominal airflow	m^3/h	38000				
Total motor power input	kW	5				
Fan speed	rpm	900				
Acoustic						
Sound power level - FP1 version (4)	dB(A)	87		88		90
Sound power level - FP2 version (4)	dB(A)	97				

(3) For minimum airflow
(4)Measured at 10m from the unit, in free field conditions (with compressor jacket)

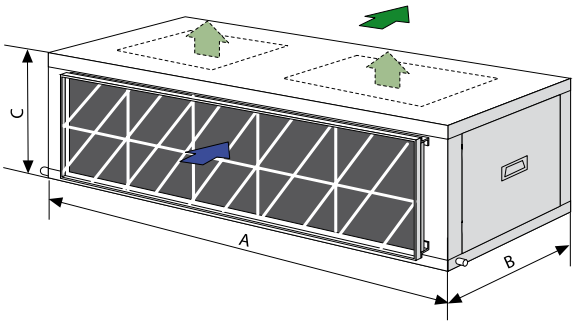
Refrigerant connections



AIRCOOLAIR™	ANCM/HM	22E	26E	32E	38E	43E	52D/D2	64D/D2	76D/D2	86D/D2	112D/D2	128D/D2	152D/D2
Total length 0 to 30m													
Pipe sizes Circuit 1	Liquid	1/2"	5/8"								3/4"		
	Gas	7/8"	1 1/8"		1 3/8"		1 1/8"		1 3/8"		1 5/8"		
Pipe sizes Circuit 2	Liquid	-					5/8"						3/4"
	Gas	-					1 1/8"		1 3/8"				1 5/8"
Maximum vertical length													
Vertical length	m	16											
Maximum total length													
Total length	m	65											
Maximum number of bends	Nb	12											

Physical data

Indoor unit



	Standard
	Optional

AIRCOOLAIR™	ANCM/HM	22E	26E	32E	38E	43E
INDOOR UNIT	**LECM/HM**	**22E**	**26E**	**32E**	**38E**	**43E**
A	mm	1195			1445	
B	mm	803			923	
C	mm	645			740	
Operating weight approx.	kg	108	111	115	150	160

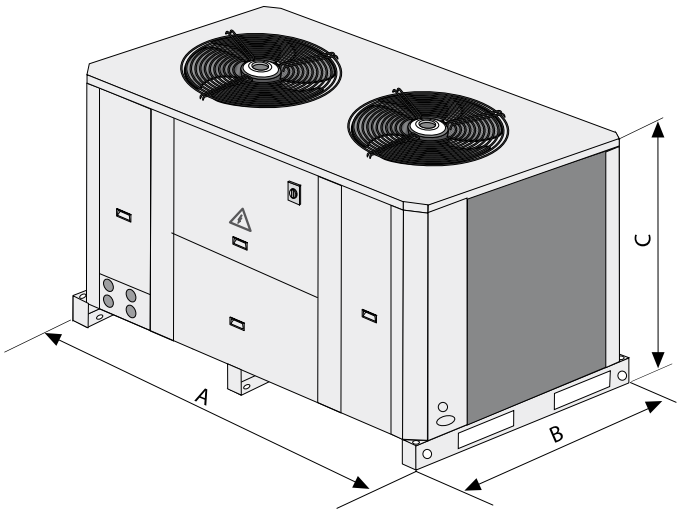
AIRCOOLAIR™	ANCM/HM	52D	52D2	64D	64D2	76D	76D2	86D	86D2
INDOOR UNIT	**LECM/HM**	**52D**	**26E+26E**	**64D**	**32E+32E**	**76D**	**38E+38E**	**86D**	**43E+43E**
A	mm	1445	1195+1195	2250	1195+1195	2250	1445+1445	2250	1445+1445
B	mm	923	803+803	923	803+803	923	923+923	923	923+923
C	mm	740	645+645	740	645+645	740	740+740	740	740+740
Operating weight approx.	kg	170	111+111	285	115+115	305	150+150	325	160+160

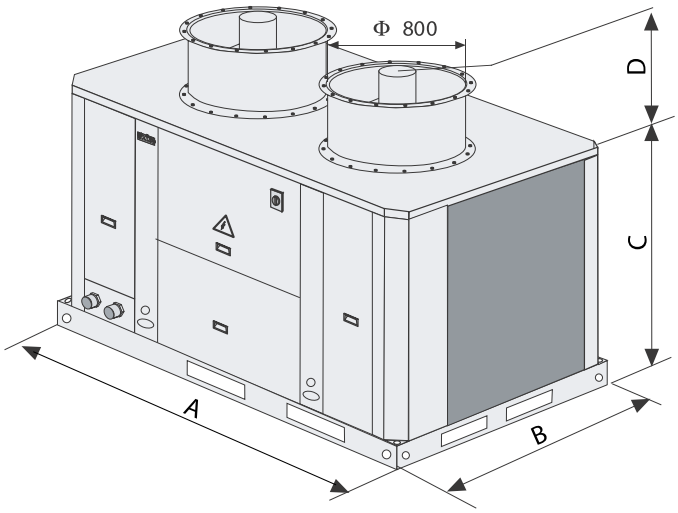
AIRCOOLAIR™	ANCM/HM	112D	112D2	128D	128D2	152D
INDOOR UNIT	**LECM**	**112D**	**68E+43E**	**128D**	**76E+43E**	**152D**
	LEHM	**112D**	**68E+44E**	**128D**	**76E+44E**	**152D**
A	mm	2900	2250+1445	2900	2250+1445	2900
B	mm	1103	923+923	1103	923+923	1103
C	mm	1140	740+740	1140	740+740	1140
Operating weight approx.	kg	470	285+160	480	305+160	490

Physical data

Outdoor unit

Units with high static fan





OUTDOOR UNIT	KNCM/HM	22E	26E	32E	38E	43E
A	mm	1195				
B	mm	660	980			
C	mm	1375	1375			
Operating weight approx. KNCM	kg	160	210	216	233	255
Operating weight approx. KNHM	kg	168	219	221	239	258

OUTDOOR UNIT	KNCM/HM	52D/D2	64D/D2	76D/D2	86D/D2	112D/D2	128D/D2	152D
A	mm	1960				2250		
B	mm	1195				1420		
C	mm	1375				1875		
Operating weight approx. KNCM	kg	443	452	481	520	632	797	906
Operating weight approx. KNHM	kg	452	463	499	537	748	828	932

OUTDOOR UNIT + FP1/FP2 OPTION	KNCM/HM	112D/D2	128D/D2	152D
A	mm	2250	2250	2250
B	mm	1420	1420	1420
C	mm	1675	1675	1675
D	mm	280	280	280
Operating weight - KNCM FP1/FP2 approx.	kg	672	837	946
Operating weight - KNHM FP1/FP2 approx.	kg	788	868	972

Options

Auxiliary heating

- **Electrical heater:** 2 to 4 power ratings according to the size of the unit with 1 or 2 heating stages. Mounted in the indoor unit.
- **Hot water coil heater:** includes the valves and has a proportional potential with Climatic™ 50 advanced control. Mounted in the indoor unit.

Architectural integration

- **Vertical fan discharge:** for vertical airflow supply.
- **FP1 / FP2 High static pressure on the condensing air:** specially designed for models 112 to 152. This allows indoor installation of the Condensing unit with a higher static pressure on condensing fans 125 or 250 Pa.
- **Inlet plenum for FP1/FP2:** this adapts the square air inlet duct to the condenser design when **AIRCOOLAIR™** is installed inside a building.
- **Square discharge duct for FP1/FP2:** this adapts the high static fan FP1/FP2 to square exhaust ducts, when the **AIRCOOLAIR™** is installed inside a building.
- **Auxiliary drip tray (only with FP1/FP2 options):** for the external units installed inside a building; this allows the condensate water to be collected.
- **Indoor high static pressure fan:** up to 400Pa static pressure available at the air supply. Designed for long or curved duct networks.
- **Indoor unit outdoor installation:** water insulation of the Air box on the indoor unit.
- **Long refrigerant piping (65m):** allows up to 65m piping between the internal and external units.

Indoor Air Quality

- **High efficiency EU4 Air Filters:** retain more and smaller particles than standard filters. EU4 filters are refillable and washable.
- **Dirty air filter indication:** sensors measure the drop through the filters and warn the user when the filters are too dirty.
- **Thermostatic freecooling:** uses fresh air when the outside temperature is near the set point.
- **Enthalpic freecooling (only with Climatic™ 50):** uses fresh air when the when outdoor temperature and humidity are appropriate instead of cooling return air.
- **Exhaust fan:** this is installed in the freecooling module and provides exhaust air pressure relief when high levels of fresh air are being introduced into the system.
- **Return module:** this is installed with freecooling module. This provides more exhaust static pressure than the « Exhaust fan».

Safety & Extended lifecycle

- **Smoke detector:** the ionic head of the smoke detector can detect any type of smoke. When this occurs the unit will stop operating, the return air damper will close fully and the fresh air damper will open fully.
- **Coil protection grill:** to protect the units during transport and installation
- **Main switch:** this is situated on the Electrical panel of the outdoor unit. The unit is shut off when the board panel is opened.
- **Precoated coil:** outdoor or indoor coils anticorrosion treatment.
- **Phase sequencer:** this prevents the unit from startingt if the phases are reversed.
- **Soft-starter:** this limits the peak starting current to 40% to protect the unit and electrical circuit of the building and reduce energy consumption.
-
-

Comfort and energy efficient accessories

- **Duct remote sensor:** this measures the temperature and pressure in the duct
- **Ambient remote sensor:** this measures the temperature and pressure in the room
- **Outdoor low noise kit:** compressor jacket and control of the condensing pressure to limit the fan's speed and noise.
- **Rubber dampers:** these limit the vibration transferred from the unit to the floor using rubber dampers under the external unit.
- **Spring dampers:** these limit the vibration transferred from the unit to the floor using rubber dampers under the external unit.
- **Crankcase oil heater (for cooling only units):** for operation in low ambient conditions; this improves the compression of refrigerant by improving the separation of oil and liquid refrigerant.
- **Low ambient kit to 0°C:** this allows the unit to work in cooling mode down to 0°C. This consists of a crankcase heater that keeps the oil at optimal operating temperature.
- **Low ambient kit to -15°C & long distance kit:** proportionnal control of the condensing fan's speed. Helps the unit to work in cooling mode down to -15°C with optimization of the lifecycle cost. For the compressor's safety, this option includes a long distance kit, to prevent liquid returning into the compressor.
- **Hot gas by-pass valve:** this allows the unit to work in cooling mode down to -10°C.
- **Communication Modbus:** this board is a modbus interface, which is needed for anyone who would like a BMS system to talk to the **AIRCOOLAIR™** with «Modbus protocol». No hardware is required other than this board in order to have modbus dialogue. One board required per unit.

Service

- **Shut off service valve:** includes a valve on the gas loop side and a valve on the liquid loop side to facilitate operations of Installation & Service..
- **Refrigerant pre-charged in factory:** includes shut off service valves, on liquid & gas loop sides and refrigerant charge in the external unit. Does not include charge of refrigerant in pipe.

Climatic 50 advanced control options

- **Climatic™ 50 control:** Lennox Advanced control allows greater precision and energy efficiency than standard. The additional facilities of Climatic™ 50 allows the specific options below.
- **DC 50: Comfort display:** remote control for non-technical users. It was designed to fit aesthetically in the room and be very easy to use. With DC50, the customer can change the scheduling of the different time zones, modify temperature set points and the percentage of fresh air in each zone.
- **DS 50: Service display:** this service display controller is a plug and play feature. This allows service personnel to make up to 207 settings, read up to 188 variables, up to 45 faults and read the history of the last 32 faults.
- **DM 50: Multi unit display:** this has the exact same features of the DC50 and can it can handle up to 12 units on a single Bus.
- **BE 50:** additional analogic and digital input and output for the Climatic 50.
- **TCB:** additional free contact for the Climatic 50. All components of the unit can be switched ON/OFF from the customer' Terminal Control Panel.
- **Lonworks communication:** this board is a LonTalk® interface, which is needed for anyone who would like a BMS system to talk to the **AIRCOOLAIR™** with «Lon protocol». No other hardware than this board is required to have LonTalk® dialog. One board required per rooftop.
- **Modbus communication:** this board is a modbus interface, which is needed for anyone who would like a BMS system to talk to the **AIRCOOLAIR™** with «Modbus protocol». No hardware is required other than this board to have modbus dialogue. One board required per unit.
- **BACnet communication:** this board is a Bacnet® interface, which is needed for anyone who would like a BMS system to talk to the **AIRCOOLAIR™** with "Bacnet protocol» RS485.
- **CO_2 sensor:** allows the unit to control the minimum of fresh air coming into the room.
- **DT50:** this card is required to connect a DC50 user display and a service display at the same time to the **AIRCOOLAIR™**. It also repeats the communication signal when the distance between the Climatic 50 and the display is over 200m.
- **Air differential transducer DPT:** measures the pressure in the indoor unit and informs the C50 in the event of a fault such as dirty filters, broken fan belt. Included with dirty filter sensor option.

Baltic™ • 22 ➔ 76 kW

Rooftop unit

BALTIC™

Introduction to the range

The second generation of **BALTIC™** rooftop series is developed for cooling, heating and ventilation solution for **single zone buildings or areas.** To have the lowest sound pollution on the market Lennox use special ventilators and controls and to be energy efficient we have a heat recovery system solution. Al these points together makes the **BALTIC™** rooftop series a sustainable solution for your projects.

- Compliant with EN 60204-1
- Compliant with PED 97-23 directive
-

Cost power effective

- Heat recovery solution
- Scroll compressors
- Tandem compressors (C Box, size 35 and D Box, sizes 45 and 55) for better partload efficiency
- Standard thermostatic expansion valves
- Alternate defrost: E Box (sizes 65 and 75) have independent defrost. When one circuit is in defrost cycle, the second is still in heat pump mode
- Dynamic defrost: using a set of sensors and the special Climatic™50 controller we detect when coils are frozen and starts defrost cycle only when needed
- 93% efficiency gas burner
- BAM units (multi-fuel), combine heat pump heating with gas fired heating CLIMATIC™ 50 allows the selection of the most efficient way to generate heat based on the outside temperature
- Market leading COP thanks to R410A

Sustainable performance

- Fireproof (M0) insulation
- Stainless steel fixings
- Aluminum condensate drain pan
- All electrical components are protected by circuit breakers
- Removable condensate drain pan, the bent drain traps are shipped as a kit
- Plug and play unit, all units have factory fitted options, fully tested and wired

Flexibility

- Cooling (C), Heat pump (H), cooling and gas fired (G) or heat pump and gas fired (M) possibilities
- External static pressure up to 550 Pa (size 20S and 30S) and 500 Pa (size 35S to 75D)
- Airflow adjustment on site with variable drive pulley as a standard feature

Easy installation, operation and maintenance

- Easy access to all components (patented butterfly coils)
- External pressure tap allows easier measurements of HP/LP without opening the rooftop
- Numbered wires, all wires and connectors are numbered as shown on the electrical drawing to facilitate maintenance and diagnostic
-

CLIMATIC™ 50

- Can display the last 50 different faults codes
- 100 settings available for customization
- 100 readings available for diagnostic and monitoring
- Anti short cycle, equalization of compressor running time functionality
- Master-slave capability, staggered start feature
- Automatic summer/winter time change
- 4 dry outputs contacts and 2 dry inputs contacts are available as standard
- 16 bits, 2 megabytes flash memory processor

General data

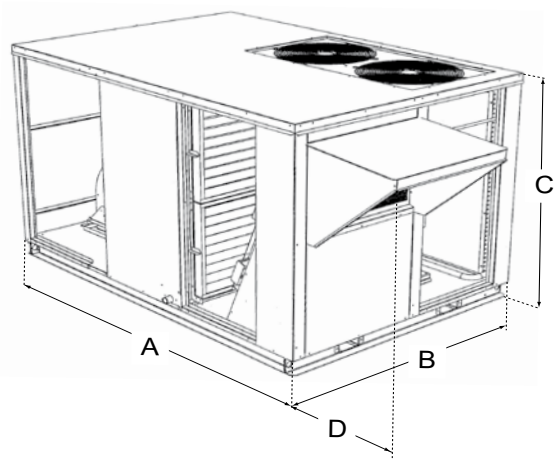
BALTIC™ - BAC/BAH/BAG/BAM		20S	30S	35S	45S
Cooling BAC/BAH/BAG/BAM					
Gross cooling capacity (1)	KW	21,7	26,8	35,5	44,7
Gross COP cooling (3)		3,02	2,79	2,76	3,03
Power input BAC	kW	7,2	9,6	12,9	14,8
Heating BAH/BAD					
Net heating capacity (1)	KW	20,5	24,9	35,6	43,3
Net COP heating (2)		3,02	2,95	3,12	3,21
Heating - gaz fired					
Gas heat capacity	kW - S (5)	19	19	19	31
Gas heat capacity	kW - H (5)	31	31	43	56
Electric heater capacity	kW - S (5)	12	12	24	27
Electric heater capacity	kW - M (5)	24	24	36	45
Electric heater capacity	kW - H (5)	36	36	48	54
Hot water coil capacity (20°C in / water 90-70°C)	kW - H (5)	33,7	38,4	53,5	71,2
Refrigeration circuit					
Nb of compressors / Nb of Circuits	Nb	1/1	1/1	2/1	2/1
Compressor type	Type	ZP83	ZP103	ZP72	ZP83
Refrigerant charge per circuit	kg	6,3	6,3	8,2	12,5
Max. outdoor temp. at indoor 27°C DB/ 19°C WB (4)	°C	46	45	45	46
Ventilation data					
Nominal airflow at 100 Pa	m^3/h	3600	4500	6300	8100
Minimum airflow	m^3/h	2900	3600	5000	6500
Maximum airflow	m^3/h	4300	5400	7600	9700
Acoustic @ 100 Pa					
Outside sound power on standard unit (1)	dB(A)	86	87	84	85
Outside sound power on Low noise unit (1)	dB(A)	76	77	81	82
Indoor blower outlet sound power on standard unit (1)	dB(A)	78	83	82	83
Outside sound power on GAS unit - S & H (1)	dB(A)	86	87	85	85
Indoor blower outlet sound power on GAS unit - S & H (1)	dB(A)	81	86	85	85

BALTIC™ - BAC/BAH/BAG/BAM		55S	65D	75D
Cooling BAC/BAH/BAG/BAM				
Gross cooling capacity (1)	KW	52,6	65,4	75,2
Gross COP cooling (3)		2,85	2,99	2,74
Power input BAC	kW	18,5	21,9	27,4
Heating BAH/BAD				
Net heating capacity (1)	KW	51,8	65,9	77,2
Net COP heating (2)		3,09	3,30	3,25
Heating - gaz fired				
Gas heat capacity	kW - S (5)	31	56	56
Gas heat capacity	kW - H (6)	56	112	112
Electric heater capacity	kW - S (5)	27	27	27
Electric heater capacity	kW - M (5)	45	45	45
Electric heater capacity	kW - H (5)	54	54	54
Hot water coil capacity (20°C in / water 90-70°C)	kW - H (5)	75,5	107,6	118,1
Refrigeration circuit				
Nb of compressors / Nb of Circuits	Nb	2/1	2/2	2/2
Compressor type	Type	ZP103	ZP154 + ZP103	ZP154
Refrigerant charge per circuit	kg	12,5	11	11
Max. outdoor temp. at indoor 27°C DB/ 19°C WB (4)	°C	45	46	45
Ventilation data				
Nominal airflow at 100 Pa	m^3/h	9000	11500	13500
Minimum airflow	m^3/h	7200	8600	10000
Maximum airflow	m^3/h	10800	13000	16000
Acoustic @ 100 Pa				
Outside sound power on standard unit (1)	dB(A)	86	85	86
Outside sound power on Low noise unit (1)	dB(A)	82	82	82
Indoor blower outlet sound power on standard unit (1)	dB(A)	84	82	85
Outside sound power on GAS unit - S & H (1)	dB(A)	86	86 / 86	86 / 86
Indoor blower outlet sound power on GAS unit - S & H (1)	dB(A)	87	84 / 85	88 / 89

(1) All data are at Eurovent condition at 400V/3Ph/50Hz at nominal Airflow, Nominal ESP
(2) including the compressor and outdoor fan (axial) and indoor fan (centrifugal)
(3) COP net = Net Cool Cap./ Pabs total
(4) The cooling and heating operating limits are given for steady state running condition with noted temperature condition
(5) : S = Standard heat - M = Medium heat - H = High heat

Physical data

1



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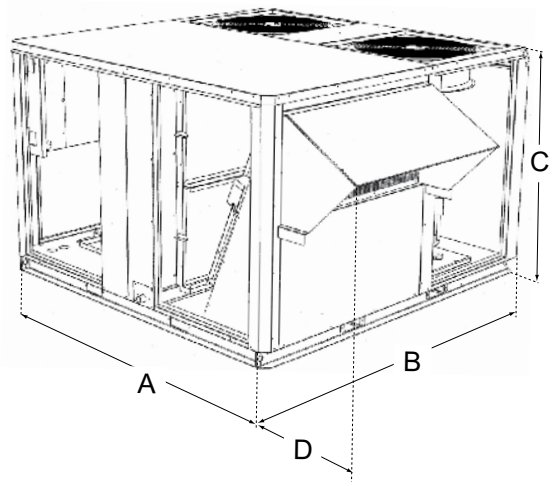

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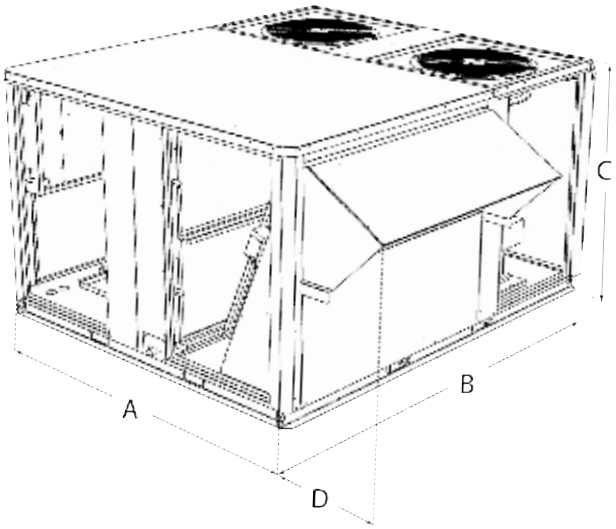

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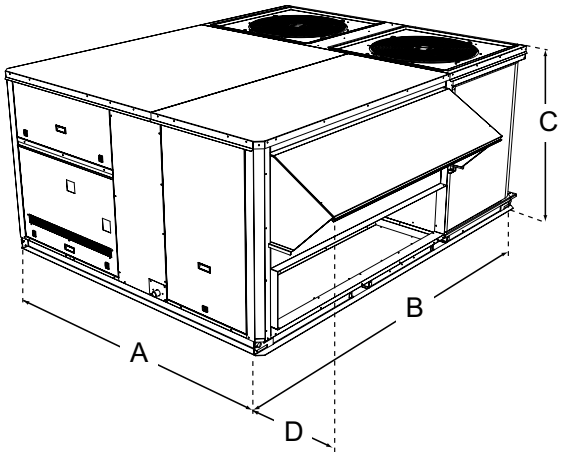
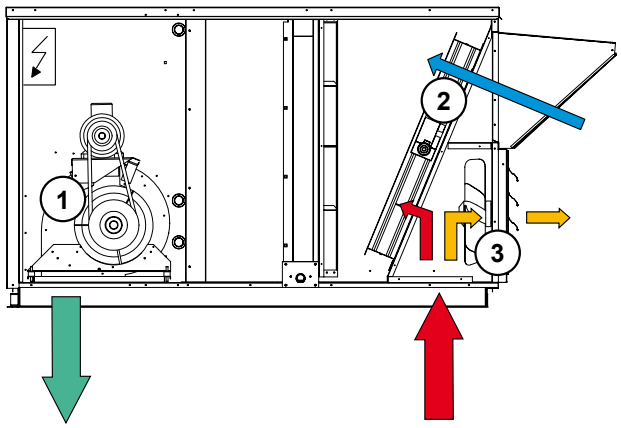


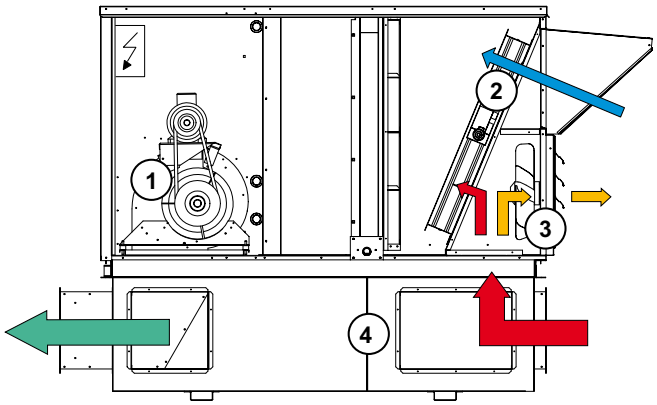
BALTIC™ BAC/BAH/BAG/BAM		20S	30S	35S	45S	55S	65D	75D
A	mm	2017	2017	1890	1910	1910	2260	2260
B	mm	1418	1418	1915	2235	2235	2873	2873
C	mm	1220	1220	1221	1221	1221	1225	1225
D	mm	484	484	414	418	418	418	418
Weight of standard units								
Without hood	kg	394	414	547	604	619	796	852
With hood	kg	417	437	575	677	652	837	893
Weight of gas units								
Standard heat without hood	kg	445	465	608	678	693	904	960
Standard heat with hood	kg	468	488	636	711	726	945	1001
High heat without hood	kg	454	474	627	700	715	963	1019
High heat with hood	kg	477	497	655	733	748	1004	1060

Principle sketch

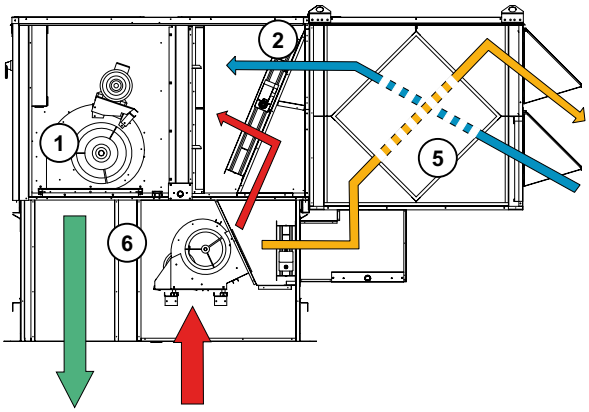
BALTIC™ (vertical flow)



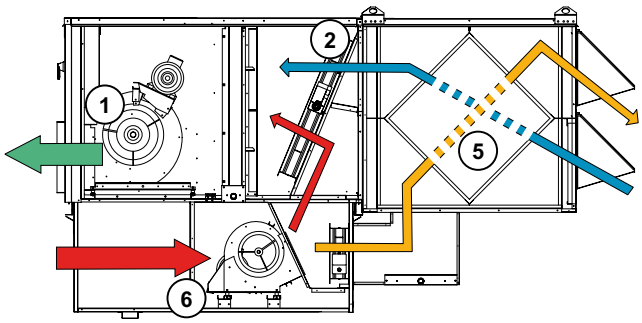
MULTIDIRECTIONAL ROOFCURB



ENERGY RECOVERY MODULE + EXHAUST ROOFCURB (vertical flow)



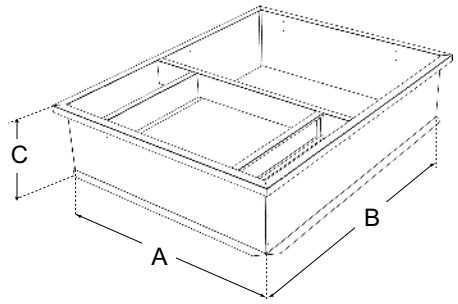
ENERGY RECOVERY MODULE + EXHAUST ROOFCURB (horizontal flow)



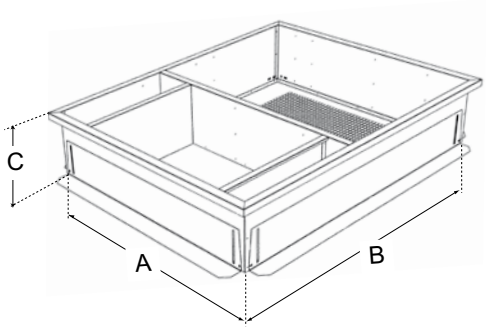
→	Fresh air	1	Supply fan	4	Multidirectional roofcurb
→	Return air	2	Economiser damper	5	Heat recovery module
→	Exhaust air	3	Exhaust damper or Exhaust damper + exhaust fan	6	Exhaust Roofcurb
→	Supply air				

Roofcurb

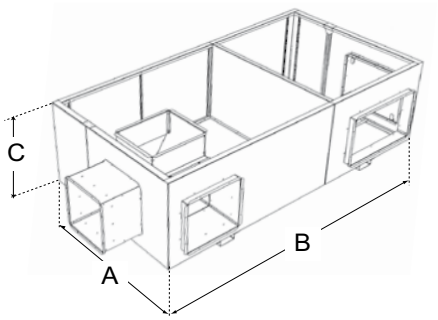
NON ADJUSTABLE, NON ASSEMBLED ROOFCURB



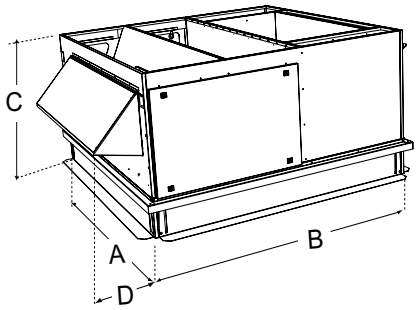
ADJUSTABLE ROOFCURB



MULTIDIRECTIONAL ROOFCURB



CENTRIFUGAL RETURN ROOFCURB (with auxiliary heating)



Roof opening / External dimensions

BALTIC™ BAC/BAH/BAG/BAM			20S	30S	35S	45S	55S	65S	75S
Non-adjustable, non assembled roofcurb									
BAC / BAH / BAG / BAM	A	mm	1183	1183	1380	1630	1630	2080	2080
	B	mm	1893	1893	1740	1740	1740	2090	2090
	C	mm	400	400	400	400	400	400	400
Assembled adjustable roofcurb									
BAC / BAH / BAG / BAM	A	mm	1186	1186	1383	1633	1633	2082	2082
	B	mm	1896	1896	1743	1743	1743	2092	2092
	C	mm	401	401	401	401	401	401	401
Multidirectional roofcurb (External dimensions. No roof opening required)									
BAC / BAH / BAG / BAM	A	mm	1236	1236	1433	1683	1683	2080	2080
	B	mm	2129	2129	1982	1846	1846	2090	2090
	C	mm	650	650	650	650	650	750	750
Exhaust vertical roofcurb									
BAC / BAH / BAG / BAM	A	mm	1390	1390	1587	1837	1837	2287	2287
	B	mm	2100	2100	1947	1947	1947	2297	2297
	C	mm	900	900	900	900	900	1050	1050
	D	mm	344	344	344	344	344	344	344
Exhaust horizontal roofcurb									
BAC / BAH / BAG / BAM	A	mm	1227	1227	1227	1674	1674	2124	2124
	B	mm	2038	2038	1989	1836	1836	2186	2186
	C	mm	740	740	740	740	740	890	890
	D	mm	344	344	344	344	344	344	344

Options

Auxiliary heating

- **Electric heater:** 3 sizes : «Standard», «Medium», and «High» heat. «Standard» and «Medium» heat are 2 stages electric heaters, «High» heat is fully modulated with TRIAC control allowing a constant supply temperature.
- **Hot water coil:** 2 and 3 row hot water coils configurations are available and offer fully modulated control through the use of a 3 way valve.
- **93% high efficiency gas burner option:** Lennox is proud to introduce the first high efficiency gas burner available on rooftop in Europe with 93% efficiency.

Architectural Integration

- **Non adjustable, non assembled roofcurb:** Shipped folded flat for ease of transportation and handling, it is easily field assembled.
- **Adjustable Roofcurb:** Aluzinc construction, for this adjustable roofcurb that can be installed on a roof with up to 4 to 5% slope in all directions.
- **Multidirectional flow roofcurb:** There are many airflow possibilities, including horizontal supply and return on the same side.

Indoor Air Quality

- **Centrifugal return roofcurb:** Where system balancing is critical, the plug fan is able to exhaust up to the nominal airflow of the unit with a maximum of 300Pa static pressure available and improves energy and maintenance cost.
- **Economiser:** «Free cooling» is provided through the use of fresh air when appropriate, rather than cooling the return air, includes fresh and return air damper and hood.
- **Gravity exhaust damper:** Gravity exhaust damper relieves the pressure when outside air is being introduced in the system.
- **Axial power Exhaust Fan:** Installed with economiser assembly, it provides exhaust air pressure relief when a high level of outside air is being introduced in the system.
- **Analogic «Blower-on» sensor and dirty filter indication:** A differential pressure sensor measures the pressure drop across the evaporator coil and filters. It indicates if the filters are dirty, missing or if there is no airflow.
- **Indoor Air Quality Sensor:** This feature gives the possibility to match minimum fresh air requirements with occupancy. It measures CO_2 levels and adjusts fresh airflow rate accordingly.

Security & Extended lifecycle

- **Fire-Stat:** This thermostat provides a signal when the temperature of the airstream is above an adjustable set point.
- **Filters F7 + pre-filters G4:** Set of two 50 mm filters. Adding a G4 prefilter before the F7 filter avoids excessive replacement of F7 filters.
- **Panel filters with metal frames and disposable filter media (EU4 / G4):** Metallic frame with washable filter media (rated EU4/G4) available.
- **Anti-corrosion protection:** Where the units are installed in potentially aggressive environments, coils can be treated witha special protection coating.
- **Disconnect switch:** A lockable main disconnect switch is available to increase safety around the rooftop unit.
- **Smoke detector:** The ionic head of the smoke detector can detect any type of smoke. When this occurs the unit will stop operating, the return air damper will close fully and the fresh air damper will open fully .

Comfort precision and energy efficiency

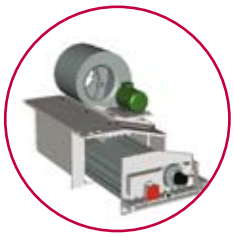
- **Air Sock Control:** Soft start control allows the air socks to be progressively filled with air on start up.
- **Humidity Control:** For dehumidifying or controlling a humidifier.
- **Low temperature kit (to 0°C):** this allows cooling operation when the external temperature approaches 0°C and the economizer cannot be used.
- **Modulating gas burner option:** the burner maintains a constant gas/air mixture and a much optimized efficiency whatever the combustion air ratio is.
- **Energy recovery module:** this option offers the possibility to recover the energy of the exhaust air.

Flexibility

- **Adaptation roofcurb:** this roofcurb is used when you want to adapt a **BALTIC™** instead of an old unit.

Climatic 50 advanced control options

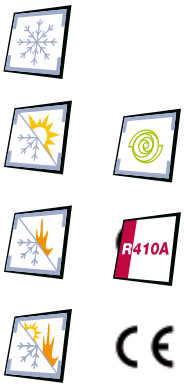
- **DC 50 : Comfort display:** This is a remote controller for non-technical customers. It was designed to aesthetically fit in the room and be very easy to use. With DC50, the customer can change the scheduling of the different time zones, modify temperature set points and the percentage of fresh air in each zone.
- **DS 50 : Service display:** This new service display controller is a plug and play feature. This allows service personel to set up to 100 settings, read up to 100 variables, up to 50 faults and read the history of the last 16 faults.
- **DM 50 Multi rooftop display:** It has the exact same features of the DC50, but, for a lower cost, it can manage up to 12 rooftops on a single Bus.
- **ModBus interface:**This board is a modbus interface, which is needed for anyone who would like a BMS system to talk to the **BALTIC™** with «Modbus protocol». No other hardware than this board is required to have modbus dialog. One board required per rooftop.
- **LonTalk® interface:** This board is a LonTalk® interface, which is needed for anyone who would like a BMS system to talk to the **BALTIC™** with «Lon protocol». No other hardware than this board is required to have LonTalk® dialog. One board required per rooftop.
- **Bacnet Interface:** This board is a Bacnet® interface, which is needed for anyone who would like a BMS system to talk to the **BALTIC™** with "Bacnet protocol» RS485.
- **Adalink™:** It can control up to 32 units on the same site.It can show the whole site map showing status of the different units, zoom on each unit and allow the user to graphically change set point, access alarm list, look at trend curves.
- **Wireless:** Lennox is able to provide you a wireless customer display DWC50 located in the ambient.
- **Zonelink™:** it configures constant volume single zone HVAC equipment and a series of dampers to maintain the desired temperature for up to 10 separate zones per rooftop unit.



Flexy™ • 85 ➔ 234 kW

Rooftop unit

FLEXY™II



Introduction to the range

- Copeland SCROLL compressors for maximum efficiency, reliability and low noise
- Thermostatic expansion valves
- Tandem assembly for improved part load efficiency and increased operating limits
- Alternate defrost: Heat pump have independent defrost. When one circuit is in defrost cycle, the second is still in heat pump mode
- Dynamic defrost : using a set of sensors, Climatic™50 detects when coils are frozen and starts defrost cycle only when needed
- Low speed air in the air treatment section for reduced pressure drop and lower noise
- Extra high efficiency variable plug fan option for life cycle cost reduction (energy + maintenance)
- Modulating gas burner option for comfort improvement

Easy installation and service

- Aluminium body for very low weight and maximum corrosion resistance
- Numbered wires , all wires and connectors are numbered as shown on the electrical drawing to facilitate maintenance and diagnostics

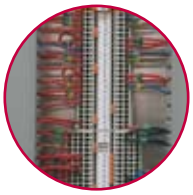
Indoor Air Quality and environmentally friendly

- R410A refrigerant
- Removable and washable condensing drain pan for improved indoor air quality
- Fireproof (M0) insulation
- IAQ kit (UV light) and Double Skin wall option for more demanding applications in Indoor Air Quality
- F7 filtration for improved Indoor air quality (option)

“FLEXY” bility

- From 85 to 230 kW to cover wide range of applications
- Cooling only (C) , Heat pump (H) , Cooling and gas fired (G) or heat pump and gas fired (D)
- Variable drive pulley as a standard feature
- External static pressure up to 600 Pa
- Plug and play unit, all units have factory fitted options, fully tested and wired

Safety



- Compliant with EN 60204-1
- Compliant with PED 97-23 directive
- All electrical components are protected by circuit breakers

General data

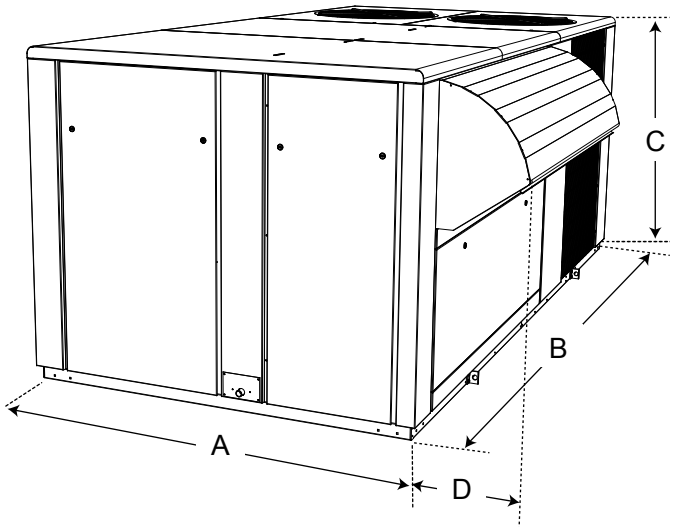
FLEXY™ FC/FH/FG/FD		85	100	120
Cooling mode FCM/FGM/FHM/FDM				
Gross cooling capacity (35 °C out, 27°C in, 47% HR) Eurovent	kW	85,2	105	119
Gross COP cooling (32°C out, 26°C in, 60% HR)		2,94	2,74	2,68
Power input FCM	kW	29,0	38,3	44,5
Heating mode FHM/FDM				
Net heating capacity (7°C out, 20°C in)	kW	82,9	103	117
Net COP heating (7°C out, 20°C in) FHM		3,16	3,10	3,10
Auxiliary heating				
Gas heat capacity S	kW	55,2	55,2	55,2
Gas heat capacity H	kW	110,4	110,4	110,4
Electric heater capacity S	kW	30	30	30
Electric heater capacity M	kW	54	54	54
Electric heater capacity H	kW	72	72	72
Hot water coil capacity S (20°C in / water 90-70 °C)	kW	112	124	130
Hot water coil capacity H (20°C in / water 90-70 °C)	kW	175	197	209
Refrigerant circuit				
Nb of Circuits / Number of compressor per circuit		2 / 1		
Refrigerant charge per circuit	kg	10,5 + 10,5	10,5 + 10,6	10,6 + 10,6
Max. Outdoor temp. at Indoor 27°C DB/ 19°C WB	°C	46	44	44
Ventilation				
Nominal airflow	m^3/h	15000	18500	20500
Minimum airflow	m^3/h	12000	14000	15000
Maximum airflow	m^3/h	23000	23000	23000
Acoustic				
Outdoor sound power (Standard unit)	dB(A)	87	88	87
Outdoor sound power (Low Noise unit)	dB(A)	82	82	82

FLEXY™ FC/FH/FG/FD		150	170	200	230
Cooling mode FCM/FGM/FHM/FDM					
Gross cooling capacity (35 °C out, 27°C in, 47% HR) Eurovent	kW	148	170	197	234
Gross COP cooling (32°C out, 26°C in, 60% HR)		2,83	2,58	2,99	2,66
Power input FCM	kW	52,4	65,9	65,9	88,1
Heating mode FHM/FDM					
Net heating capacity (7°C out, 20°C in)	kW	142	168	188	226
Net COP heating (7°C out, 20°C in) FHM		3,10	2,98	3,24	3,04
Auxiliary heating					
Gas heat capacity S	kW	110,4	110,4	165,6	165,6
Gas heat capacity H	kW	165,6	165,6	220,8	220,8
Electric heater capacity S	kW	45	45	72	72
Electric heater capacity M	kW	72	72	108	108
Electric heater capacity H	kW	108	108	162	162
Hot water coil capacity S (20°C in / water 90-70 °C)	kW	140	149	177	199
Hot water coil capacity H (20°C in / water 90-70 °C)	kW	251	272	296	313
Refrigerant circuit					
Nb of Circuits / Number of compressor per circuit		2 / 1 & 2		2 / 2	
Refrigerant charge per circuit	kg	15,8 + 16	16 + 16	22 + 22	23,5 + 23,5
Max. Outdoor temp. at Indoor 27°C DB/ 19°C WB	°C	44	46	46	44
Ventilation					
Nominal airflow	m^3/h	26000	30000	35000	39000
Minimum airflow	m^3/h	18000	21000	24000	27000
Maximum airflow	m^3/h	35000	35000	43000	43000
Acoustic					
Outdoor sound power (Standard unit)	dB(A)	92	92	88	89
Outdoor sound power (Low Noise unit)	dB(A)	84	86	85	85

(*) S (Standard), M (Medium) and H (High)

Physical data

1



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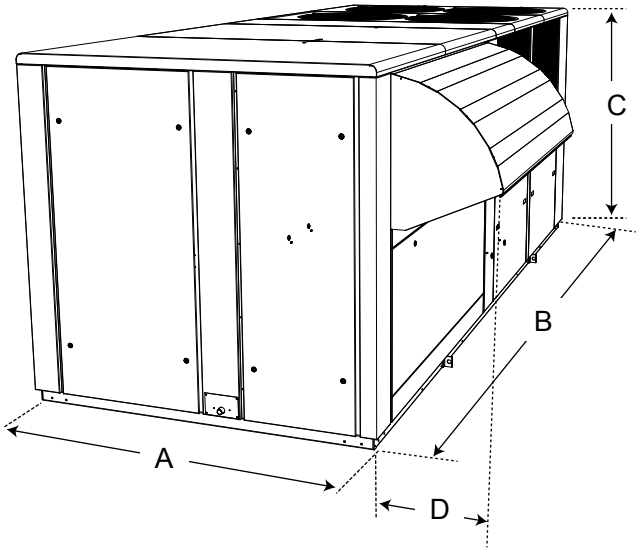
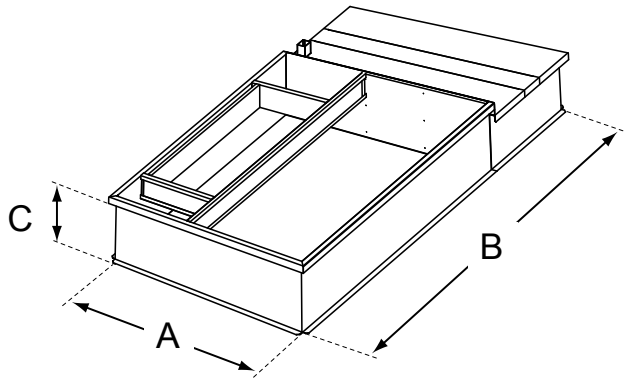


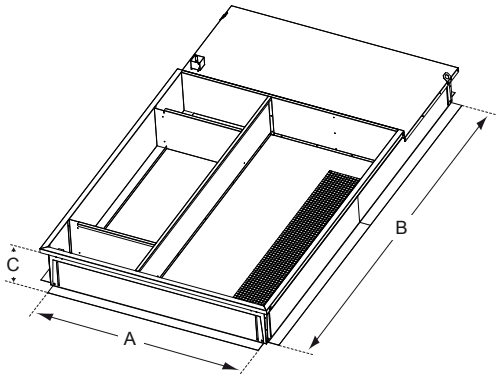
FLEXY™ FC/FH/FG/FD		85	100	120	150	170	200	230
View		**1**	**1**	**2**	**2**	**2**	**2**	**2**
A	mm	2200	2200	2200	2200	2200	2200	2200
B	mm	3350	3350	3350	4380	4380	5533	5533
C	mm	1510	1510	1510	1834	1834	2134	2134
D	mm	360	360	360	450	450	615	615
Weight of standard units								
Without economizer FCM	kg	934	1009	1085	1367	1430	1650	1950
With economizer	kg	990	1065	1142	1442	1505	1752	2052
Weight gas unit								
Without economizer	kg	1041	1116	1192	1608	1671	1914	2214
With economizer	kg	1097	1172	1249	1683	1746	2016	2316
High heat without economizer	kg	1111	1186	1262	1631	1694	1954	2254
High heat With economizer	kg	1167	1242	1319	1706	1769	2056	2356

Roofcurb

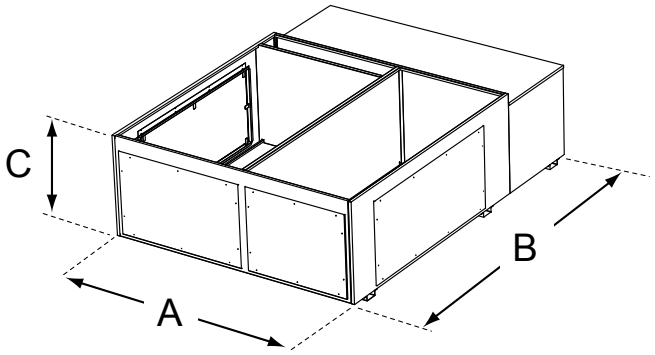
STANDARD ROOFCURB



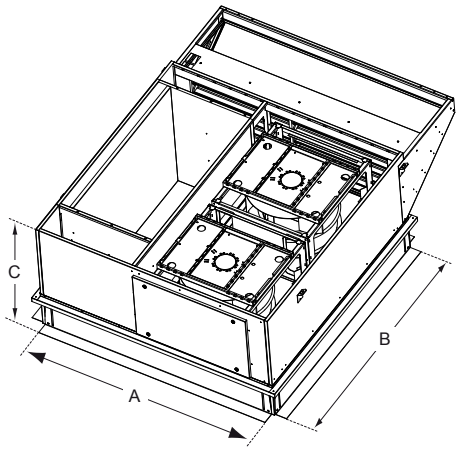
ADJUSTABLE ROOFCURB



MULTI DIRECTIONAL ROOFCURB



CENTRIFUFAL RETURN ROOFCURB

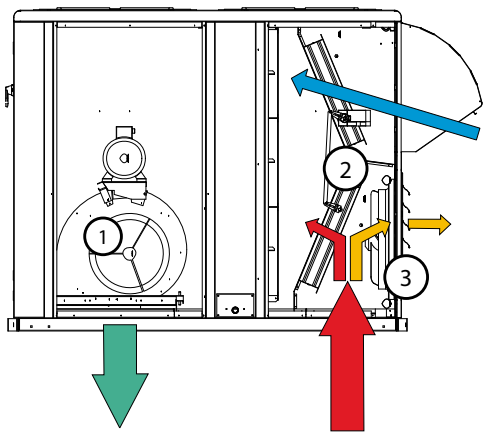


Roof opening

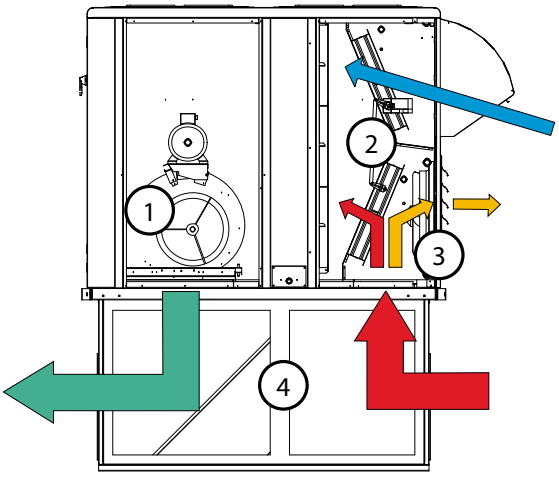
FLEXY™ II	FC/FH/FG/FD	85	100	120	150	170	200	230
Non-adjustable, non assembled roofcurb								
A	mm	2056	2056	2056	2056	2056	2056	2056
B	mm	2770	2770	2770	3466	3466	4066	4066
C	mm	400	400	400	400	400	425	425
Assembled adjustable roofcurb								
A	mm	2056	2056	2056	2056	2056	2056	2056
B	mm	2770	2770	2770	3466	3466	4100	4100
C	mm	400	400	400	400	400	400	400
Multidirectional roofcurb								
A	mm	2056	2056	2056	2056	2056	2056	2056
B	mm	2745	2745	2745	3441	3441	4070	4070
C	mm	800	800	800	1100	1100	1300	1300
Transition roofcurb								
A	mm	2056	2056	2056	2056	2056	2056	2056
B	mm	2770	2770	2770	3466	3466	4100	4100
C	mm	660	660	660	660	660	660	600
Return vertical roofcurb								
A	mm	2156	2156	2156	2156	2156	2156	2156
B	mm	2740	2740	2740	3437	3437	3394	3394
C	mm	1030	1030	1030	1030	1030	1030	1030
Return horizontal roofcurb								
A	mm	2056	2056	2056	2056	2056	2056	2056
B	mm	2762	2762	2762	3460	3460	4096	4096
C	mm	1220	1220	1220	1220	1220	1305	1305

Principle sketches

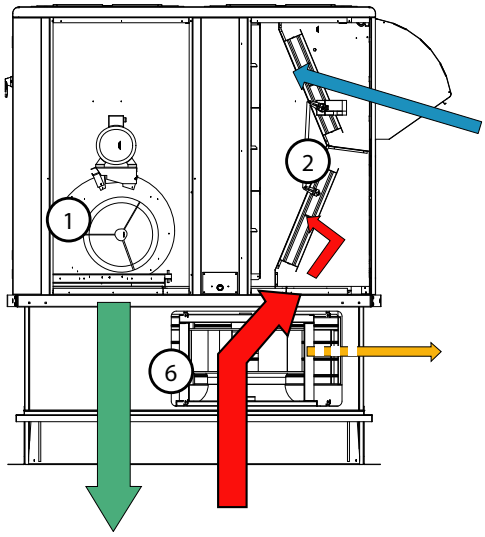
FLEXY™ II (vertical flow)



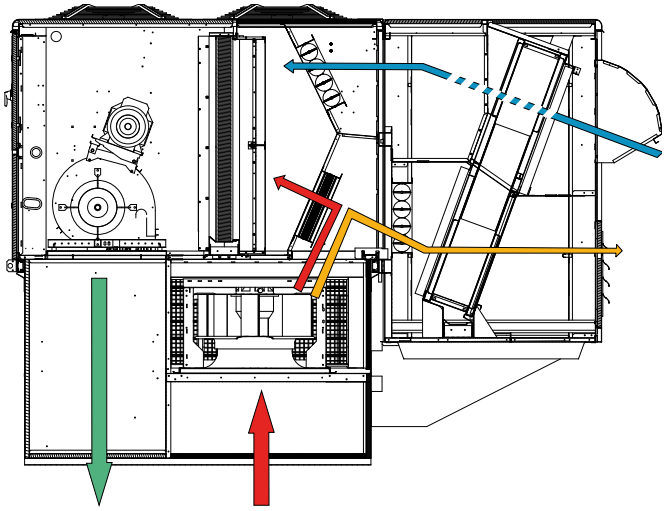
MULTIDIRECTIONAL ROOFCURB



CENTRIFUGAL RETURN ROOFCURB (vertical flow)



ENERGY RECOVERY MODULE



→	Fresh air
→	Return air
→	Exhaust air
→	Supply air
1	Supply fan
2	Return air damper
3	Exhaust damper
4	Multidirectional curb
5	Heat recovery exchanger
6	Return / Exhaust fan

Extract of the option list

Auxiliary heating

- **Electric heater:** 3 sizes : «Standard», «Medium», and «High» heat. «Standard»-heat is a 2 stages electric heaters, «Medium» and «High» heat are fully modulated with TRIAC control allowing a constant supply temperature.
- **Hot water coil:** 1 and 2 row hot water coils configurations are available and offer fully modulated control through the use of a 3 way valve.
- **92% high efficiency gas burner option:** Due to its high efficiency and its new technologies, it assists in improving space comfort levels by avoiding large supply air temperature deviations.

Artchitectural Integration

- **Non-adjustable, non assembled roofcurb:** Shipped folded flat for ease of transport and handling, it is easily field assembled.
- **Adjustable roofcurb:** Aluzinc construction, for this adjustable roofcurb that can be installed on a roof with up to 4 to 5% slope in all directions.
- **Multidirectionnal roofcurb:** Has many airflow possibilities, including horizontal supply and return on the same side.
- **Horizontal / Up and down air flow:** Maximum flexibility, the rooftop can blow horizontaly, upflow or downflow, same for return.

Indoor Air Quality

- **Centrifugal return roofcurb:** Where system balancing is critical, the plug fan is able to exhaust up to the nominal airflow of the unit with a maximum of 300Pa static pressure available and improves energy and maintenance cost.
- **Economiser:** «Free cooling» is provided through the use of fresh air when appropriate rather than cooling the return air, includes fresh and return air damper and hood.
- **Gravity exhaust damper:** Gravity exhaust mper relieves the pressure when outside air is being introduced in the system.
- **Axial power exhaust fan:** Installed with economiser assembly, it provides exhaust air pressure relief when high levels of fresh air are being introduced in the system.
- **Indoor Air Quality sensor:** This feature gives the possibility to match minimum fresh air requirements with occupancy. It measures CO2 levels and adjusts fresh airflow rate accordingly.
- **IAQ Kit : Germicidal light package (available only for sizes 085 to 170 included):** By the destruction of microorganism, the UV light keeps clean the coil and allow constant air pressure drop on the coil, so less energy consumption.

Security & Extended lifecycle

- **Refillable G4 filters:** Instead of replacing the whole filter frame, only the media has to be changed. It's a good cost saving solution.
- **EU7 / F7 panels filters:** Set of two 50 mm filters. Adding a G4 prefilter before the F7 filter avoids excessive replacement of F7 filters.
- **Double skin 25 mm:** This feature prevents bacteria development on porous surface and allows an easy cleaning of the panel.
- **Transition curb:** It answers to the French regulation CH40 (Public buildings), which says, that rooftop can not be installed in France directly on a roofcurb.
- **Smoke detector:** The optical head of the smoke detector can detect any type of smoke. When this occurs the unit will stop operating, the return air damper will close fully and the fresh air damper will open fully

Comfort precision and energy efficiency

- **Air sock control:** Soft start control allows the air socks to be progressively filled with air on start up.
- **High efficiency electronic commutation motor plug fan:** The EC plug-fan, not only absorbs 50% less energy than a normal centrifugal fan, but it is also a variable air volume fan. This feature dramatically decrease the energy consumption of the rooftop.
- **Modulating gas burner option:** The burner maintains a constant gas/air mixture and a much optimized efficiency whatever the combustion air ratio is.
- **Energy recovery module:** this option offers the possibility to recover the energy of the exhaust air.

Quiet operation

- **Low noise option:** To achieve a low noise level, **FLEXY™ II** has a quieter fan, a compressor jacket and is fully equipped with acoustic isolation in the refrigerating box.

Flexibility

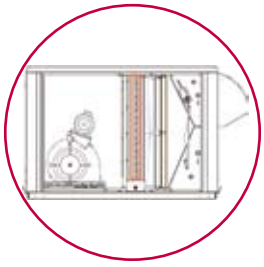
- **Adaptation roofcurb:** this roofcurb is used when you want to adapt a **BALTIC™** instead of an old unit.

Climatic 50 advanced control options

- **Advanced control pack:** Thanks to a software and a set of sensors, this pack allows an enthalpy control on economiser and a humidity control.
- **DS 50 : Service display:** This service display controller is a plug and play feature. This allows service personnel to set, up to 207settings, read up to 188 ariables, up to 45 faults and read the history of the last 32 faults.
- **DC50: Comfort display:** This is a remote controller for non-technical customer. It was designed to aesthetically fit in the room and be very easy to use. With DC50, the customer can change the scheduling of the different time zones, modify temperature set points and percentage of fresh air in each zone.
- **DM 50 Multi rooftop display:** It has the exact same features of the DC50, but, for a lower cost, it can manage up to 12 rooftops on a single Bus.
- **Communication Interface / Modbus Interface:** This board is a modbus interface, which is needed for anyone who would like a BMS system to talk to the **FLEXY™ II** with «Modbus protocol». No other hardware than this board is required to have modbus dialog. One board required per rooftop.
- **Lontalk Interface:** This board is a LonTalk® interface, which is needed for anyone who would like a BMS system to talk to the **FLEXY™ II** with «Lon protocol». No other hardware than this board is required to have LonTalk® dialog. One board required per rooftop.
- **Bacnet Interface:** This board is a Bacnet® interface, which is needed for anyone who would like a BMS system to talk to the **FLEXY™ II** with "Bacnet protocol» RS485.
- **Adalink:** It can control up to 32 units on the same site.It can show the whole site map showing status of the different units, zoom on each unit and allow the user to graphically change set point, access alarm list, look at trend curves.
- **Wireless:** Lennox is able to provide you a wireless customer display DWC50 located in the ambient.

Notes:

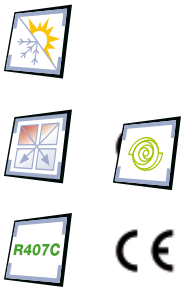
1. EC-fan + airflow configuration options is only available in some airflow configurations. Please contact your local agent for more details.
2. Be aware that not all combinations of options are available. If you are not sure if certain combinations of options are available, please contact your local agent.






FX • 25 ➔ 165 kW

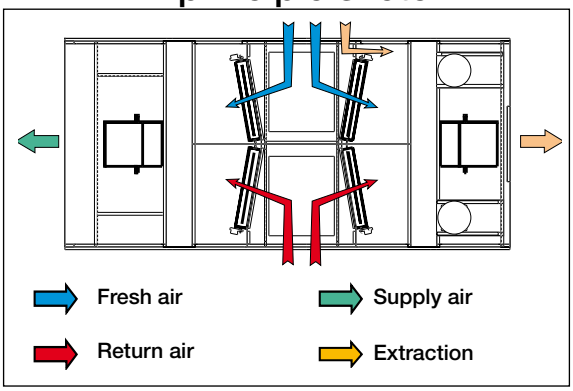
Rooftop unit with heat recovery



Introduction to the range

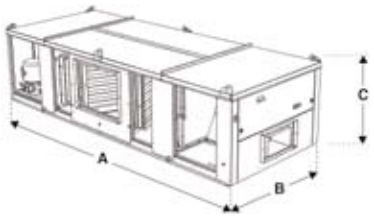
- Thermodynamic air/air heat recovery unit
- System with four motorized shutters allowing 0 to 100% fresh air input
- Ideal for all applications using large quantities of fresh air
- Centrifugal intake and distribution fans for very precise ventilation control of the building
- Can be fully ducted, making it suitable for installation in machine rooms
- All units are multi-circuit (1 compressor per circuit) to prevent heat trains
- Incorporates CLIMATIC™ 50 control
- Air filtered in treatment and discharge
- Ventilation balancing grille as standard

FX principle sketch

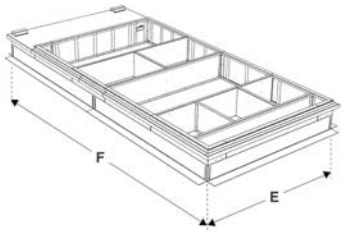


Physical data

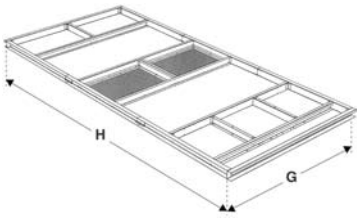
1 Unit



2 Roofcurb



3 Supporting frame



FLEXY™	FX	25	30	35	40	55	70	85	100	110	140	170
View 1 - FX unit dimensions												
A	mm	3970	3970	4750	4750	4750	5050	5050	5050	5650	5650	5650
B	mm	1610	1610	2255	2255	2255	2255	2255	2255	2255	2255	2255
C	mm	1055	1055	1340	1340	1340	1725	1725	1725	2150	2150	2150
View 2 - FX roofcurb dimensions												
E	mm	1540	1540	2175	2175	2175	2175	2175	2175	2175	2175	2175
F	mm	3960	3960	4730	4730	4730	5040	5040	5040	5630	5630	5630
View 3 - FX supporting frame dimensions												
G	mm	1540	1540	2175	2175	2175	2175	2175	2175	2175	2175	2175
H	mm	3960	3960	4725	4725	4725	5040	5040	5040	5630	5630	5630
Weight												
Weight - standard unit	kg	950	980	1400	1450	1600	1800	1900	2000	2300	2400	2600

General data

FLEXY™	FX	25	30	35	40	55	70
Cooling mode							
Gross cooling capacity (35°C out, 27 °C in, 47% HR, 25% fresh air)	kW	24,8	30,5	34,5	40,5	49,5	68,8
Gross cooling capacity (32°C out, 26°C in, 60% HR, 50% fresh air)	kW	26,2	32,2	38,1	44,1	51,2	72,7
Gross COP cooling (35°C out, 27°C in, 47% HR, 25% fresh air)		2,7	2,7	3,0	2,7	2,8	3,0
Gross COP cooling (32°C out, 26°C in, 60% HR, 50% fresh air)		3,0	2,8	3,9	3,3	3,4	3,5
Absorbed power at operation limits	kW	13	16	16	22	26	31
Heating mode							
Net heating capacity (7°C out, 20°C in)	kW	23,6	30,4	31,0	37,7	44,8	64,7
Net COP heating (7°C out, 20°C in)		3,4	3,5	3,7	3,6	4,0	4,0
Refrigerant circuit data							
Number of compressors / Number of circuits	Nr	2/2	2/2	2/2	2/2	2/2	2/2
Compressor type	Type	MTZ 50	MTZ 64	MTZ 64	MTZ 80	MTZ 100	MTZ 125
Refrigerant charge per circuit	kg	4	4	5	6	6	10
Maximum outdoor temperature in cooling mode	°C	40	39	42	41	42	42
Ventilation							
Nominal airflow at 150 Pa	m^3/h	4000	5000	6000	7200	9000	10800
Minimum airflow	m^3/h	3200	4000	4800	5800	7200	8600
Maximum airflow (1)	m^3/h	4500	5500	6600	8100	9900	12200
Acoustic							
Outside sound power level	dB(A)	85	87	83	84	89	90
Indoor air discharge sound power level	dB(A)	80	83	78	80	83	84

FLEXY™	FX	85	100	110	140	170
Cooling mode						
Gross cooling capacity (35°C out, 27 °C in, 47% HR, 25% fresh air)	kW	84,3	100,9	112,0	140,7	165,3
Gross cooling capacity (32°C out, 26°C in, 60% HR, 50% fresh air)	kW	87,2	104,5	117,9	148,1	173,1
Gross COP cooling (35°C out, 27°C in, 47% HR, 25% fresh air)		3,0	3,73	3,37	3,23	3,0
Gross COP cooling (32°C out, 26°C in, 60% HR, 50% fresh air)		3,1	4,1	3,7	3,6	3,2
Absorbed power at operation limits	kW	42	50	51	66	86
Heating mode						
Net heating capacity (7°C out, 20°C in)	kW	80,4	83,1	106,4	136,1	166,8
Net COP heating (7°C out, 20°C in)		3,9	4,3	3,9	3,8	3,5
Refrigerant circuit data						
Number of compressors / Number of circuits	Nr	2/2	2/2	4/4	4/4	4/4
Compressor type	Type	MTZ 160	SZ 185	MTZ 100	MTZ 125	MTZ 160
Refrigerant charge per circuit	kg	11	12	7	7,5	8,5
Maximum outdoor temperature in cooling mode	°C	42	44	44	43	41
Ventilation						
Nominal airflow at 150 Pa	m^3/h	13500	17300	19000	24000	27000
Minimum airflow	m^3/h	10800	13800	15200	19200	24000
Maximum airflow (1)	m^3/h	15400	18200	21500	25500	30000
Acoustic						
Outside sound power level	dB(A)	94	95	92	96	98
Indoor air discharge sound power level	dB(A)	88	93	87	91	93

(1) : Cooling capacities at nominal airflow. Please use the multiplier 1,02 to obtain the cooling capacities to maximum airflow.

Condensing Units
and Dry-coolers

Providing indoor climate comfort

Aircube • 9 - 17 kW

Air cooled condensing unit

Introduction to the range

AIRCUBE™ is typically used in applications with **air handling units for building air conditionning.**
The **AIRCUBE™** range benefits from the latest technological innovations such as scroll compressors and high performance heat exchanger. Each unit is available in a cooling only version.

Sustainable performance

- Pre-painted galvanized sheet steel casing (Colour RAL 9002)
- Control and protection panel according to EN 60204-1

Quiet performance

- Axial condenser fan directly driven by an IP54 low noise motor (suitably protected for outdoor installation)

Easy installation, operation and maintenance

- Optimal access to the various components
- Galvanized sheet steel framework with fork lift pockets for ease of maintenance
- HP/LP pressure switches

Energy performance

- Hermetic scroll compressor
- R407C refrigerant (unit delivered filled with nitrogen)

Control

- Managed from an external dry contact
- One contact needed per circuit
- Alarm

Options

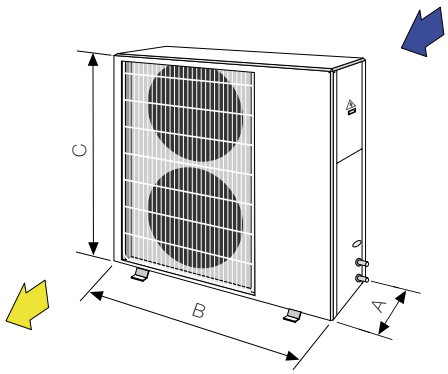
- Main ON/OFF switch
- Three phase detector
- Condenser protection grilles
- Corrosion-proofed coils
- Soft starter (400V/3)
- 24 VAC control circuit
- ON/OFF all-season operation
- Proportional all-season kit
- Hot gas by-pass
- Unit pre-filled with refrigerant
- Manual valves : liquid and suction
- Anti-vibration mountings
- Compressor jacket
- Low-noise kit (including compressor jacket and proportional all season kit)

General data

AIRCUBE	KSCK	10E	12E	16E	18E
Cooling mode					
Cooling capacity (1)	kW	9,4	12	14,1	16,9
Absorbed power (1)	kW	2,9	3,5	4,5	5,2
EER		3,2	3,4	3,1	3,3
Electrical data					
Voltage	V/Ph/Hz	400/3/50			
Start-up intensity	A	46	50	66	74
Maximum current	A	10	12	15	18
Refrigeration circuit					
Number of circuits	Nb	1			
Compressor	Nb	1			
Capacity steps	Nb	1			
Pipe sizes	Liquid	3/8"			1/2"
	Gas	3/4"			7/8"
Condenser fan (helicoidal)					
Number	Nb	1	2		
Nominal airflow	m^3/h	3200	5500		5200
Fan speed	rpm	900			
Acoustic					
Sound pressure level (2) (Lw)	dB(A)	43	46		47
Operating limits					
Maximum outside air temperature (3)	°C	45			
Minimum outside air temperature (3) (4)	°C	-10/0/20			
Minimum evaporating temperature	°C	0			

(1) Evaporating temperature: 7°C - Air: 35°C
(2) Eurovent conditions
(3) Evaporating temperature: 7°C
(4) With proportional kit / with ON-OFF / Without all-season kit

Physical data



AIRCUBE	KSCK	10E	12E	16E	18E
A	mm	333	333	333	386
B	mm	973	973	973	973
C	mm	931	1235	1235	1235
Operating weight	kg	73	99	109	130

Aircube™ • 19 - 193 kW

Air cooled condensing unit

AIRCUBE™

Introduction to the range

AIRCUBE™ is typically used in applications with **air handling units for building air conditioning.**
The **AIRCUBE™** range provide you with a low noise, high efficiency, modern design and almost customised units.
Lennox has taken into account all the modern requirements of today to have a complete range who gives **a maximum comfort to the end user.**

Sustainable performance

- Galvanized sheet steel casing
- Polyester paint finish
- Control and protection panel according to EN 60204-1
- 1 or 2 independent cooling circuits according to size

Quiet performance

- Low noise level of the unit
- Low speed axial fan

Easy installation, operation and maintenance

- To give better and quicker service and maintenance you do not need to access to the electrical board , the control is mounted outside on the outdoor unit , and permit a possible adjustment of some parameter like anti – cycling control time, or defrost cycle for heat pump units. Remote operating and failure indications by means of potential free contacts.
- Complete user friendly electrical box with circuit breakers instead of fuses for individual protection of each motor.
- Easy access to components

Energy performance

- R410A Refrigerant
- High Energy Efficiency EER/COP, average energy saving of 15 %
- All the range is equipped with the new generation of Scroll compressors with higher efficiency and low noise

General data

AIRCUBE™	KSCM/HM	22E	26E	32E	38E	43E
Cooling mode						
Cooling capacity (1)	kW	19,7	24,7	28,4	36,1	42
EER		3,06	3,05	2,95	3,03	2,98
Heating mode						
Heating capacity (2)	kW	19,8	25	28,6	36	40,2
COP		3,20	3,21	3,12	3,24	2,98
Electrical data						
Voltage	V/Ph/Hz	400-N/3/50				
Maximum absorbed power	kW	8,55	10,8	12,5	16,4	17,7
Acoustic						
Sound power level (3)	dB(A)	76	78	81	80	81
Refrigeration circuit						
Number of circuits (cooling mode)	Nr	1				
Compressor	Nr	1				
Capacity steps	Nr	1				

	KSCM/HM	52D	64D	76D	86D	112D	128D	152D	214D
Cooling mode									
Cooling capacity (1)	kW	49,4	56,7	72,1	83,9	104	115	141	193
EER		3,05	2,94	3,04	2,96	3,03	3,1	3,05	3,11
Heating mode									
Heating capacity (2)	kW	50,1	57,1	71,9	80,3	105	114	137	191
COP		3,21	3,1	3,24	3,1	3,24	3,2	3,13	3,19
Electrical data									
Voltage	V/Ph/Hz	400/3/50							
Maximum absorbed power	kW	21,6	25	32,8	35,5	45,6	48,7	59,9	83,0
Acoustic									
Sound power level (3)	dB(A)	81	84	83	84	87	87	90	89
Refrigeration circuit									
Number of circuits (cooling mode)	Nr	2							
Compressor	Nr	2				3			4
Capacity steps	Nr	2							

General data - High static fan option (FP1/FP2)

KSCM/HM+FP1 / FP2 OPTION (OUTDOOR UNIT)	KSCM/HM	112D	128D	152D	214D
Condenser high static fan					
Number	Nr	2			4
Voltage	V / Ph / Hz	400/3/50			
FP1 version					
Maximum available static pressure - FP1 version (5)	Pa	125			
Nominal air flow - FP1 version	m^3/h	38000			56000
Total motor power input- FP1 version	kW	5			10
Fan speed-FP1 version	rpm	900			
FP2 version					
Maximum available static pressure - FP2 version (5)	Pa	250			
Nominal air flow - FP2 version	m^3/h	44000			56000
Total motor power input- FP2 version	kW	9,2			18,6
Fan speed-FP2 version	rpm	1450			
Acoustic					
Sound pressure level - FP1 version (4)	dB(A)	59	59	59	62
Sound pressure level - FP2 version (4)	dB(A)	69		69	72

(1) Evaporating temperature : 7ºC Ambient temperature: 35ºC
(2) Condensing temperature: 50ºC Ambient temperature 7ºC DB/6ºC WB
(3) Eurovent conditions
(4)Measured at 10m from the unit, in free field conditions (with compressor jacket)
(5) For minimum airflow

Operating limits

AIRCUBE™	KSCM/HM	22E	26E	32E	38E	43E	52D	64D	76D	86D	112D	128D	152D	214D
Operating limits														
Maximum outside air temperature	°C	45			47		45		47		47			
Minimum outside air temperature (1) (2)	°C	19/0												
Minimum evaporating temperature (cooling)	°C	-1												
Minimum outside air temperature (heating)	°C	-10												
Maximum condensing temperature	°C	65												
Maximum evaporating temperature	°C	12												
Minimum evaporating temperature	°C	-22												

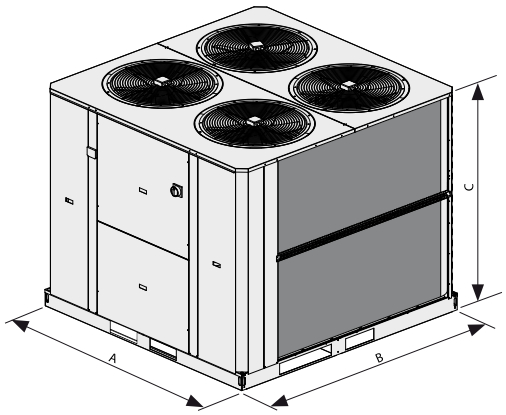
(1) Evaporating temperature: 7ºC
(2) With proporcional kit /with ON-OFF/without all season kit

Refrigerant connections

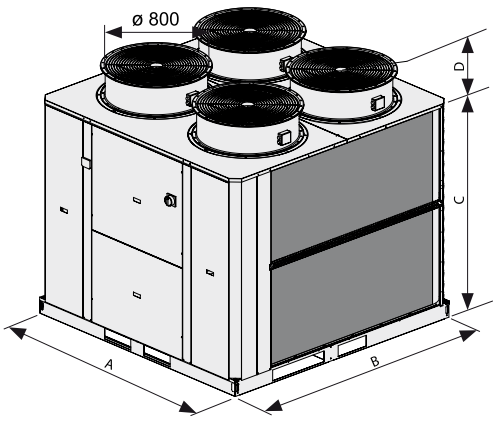
AIRCUBE™	KSCM/HM	22E	26E	32E	38E	43E	52D	64D	76D	86D	112D	128D	152D	214D
Total length 0 to 30m														
Pipe sizes Circuit 1	Liquid	1/2"	5/8"								3/4"			7/8"
	Gas	7/8"	1 1/8"		1 3/8"		1 1/8"		1 3/8"		1 5/8"			
Pipe sizes Circuit 2	Liquid	-	-	-	-	-	5/8"						3/4"	7/8"
	Gas	-	-	-	-	-	1 1/8"		1 3/8"				1 5/8"	
Maximum vertical length														
Vertical length	m	16												
Maximum total length														
Total length	m	65												
Maximum number of bends	Nb	12												

Physical data

Standard units



Units with high static fan



OUTDOOR UNIT	KSCM/HM	22E	26E	32E	38E	43E
A	mm	1195				
B	mm	660	980			
C	mm	1375				
Operating weight Approx.	kg	168	219	221	239	258

OUTDOOR UNIT	KSCM/HM	52D	64D	76D	86D	112D	128D	152D	214D
A	mm	1960				2250			
B	mm	1195				1420			2300
C	mm	1375				1875			1975
Operating weight Approx.	kg	452	463	499	537	748	828	932	1684

OUTDOOR UNIT + FP1/FP2 OPTION	KSCM/HM	112D	128D	152D	214D
A	mm	2250			
B	mm	1420			2300
C - FP1 / FP2 version	mm	1675			1975
D - FP1 /FP2 version	mm	280			
Operating weight - KNHM FP1/FP2	kg	788	868	972	1764

Options

- Vertical fan discharge
- High pressure fan FP1/FP2 (outdoor 112D/128D/152D)
- Inlet plenum for FP1/FP2
- Square discharge duct for FP1/FP2
- Long refrigerant piping (65m)
- Auxiliary drip tray FP1/FP2
- Main ON/OFF switch
- Three phase detector
- Crankcase heater (only cooling)
- Condenser protection grilles
- Corrosion-proofed coils
- Soft starter (400V/3)
- 24 VAC control circuit
- Drive indoor fan motor by free contact
- ON/OFF all-season operation
- Proportional all-season kit
- Hot gas by-pass
- Unit pre-filled with refrigerant
- Manual valves : liquid and suction
- Anti-vibration mountings
- Compressor jacket
- Low-noise kit (including compressor jacket and proportional all season kit)

KC • 5 - 18 kW

Centrifugal condensing unit

Construction

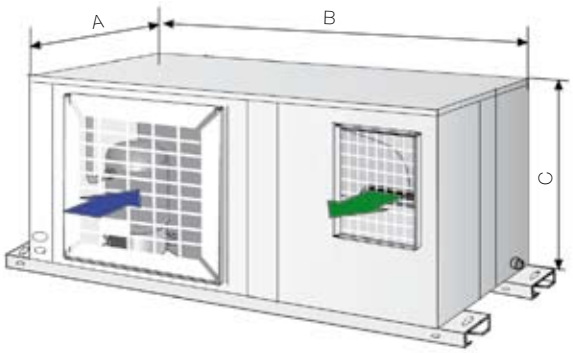
- Pre-painted galvanized sheet steel casing
- Hermetic scroll compressor
- Units delivered with nitrogen holding charge
- Axial condenser fan
- Control panel protection
- 3 phase protection
- Refrigeration connection:
  - Liquid: Copper refrigeration tubing for brazing
  - Suction: Copper refrigeration tubing for brazing
- Return lock
- Reduced height
- Fixing supports included
- Fan protection grille
- Different connectionsoptions for air outlet
- Scroll compressors
- Service valves with flared connections

General data

CENTRIFUGAL CONDENSER		KCCK/KCHK	18	24	30	36	36	48	60	70	80
Cooling mode											
Cooling capacity		kW	5,1	6,6	7,7	9,0	9,0	11,0	13,5	16,1	18,3
Absorbed power		kW	2,0	2,6	3,3	3,87	3,87	4,7	5,8	6,7	7,8
Outdoor operating limits		°C	+19 (0 (1), -10 (2)) / +45								
Start-up intensity		A	47	61	76	95	46	50	66	74	101
Maximum current (axial / centrifugal)		A	13,1	16,5	20,4	21,7	10,3	11,8	14,3	16,3	19,8
Heating mode											
Heating capacity		kW	5,4	6,8	8,4	9,2	9,2	11,4	14,4	16,4	19,0
Absorbed power		kW	2,0	2,6	3,2	3,5	3,5	4,2	5,7	6,0	7,3
Outdoor operating limits		°C	-10 / +18								
Start-up intensity		A	47	61	76	95	46	50	66	74	101
Maximum current (axial / centrifugal)		A	13,1	16,5	20,4	21,7	10,3	11,8	14,3	16,3	19,8
REFRIGERANT CIRCUIT		**KCCK/KCHK**	**18**	**24**	**30**	**36**	**36**	**48**	**60**	**70**	**80**
Shut-off valve diameter		Liquid	1/4"	1/4"	3/8"	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"
		Gas	1/2"	5/8"	5/8"	3/4"	3/4"	3/4"	3/4"	7/8"	7/8"
Refrigerant pipework	Max. vertical	m	15	15	15	15	15	15	15	15	15
	Total	m	25	25	25	25	25	25	25	25	25
Cooling		**KCCK**	**18**	**24**	**30**	**36**	**36**	**48**	**60**	**70**	**80**
Voltage		V/Ph/Hz	230/1/50				400/3/50				
Outdoor unit sound pressure (3)		dB(A)	40		41			43	45		49
Additional charge /m		g	10		20					85	
Refrigerant charge (suitable for 5 m piping)		g	1370	2050	2645	2950		3720	4000	5600	
Heat pump		**KCHK**	**18**	**24**	**30**	**36**	**36**	**48**	**60**	**70**	**80**
Voltage		V/Ph/Hz	230/1/50				400/3/50				
Outdoor unit sound pressure (3)		dB(A)	40		41			43	45		49
Refrigerant charge (suitable for 5 m piping)		g	20		45					85	
Additional charge /m		g	1450	2200	2785	3200		4000	4300	6000	

(1) With ON/OFF low ambient kit
(2) With Proportionnal low ambient kit
(3) Max airlfow - Measured at 10 m from the unit, ducted unit
Cooling duties based on ambient temperature 35°C and evaporator temperature 7°C Heating duties based on ambient temperature 8°C and condensing temperature 40°C

Physical data



CENTRIFUGAL CONDENSER	KCCK	18	24	30	36	48	60	70	80
A	mm	625	625	750	750	820	830	830	900
B	mm	975	975	1050	1050	1250	1300	1300	1450
C	mm	470	470	490	490	495	595	595	595
Weight	kg	78	81	92	92	140	185	190	200

KVCK/KVHK - VFC • 20 - 100 kW

Centrifugal condensing unit

Construction

- Ducted installation
- Galvanized sheet steel casing, with polyester paint finish
- Class M1 insulation
- Centrifugal fan with floating mounting
- Hermetic scroll compressor
- Units delivered with nitrogen holding charge

Options

- Vertical distribution fan discharge
- Kit for high static pressure
- Main ON/OFF switch
- 3 phase rotation protection
- Crankcase heater (cooling only units)
- Softstarter
- Anti-corrosion coil treatment
- Proportional all-season kit
- Hot gas by-pass

General data - E = 1 circuit, D = 2 circuits

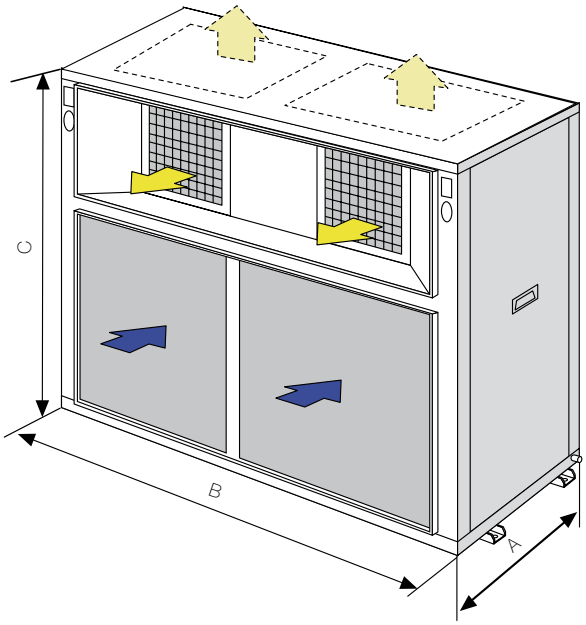
CENTRIFUGAL CONDENSER	KVCK/HK-VFC	22E	24E	28E	32E	38E
Cooling mode						
Cooling Capacity	kW	19,6	21,4	25,7	29,6	36,6
Absorbed power	kW	7,18	7,85	9,56	11,03	13,39
Heating mode						
Heating capacity	kW	20,2	22,5	27,0	30,3	36,9
Electrical data						
Voltage	V/Ph/Hz	400/3/50				
Ventilation						
Minimum Airflow	m^3/h	5600			6500	9000
Maximum Airflow	m^3/h	7550	7350	7100	800	11000
Maximum available static pressure	Pa	170	160	140	300	300
Acoustic						
Sound pressure level (1)	dB(A)	51				

CENTRIFUGAL CONDENSER	KVCK/HK-VFC	44D	48D	56D	64D	76D	86D	100D
Cooling mode								
Cooling Capacity	kW	39,1	42,8	51,4	59,2	72,6	87,0	101,0
Absorbed power	kW	14,36	15,71	19,12	22,07	26,77	32,46	40,13
Heating mode								
Heating capacity	kW	40,4	45,0	54,0	60,6	73,8	89,0	102,0
Electrical data								
Voltage	V/Ph/Hz	400/3/50						
Ventilation								
Minimum Airflow	m^3/h	11200			13000	18000	21000	23000
Maximum Airflow	m^3/h	151000	14700	14200	16000	22000	26000	28000
Maximum available static pressure	Pa	170	160	140	300	300	270	360
Acoustic								
Sound pressure level (1)	dB(A)	58	59		61	62	63	64

(1) Max airlfow - Measured at 10 m from the unit, ducted unit
Cooling duties based on ambient temperature 35°C and evaporator temperature 7°C
Heating duties based on ambient temperature 8°C and condensing temperature 40°C

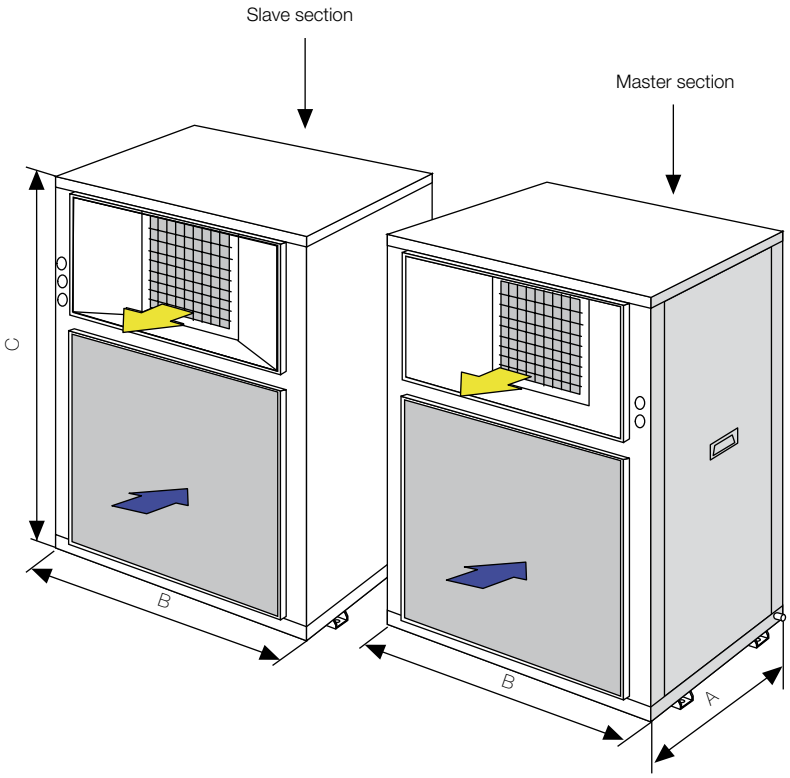
Physical data

Sizes 22E to 76D2



	Standard
	Optional

Sizes 86D, 86D2, 100D and 100D2



CENTRIFUGAL CONDENSER	KVCK/HK-VFC	22E	24E	28E	32E	38E
A	mm	750	750	750	750	750
B	mm	1195	1195	1195	1195	1320
C	mm	1350	1350	1350	1350	1415
Weight	kg	210	270	280	285	365

CENTRIFUGAL CONDENSER	KVCK/HK-VFC	44D	48D	56D	64D	76D	86D	100D
A	mm	750	750	750	750	750	750	750
B	mm	2250	2250	2250	2250	2500	2 x 1570	2 x 1570
C	mm	1350	1350	1350	1350	1415	1440	1440
Weight	kg	410	530	550	555	680	860	910

RA • 150 - 380 kW

Air cooled condensing unit

Introduction to the range

RA is typically used in applications with **air handling units for building air conditioning.**
The **RA** air-cooled units are developed from the ECOLOGIC liquid chiller range and share the same design quality and technological innovations.

Sustainable performance

- Machine welded framework for enhanced rigidity
- Aluzinc sheet casing
- Protection by Epoxy treatment (RAL 9002)
- IP55 class F motor
- Control and protection panel according to EN 60 204-1
- 2 independent cooling circuits

Quiet performance

- Hushtone condenser fan for high efficiency and low noise level

Easy installation, operation and maintenance

- Vertical condenser coils (reduced clogging - easy cleaning)
- CLIMATIC™ electronic controller

Energy performance

- Hermetic scroll compressor
- R407C refrigerant

Options

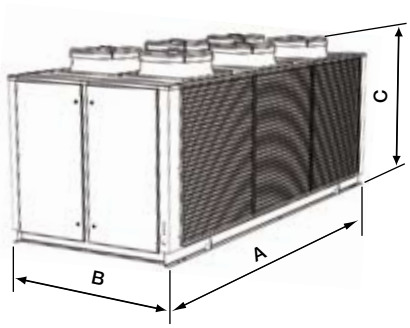
- Condensers protected with Alucoat 507
- Pre-coated aluminium
- Alucoat treatment
- Main ON/OFF switch
- Soft-Starter
- Power factor correction
- Coil guard
- Rubber anti-vibration mountings (delivered separately)
- Anti-vibration springs (delivered separately)
- Sight glass
- Removable cartridge drier
- Removable cartridge drier oversized
- Suction and discharge isolation valve
- LP / HP pressure gauges
- CLIMATIC™
- DC 50 comfort display
- DS 50 maintenance display
- MODBUS Interface

General data

RA	RA	200	230	270	300	370
Cooling mode						
Cooling capacity (1)	kW	193,9	235,4	284,3	302,9	370,6
COP		2,4	2,4	2,3	2,2	2,2
Electrical data						
Voltage	V/Ph/Hz	400/3/50				
Refrigeration circuit						
Number of circuits	Nb	2	2	2	2	2
Compressor	Nb	4	4	4	4	6
Capacity steps	Nb	6	6	6	4	6
Pipe sizes	Liquid	7/8"	7/8"	1" 1/8	1" 1/8	1" 1/8
	Gas	2" 1/8	2" 1/8	2" 5/8	2" 5/8	2" 5/8
Condenser fan (helicoidal)						
Number	Nb	4	4	6	6	6
Nominal airflow	m^3/h	64200	61850	96000	96000	92700
Total motor power input	kW	10	10	15	15	15
Fan speed	tr/mn	1090				
Acoustic						
Global sound power level (2)	dB(A)	91	92	93	93	93
Operating limits						
Maximum outside air temperature (3)	°C	48	47	50	50	47
Minimum outside air temperature (3)	°C	6				
Minimum evaporating temperature	°C	-5				

(1) Evaporating temperature : 7°C - Air : 35°C
(2) EUROVENT conditions
(3) Evaporating temperature : 7°C

Physical data



RA	RA	200	230	270	300	370
A	mm	3304	3304	4704	4704	4704
B	mm	1904	1904	1904	1904	1904
C	mm	1959	1959	1961	1961	1961
Operating weight	kg	1642	786	2254	2302	2734
Weight without water	kg	1605	1730	2197	2246	2649

LFC/LFC-V • 26 - 850 kW

Dry cooler

LFC

LFC-V

Introduction to the range

The **LFC** models are designed for chilling water with water condensers, free cooling, chilling various fluids, industrial processes, etc ...

- 5 fan rotation speeds: 380/430/570/700 and 900 rpm.
- Can be installed with vertical or horizontal airflow

The air-cooled LFC units are fan-type heat exchangers installed outdoors for closed-circuit chilling of copper-compatible liquids (usually glycol solution) at temperatures up to 100°C. The liquid freezing point must be at least 5°K below the minimum ambient winter temperature of the installation site.

The **LFC-V** models have been designed to suit the applications where the installation space is limited.

Designation

LFC 03S 06P 101		
LFC	Lennox Fluid cooler	
03S	Fan arrangement and number	**03** = 3 fans **S** = In single line
06P	Fan rotation speed	**06P** = standard **08P** = average **12P** = quiet **16P** = very quiet
101	Model	**10_** = Ø 762 mm **14_; 17_; 21_** = Ø 900 mm

Advantages

These includes : simple and inexpensive installation (steel pipes); flexible application; assured and reliable operation, summer and winter; ease of winter control of fluid outlet temperature; very low maintenance costs; no water consumption; no steam consumption; no scaling; no bacterial contamination of water.

Construction

Casing:

The casing is made from galvanized sheet steel and pre-lacquered galvanized sheet, colour grey RAL7035. The use of 18/10 stainless steel fastenings provides excellent corrosion resistance and durable surface finish.

Coil :

- Copper tube, in quincunx formation, and corrugated aluminium fins for optimal heat exchange
- Collectors with air bleed and drain plug
- Connections:
  - Standard: threaded steel gas tube DN 20 to DN 50, flanged PN 16 for DN 65 and DN 80
  - Option: flanged PN 16, DN 20 to DN 50

Fans :

The direct drive fans, 762 / 900 mm, are fitted with coupled two-speed motors.

These motors are of the 400 V, three-phase, 50 Hz hermetic «appliance» type, Class F, according to IEC 34-1, with long-lasting lubrication. If the heated air temperature exceeds 60°C you should consult us. The motors are factory wired and connected, in :

- An electrical equipment box for L models (in line motors)
- Two electrical equipment boxes for P models (motors in parallel)

The 06P, 08P and 12P motors are delta-connected : high speed. 16 P motors are produced by star connecting (Y) 12P motors in the factory.

Speed control: if the process requires precise regulation, we recommend the use of a speed controller; consult us for information.

The protective grilles conform to NF E51.190.

Options

Coil:
- Blygold Plus protection of fins (BYD)
- Protection of fins (BAE)
- Copper fins (BCC)
- Special circuits
- Free drainage circuit when not in operation
- Mating flanges, bolts and joints supplied
- Steel 1/2 G or brass bleed and drain valves

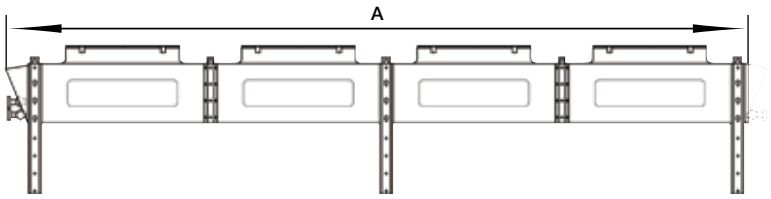
Fans:
- 60 Hz direct drive fans (adapted blades) (M60)
- Factory wiring: 2 speed (star/delta connection) 400 V, 50 or 60 Hz in electrical equipment box(es) (except 06 models) (C2V)

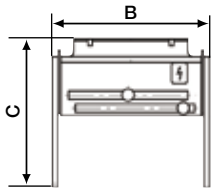
Casing:
- Raised support feet (REH) - LFC models only

Miscellaneous:
- Expansion tank (VEX)
- Safety box (CSE)
- Speed control panel (VDV)

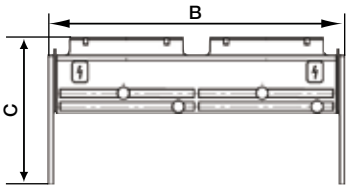
Protection and controls :
- Motors protection cabinet (CMP)
- CMP plus control by fan cycling (RT1)
- CMP plus control by speed regulation (voltage variation) (RT2)
- CMP plus control by speed regulation (frequency variation) (RT3)
- Pressure regulation with electronic motor speed control

Physical data - LFC





Single fan line



Double fan line

	MODEL	REJECTION CAPACITY (KW) (1)		SOUND LEVEL (DB(A))		INPUT POWER (KW)	DIMENSIONS A/B/C (MM)	WEIGHT (KG)
		+32°C	+35°C	LW	LP @10M (2)			
06P (900 rpm)	LFC 01S 06P 101	24,9	17,9	89	51	2,6	1280/1226/1218	174
	LFC 01S 06P 141	34,9	22,0	94	56	2,6	1680/1226/1251	193
	LFC 01S 06P 142	47,3	29,2	94	56	2,6	1680/1226/1251	206
	LFC 01S 06P 172	51	35,3	94	56	2,6	2030/1226/1251	230
	LFC 01S 06P 173	58,7	41,0	94	56	2,6	2030/1226/1251	246
	LFC 01S 06P 213	65,6	45,4	94	56	2,6	2380/1226/1251	276
	LFC 02D 06P 141	71,13	54,0	97	59	5,2	1680/2310/1251	364
	LFC 02S 06P 142	93,8	63,1	97	59	5,2	3082/1226/1251	357
	LFC 02S 06P 143	99,5	68,3	97	59	5,2	3082/1226/1251	382
	LFC 02S 06P 144	110,1	76,0	97	59	5,2	3082/1226/1251	407
	LFC 02S 06P 174	126,6	87,9	97	59	5,2	3782/1226/1251	480
	LFC 02S 06P 214	141	98,5	97	59	5,2	4482/1226/1251	546
	LFC 03S 06P 143	153,8	108,2	99	61	7,8	4484/1226/1251	556
	LFC 03S 06P 144	166,3	117,8	99	61	7,8	4484/1226/1251	594
	LFC 03S 06P 173	179,9	127,6	99	61	7,8	5534/1226/1251	651
	LFC 04S 06P 143	204,8	146,0	100	62	10,4	5886/1226/1251	720
	LFC 04S 06P 144	223	154,7	100	62	10,4	5886/1226/1251	770
	LFC 05S 06P 142	227,3	164,2	101	63	13	7288/1226/1251	832
	LFC 05S 06P 143	251	180,6	101	63	13	7288/1226/1251	895
	LFC 05S 06P 144	276,9	191,7	101	63	13	7288/1226/1251	957
	LFC 06D 06P 143	306,9	222,2	102	64	15,6	4484/2310/1251	1025
	LFC 06D 06P 174	379,9	263,9	102	64	15,6	5534/2310/1251	1241
	LFC 08D 06P 143	409,6	291,4	103	65	20,8	5886/2310/1251	1324
	LFC 08D 06P 173	479,9	330,6	103	65	20,8	7286/2310/1251	1499
	LFC 10D 06P 143	526,2	361,1	104	66	26	7288/2310/1251	1635
	LFC 10D 06P 144	554,9	397,8	104	66	26	7288/2310/1251	1760
	LFC 12D 06P 144	NA	472,4	105	67	31,2	8690/2310/1251	2085

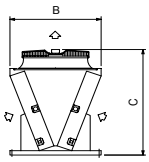
(1) Water conditions: in/out 45°C/40°C, 34% glycol
(2) Sound pressure level in dB(A) measured at 10 meters distance, at fan blade level, in a free field on a reflective plan, given as indicative value. Only the acoustic power and the Lw value, are contractual and usable for the calculation of the sound pressure level data at owner land limits.
For any other condition, please consult your Lennox representative.

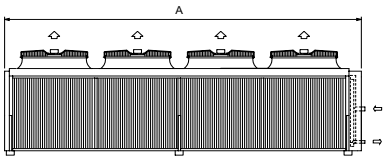
Physical data - LFC

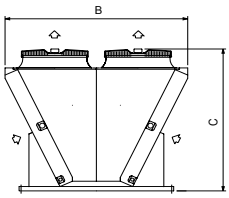
	MODEL	REJECTION CAPACITY (KW) (1)		SOUND LEVEL (DB(A))		INPUT POWER (KW)	DIMENSIONS A/B/C (MM)	WEIGHT (KG)
		+32°C	+35°C	LW	LP @10M (2)			
08P (700 rpm)	LFC 01S 08P 101	22,9	16,5	81	43	1,35	1280/1226/1218	174
	LFC 01S 08P 171	36,3	24,3	86	48	1,35	2030/1226/1251	215
	LFC 01S 08P 172	44,1	30,0	86	48	1,35	2030/1226/1251	230
	LFC 01S 08P 212	49,5	34,3	86	48	1,35	2380/1226/1251	257
	LFC 01S 08P 213	54,6	38,4	86	48	1,35	2380/1226/1251	276
	LFC 02S 08P 141	69,1	46,4	89	51	2,7	3082/1226/1251	332
	LFC 02S 08P 142	79,3	56,1	89	51	2,7	3082/1226/1251	357
	LFC 02S 08P 143	84,7	62,5	89	51	2,7	3082/1226/1251	382
	LFC 02S 08P 173	97,5	69,5	89	51	2,7	3782/1226/1251	448
	LFC 02S 08P 213	109,1	77,6	89	51	2,7	4482/1226/1251	509
	LFC 03S 08P 142	118,6	85,8	91	53	4,05	4484/1226/1251	519
	LFC 04S 08P 141	138,3	98,0	92	54	5,4	5886/1226/1251	620
	LFC 03S 08P 173	149,4	106,5	91	53	4,05	5534/1226/1251	651
	LFC 04D 08P 143	175,7	121,9	92	54	5,4	3082/2310/1251	714
	LFC 04S 08P 172	185,4	132,0	92	54	5,4	7286/1226/1251	791
	LFC 04D 08P 173	199	143,3	92	54	5,4	3782/2310/1251	796
	LFC 05S 08P 143	217,9	156,6	93	55	6,75	7288/1226/1251	895
	LFC 06D 08P 143	261,3	185,4	94	56	8,1	4484/2310/1251	1025
	LFC 06D 08P 174	309,2	226,6	94	56	8,1	5534/2310/1251	1241
	LFC 08D 08P 172	370,3	264,0	95	57	10,8	7286/2310/1251	1374
	LFC 10D 08P 143	435,8	312,5	96	58	13,5	7288/2310/1251	1635
	LFC 12D 08P 144	549,9	385,7	97	59	16,2	8690/2310/1251	2085
12P (430 rpm)	LFC 01S 12P 101	17,7	12,6	67	29	0,5	1280/1226/1218	165
	LFC 01S 12P 171	29,5	18,0	72	34	0,5	2030/1226/1251	215
	LFC 01S 12P 212	35,6	23,5	72	34	0,5	2380/1226/1251	257
	LFC 02S 12P 141	50,6	32,4	75	37	1	3082/1226/1251	332
	LFC 03S 12P 102	57,5	39,1	72	34	1,5	3284/1226/1218	424
	LFC 02S 12P 172	65,1	45,9	75	37	1	3782/1226/1251	417
	LFC 03S 12P 141	75,4	54,3	77	39	1,5	4484/1226/1251	481
	LFC 03S 12P 171	87,9	61,6	77	39	1,5	5534/1226/1251	557
	LFC 03S 12P 172	95,4	69,7	77	39	1,5	5534/1226/1251	604
	LFC 04S 12P 142	112,6	80,3	78	40	2	5886/1226/1251	670
	LFC 05S 12P 141	128,7	91,9	79	41	2,5	7288/1226/1251	770
	LFC 05S 12P 142	140,2	100,6	79	41	2,5	7288/1226/1251	832
	LFC 06D 12P 142	170,9	119,6	42	4,73	3	4484/2310/1251	950
	LFC 06D 12P 172	190,8	139,5	42	7,65	3	5534/2310/1251	1054
	LFC 08D 12P 171	234,1	167,1	81	43	4	7286/2310/1251	1250
	LFC 10D 12P 141	257,4	183,2	82	44	5	7288/2310/1251	1385
	LFC 10D 12P 171	286,6	207,3	82	44	5	9038/2310/1251	1539
	LFC 12D 12P 142	341,3	238,7	83	45	6	8690/2310/1251	1785
16P (320 rpm)	LFC 01S 16P 101	15,3	11,0	57	19	0,28	1280/1226/1218	165
	LFC 01S 16P 171	23,2	14,3	62	24	0,28	2030/1226/1251	215
	LFC 02S 16P 101	29	20,0	60	22	0,56	2282/1226/1218	275
	LFC 02S 16P 141	40,6	27,1	65	27	0,56	3082/1226/1251	332
	LFC 02S 16P 171	46,3	31,4	65	27	0,56	3782/1226/1251	386
	LFC 02S 16P 211	51,6	36,4	65	27	0,56	4482/1226/1251	434
	LFC 03S 16P 141	61,4	43,4	67	29	0,84	4484/1226/1251	481
	LFC 03S 16P 171	69,1	50,3	67	29	0,84	5534/1226/1251	557
	LFC 04S 16P 141	81,1	57,9	68	30	1,12	5886/1226/1251	620
	LFC 04S 16P 171	94,3	66,8	68	30	1,12	7286/1226/1251	729
	LFC 05S 16P 141	100,6	72,4	69	31	1,4	7288/1226/1251	770
	LFC 06D 16P 141	122,7	86,7	70	32	1,68	4484/2310/1251	875
	LFC 06D 16P 171	137,9	100,3	70	32	1,68	5534/2310/1251	960
	LFC 08D 16P 141	161,9	117,6	71	33	2,24	5886/2310/1251	1125
	LFC 08D 16P 171	188,3	133,6	71	33	2,24	7286/2310/1251	1250
	LFC 08D 16P 211	205,2	149,2	71	33	2,24	8686/2310/1251	1324
	LFC 12D 16P 141	245,4	176,3	73	35	3,36	8690/2310/1251	1635

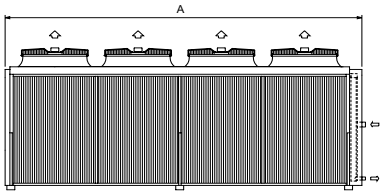
(1) Water conditions: in/out 45°C/40°C, 34% glycol
(2) Sound pressure level in dB(A) measured at 10 meters distance, at fan blade level, in a free field on a reflective plan, given as indicative value. Only the acoustic power and the Lw value, are contractual and usable for the calculation of the sound pressure level data at owner land limits.
For any other condition, please consult your Lennox representative.

Physical data - LFC-V





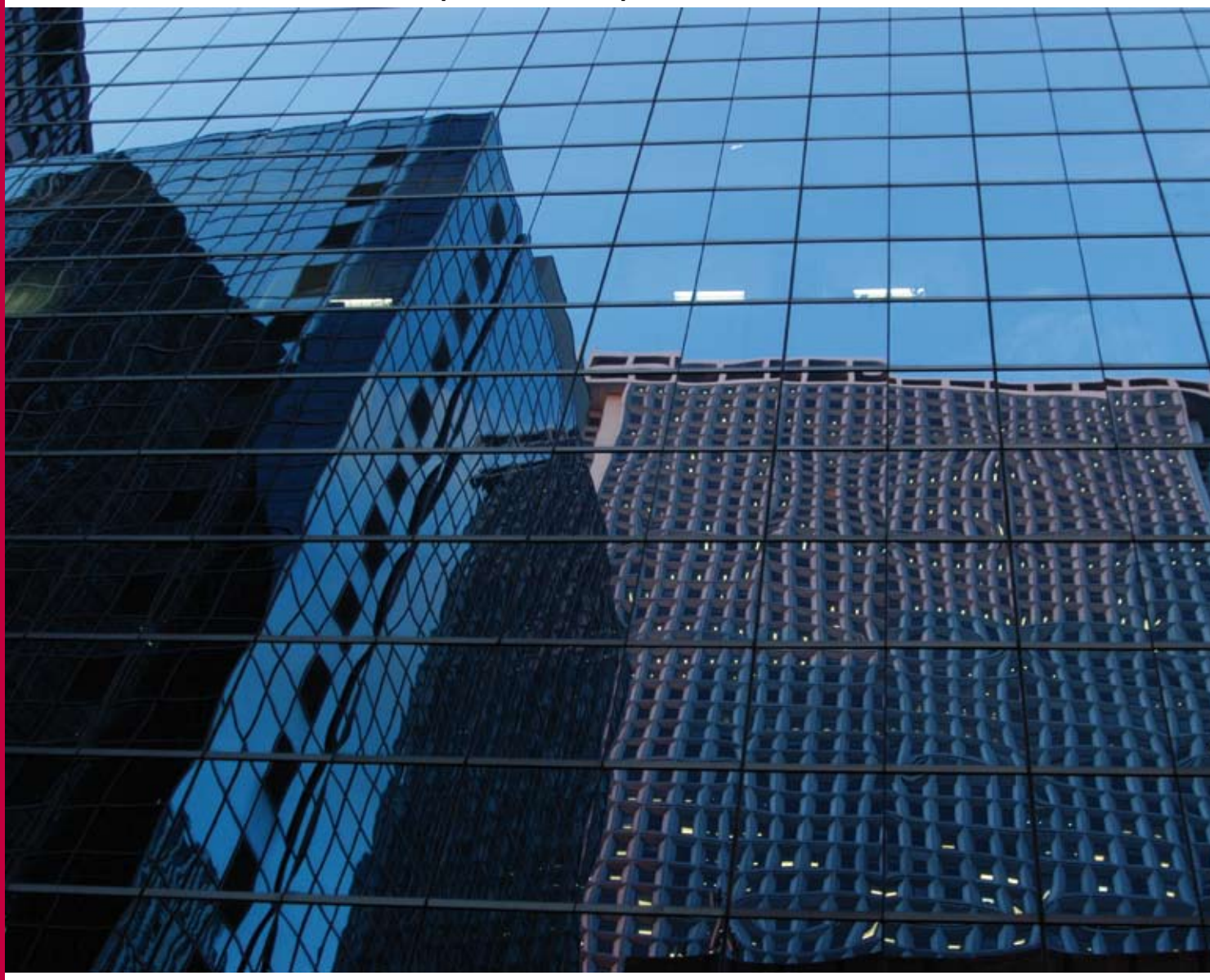




	MODEL	REJECTION CAPACITY (KW) [1]		SOUND LEVEL (DB(A))		INPUT POWER (KW)	DIMENSIONS A/B/C (MM)	WEIGHT (KG)
		+32°C	+35°C	LW	LP @10M [2]			
06P (880 rpm)	LFC-V 01S 06P 101	47	32,0	83,0	45	2	1350/1150/1450	280
	LFC-V 01S 06P 102	51,1	38,6	83,0	45	2	1350/1150/1450	300
	LFC-V 02S 06P 101	93,9	67,3	86,0	48	4	2400/1150/1450	490
	LFC-V 02S 06P 102	107	77,1	86,0	48	4	2400/1150/1450	540
	LFC-V 03S 06P 101	140,8	95,9	88,0	50	6	3450/1150/1450	730
	LFC-V 03S 06P 102	160,5	112,7	88,0	50	6	3450/1150/1450	770
	LFC-V 04D 06P 101	168,8	114,6	89,0	51	8	2400/2300/1950	720
	LFC-V 04S 06P 101	178,3	134,5	89,0	51	8	4500/1150/1450	820
	LFC-V 04D 06P 102	183,2	138,5	89,0	51	8	2400/2300/1950	940
	LFC-V 04S 06P 102	202,7	154,4	89,0	51	8	4500/1150/1450	850
	LFC-V 06D 06P 101	253,1	171,8	91,0	53	12	3450/2300/1950	1230
	LFC-V 05S 06P 102	260,9	180,7	90,0	52	10	5550/1150/1450	1130
	LFC-V 06D 06P 102	288,9	198,7	91,0	53	12	3450/2300/1950	1340
	LFC-V 08D 06P 102	365,5	277,3	92,0	54	16	4500/2300/1950	1570
	LFC-V 10D 06P 101	410,6	299,4	93,0	55	20	5550/2300/1950	1810
	LFC-V 12D 06P 101	507,6	345,2	94,0	56	24	6600/2300/1950	2160
	LFC-V 12D 06P 102	578,8	397,4	94,0	56	24	6600/2300/1950	2350
08P (660 rpm)	LFC-V 01S 08P 101	38,9	27,4	78,0	40	1,25	1350/1150/1450	280
	LFC-V 01S 08P 102	43,3	31,4	78,0	40	1,25	1350/1150/1450	300
	LFC-V 02S 08P 101	77,9	55,9	81,0	43	2,5	2400/1150/1450	490
	LFC-V 02S 08P 102	86,7	62,7	81,0	43	2,5	2400/1150/1450	540
	LFC-V 03S 08P 101	116,8	85,3	83,0	45	3,75	3450/1150/1450	730
	LFC-V 03S 08P 102	130	95,5	83,0	45	3,75	3450/1150/1450	770
	LFC-V 04D 08P 101	140,36	100,6	84,0	46	5	2400/2300/1950	720
	LFC-V 04S 08P 101	147,2	112,0	84,0	46	5	4500/1150/1450	820
	LFC-V 04D 08P 102	147,68	112,2	84,0	46	5	2400/2300/1950	940
	LFC-V 04S 08P 102	178,8	125,4	84,0	46	5	4500/1150/1450	850
	LFC-V 05S 08P 102	214,2	145,7	85,0	47	6,25	5550/1150/1450	1130
	LFC-V 06D 08P 101	210,5	147,1	86,0	48	7,5	3450/2300/1950	1230
	LFC-V 06D 08P 102	232,7	163,6	86,0	48	7,5	3450/2300/1950	1340
	LFC-V 08D 08P 102	292,7	224,3	87,0	49	10	4500/2300/1950	1570
	LFC-V 10D 08P 101	341,8	250,1	88,0	50	12,5	5550/2300/1950	1810
	LFC-V 12D 08P 102	466,4	327,6	89,0	51	15	6600/2300/1950	2350
12P (440 rpm)	LFC-V 01S 12P 101	30,1	20,7	67,0	29	0,37	1350/1150/1450	270
	LFC-V 02S 12P 101	61	43,4	70,0	32	0,74	2400/1150/1450	470
	LFC-V 03S 12P 101	89,8	65,0	72,0	34	1,11	3450/1150/1450	710
	LFC-V 04D 12P 101	110,6	79,4	73,0	35	1,48	2400/2300/1950	690
	LFC-V 04S 12P 101	121,9	86,7	73,0	35	1,48	4500/1150/1450	790
	LFC-V 05S 12P 101	145,7	109,8	74,0	36	1,85	5550/1150/1450	990
	LFC-V 06D 12P 101	155,2	117,5	75,0	37	2,22	3450/2300/1950	1190
	LFC-V 08D 12P 101	221,1	154,5	76,0	38	2,96	4500/2300/1950	1390
	LFC-V 10D 12P 101	275,3	198,7	77,0	39	3,7	5550/2300/1950	1730
	LFC-V 12D 12P 101	321,5	235,5	78,0	40	4,44	6600/2300/1950	2070
16P (330 rpm)	LFC-V 01S 16P 101	25,1	17,3	61,0	23	0,2	1350/1150/1450	270
	LFC-V 02S 16P 101	51	36,3	63,0	25	0,4	2400/1150/1450	470
	LFC-V 03S 16P 101	77,2	55,3	65,0	27	0,6	3450/1150/1450	710
	LFC-V 04D 16P 101	91,8	66,1	66,0	28	0,8	2400/2300/1950	690
	LFC-V 04S 16P 101	101,9	72,6	66,0	28	0,8	4500/1150/1450	790
	LFC-V 05S 16P 101	121,3	92,2	67,0	29	1	5550/1150/1450	990
	LFC-V 06D 16P 101	139,2	99,5	68,0	30	1,2	3450/2300/1950	1190
	LFC-V 08D 16P 101	183,6	130,7	69,0	31	1,6	4500/2300/1950	1390
	LFC-V 10D 16P 101	228,4	165,8	70,0	32	2	5550/2300/1950	1730
	LFC-V 12D 16P 101	270,3	196,6	71,0	33	2,4	6600/2300/1950	2070

(1) Water conditions: in/out 45°C/40°C, 34% glycol
(2) Sound pressure level in dB(A) measured at 10 meters distance, at fan blade level, in a free field on a reflective plan, given as indicative value. Only the acoustic power and the Lw value, are contractual and usable for the calculation of the sound pressure level data at owner land limits.
For any other condition, please consult your Lennox representative.

Chillers,
and Heat pumps



Providing indoor climate comfort

Ecolean™ • 9 ➔ 19 kW

Air cooled chiller/heat pump

ECOLEAN™

Standard unit

High static unit

Introduction to the range

ECOLEAN™ can be used for **comfort applications such as small office and small shops air conditioning.**
The **ECOLEAN™** range benefits from the latest technological innovations such as scroll compressors, microprocessor control, brazed plate exchanger, etc. Each unit is available in the cooling only or heat pump version.

Energy performance

- Scroll compressor
- R407C refrigerant

Easy installation, operation and maintenance

- Hydraulic modules incorporated in the same cabinet
- Threaded hydraulic connection
- Optimal access to the various components
- Galvanized sheet steel framework with fork lift pockets for ease of maintenance

Architectural integration

- Unit with available pressure fan for indoor installation (FP version - up to 200 Pa)

Advanced control

- CLIMATIC™ electronic controller with display
- Timer:
  - Balanced compressor operation
  - Short-cycling prevention
- General alarm with report
- Remote start/stop
- Hydraulic module control (pump, safety device, ...)

General data

ECOLEAN™ STD	EAC/EAR	91	111	151	191	211
Cooling mode						
Cooling capacity (1)	kW	8,84	11,2	13,4	17,4	19,2
EER (3)		2,86	2,96	2,72	2,74	2,72
ESEER (3)		3,16	3,22	3,17	3,21	3,30
Heating mode						
Heating capacity (2)	kW	8,96	11	13,1	17,4	19,8
COP		2,66	2,47	2,48	2,55	2,56
Electrical data						
Voltage	V/Ph/Hz	400/3/50				
Refrigeration circuit						
Number of circuits	Nr	1				
Compressor	Nr	1				
Evaporator	Type	Brazed plates				
Capacity steps	Nr	1				
Refrigerant charge per circuit (cooling only/heat pump unit)	kg	3/3,1	3/3,1	3,4/3,9	4/5	5,5/6,5
Pressure drop						
Nominal water flow	m^3/h	1,51	1,91	2,3	2,99	3,29
Pressure drop without water filter	kPa	25	39	29	47	41
Pressure with optional water filter	kPa	49	66	58	81	78
Hydraulic connection						
Type		Threaded - Female				
Diameter	Inches	1"				
Acoustic						
Sound power level (3)	dB(A)	73	75	76	76	79

General data - High static version

ECOLEAN™ FP	EAC/EAR	91	111	151	191	211
Cooling mode						
Cooling capacity (1)	kW	8,8	11,1	13,3	17,3	19,1
EER (3)		2,3	2,1	2,0	2,2	2,2
Heating mode						
Heating capacity (2)	kW	9	11,1	13,1	17,5	19,8
COP		2,3	1,9	2	2,2	2,3
Electrical data						
Voltage	V/Ph/Hz	400/3/50				
Refrigeration circuit						
Number of circuits	Nr	1				
Compressor	Nr	1				
Evaporator	Type	Brazed plates				
Capacity steps	Nr	1				
Refrigerant charge per circuit (cooling only/heat pump unit)	kg	3/3,1	3/3,1	3,4/3,9	4/5	5,5/6,5
Pressure drop						
Nominal water flow	m^3/h	1,51	1,91	2,3	2,98	3,29
Pressure drop without water filter	kPa	24,8	38,9	28,5	46,5	41
Pressure with optional water filter	kPa	49	66	58	81	78
Hydraulic connection						
Type		Threaded - Female				
Diameter	Inches	1»				
Acoustic						
Sound power level (3)	dB(A)	79	82	82	82	83

(1) Water: 12°C/7°C - Air: 35°C
(2) Water: 45°C - Air: 7°C
(3) Eurovent conditions

Operating limits

ECOLEAN™	EAC/EAR	91	111	151	191	211
Operating limits (cooling only / heat pump unit)						
Maximum outside air temperature	°C	46/23				
Minimum outside air temperature	°C	0°C (-15°C as an option)/-10°C (-15°C as an option)				
Maximum inlet water temperature	°C	17/43				
Minimum outlet water temperature	°C	+5°C and -10°C (as an option)/+20°C				

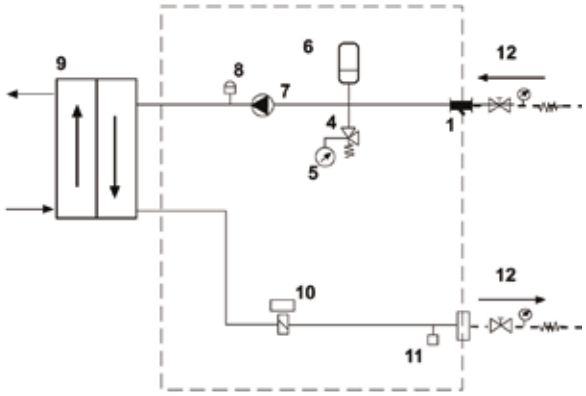
General data - Integrated hydraulic module

ECOLEAN™ HY / HN	EAC/EAR	91	111	151	191	211
Pump module						
Nominal water flow	m^3/h	1,51	1,91	2,3	2,98	3,29
Available static pressure	kPa	196	161	152	140	126
Voltage	V/Ph/Hz	230/1/50			400/3/50	
Absorbed power	kW	0,49			0,72	
Maximum current	A	2,3			1,4	
Expansion vessel volume	l	5				
Maximum pressure - Expansion vessel	Bar	4				
Weight	kg	14				15
Buffer tank (1)						
Volume	l	50				
Weight	kg	30				
Antifreeze heater (option)	kW	2,25				
Additional electrical heater (option for HP units only)	kW	6				

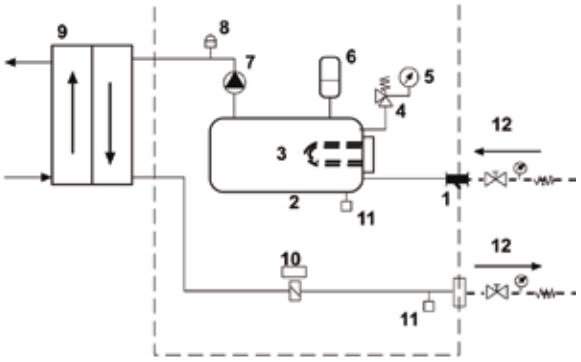
(1) Available only for the "Hydronic" type version

Principle sketch - Integrated hydraulic module

"Hydraulic" module (HY)



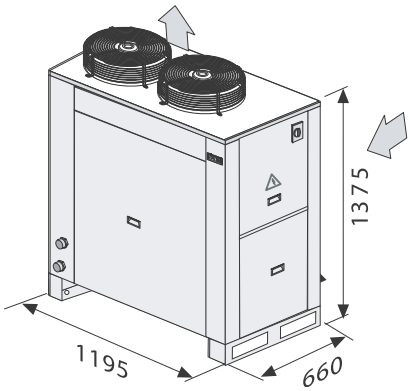
"Hydronic" module (HN)



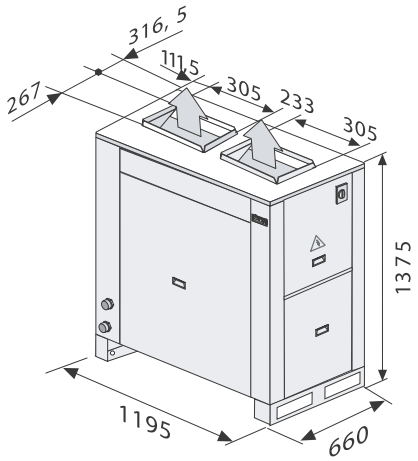
1. Water filter (removable)
2. Tank
3. Immersion heater for tank (optional)
4. Safety valve
5. Pressure gauge
6. Expansion tank
7. Pump
8. Air bleed valve
9. Plate exchanger
10. Flow switch
11. Drain valve
12. Water isolation valves (optional)

Physical data

Standard version



High static version



ECOLEAN™ STD	EAC/EAR	91	111	151	191	211
Standard version						
Operating weight (1)	kg	150	158	172	185	250
High static version						
Operating weight (1)	kg	159	176	190	204	268
Additional weight						
«HYDRAULIC» module without water (2)	kg	14				15
«HYDRONIC» module without water(2)	kg	44				45

(1) Not including the «HYDRAULIC» or «HYDRONIC» module
(2) Weight to be added to that of the corresponding machine - Warning! Be sure to allow for the volume of the components when calculating the load weight

Options

- Water tank electrical heater (230V - 400V) (2)
- Epoxy coated Al fins coils treated
- Main ON/OFF switch
- Softstarter (1)
- Three phase protection
- Evaporator antifreeze protection
- Tank antifreeze heater (230V-400V)
- Flow switch (3)
- Water filter (supplied loose) (3)
- Coils protection guards:
- Low ambient kit (-15°C) - EAC only
- Heating Low ambient kit (-15°C) (2):
- Thermostatic hot gas injection
- Kit low water temperature (water outlet: 0°C / -5°C / -10°C)
- Compressor noise insulation jacket
- Anti-vibration mounts rubber (supplied loose)
- HP & LP refrigerant Gauges
- In/Out isolating valves (supplied loose)
- Interface mod-Bus KPO6 (max. 8 units and supplied loose
- Dynamic set point
- Alarm relay
- Adaptor for interface Mod-Bus (1 per unit - supplied loose)
- Remote display (supplied loose)

(1) Available only for 400/3/50 Hz
(2) Heat pump units only
(3) Included on "Hydraulic" and "Hydronic" versions

Ecolean™ • 22 ➔ 174 kW

Air cooled chiller/heat pump

ECOLEAN™

Standard unit

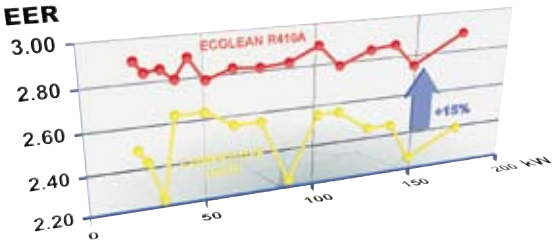
High static unit

Introduction to the range

ECOLEAN™ can be used for **comfort applications such as office buildings, shops, and hotels air conditioning.**
The Ecolean range benefits from the latest technological innovations such as R410A scroll compressors, microprocessor control, brazed plate exchanger, etc. Each unit is available in the cooling only or heat pump version.

Energy performance

- Scroll compressor
- R410A refrigerant
- Average EER of 2,8
- Average COP of 3,0



Quiet performance

- Unit design with compressor enclosure
- Latest fan design with external rotor technology

Easy installation, operation and maintenance

- Hydraulic modules incorporated in the same cabinet (versions with or without buffer tank)
- Threaded hydraulic connection
- Optimal access to the various components
- Galvanized sheet steel framework with fork lift pockets for ease of maintenance

Architectural installation

- Flat deck and low unit height (standard unit)
- Unit with available pressure fan for indoor installation (FP version - up to 350 Pa and more, depending on size)

Advanced control

- CLIMATIC™ electronic controller with display
- Timer:
  - Balanced compressor operation
  - Short-cycling prevention
- General alarm with report
- Remote start/stop
- Hydraulic module control (pump, safety device, ...)

General data - Standard version - Sizes 251 to 812

ECOLEAN™ STD	EAC/EAR	251	291	351	431	472	552	672	812
Cooling mode									
Cooling capacity (1)	kW	22,1	25,9	32	37,6	44,1	50,7	63,4	75,4
EER (3)		2;9	2;85	2;86	2;81	2,9	2,79	2,83	2,82
ESEER		3,27	3,26	3,26	3,18	3,91	3,87	3,86	3,96
Heating mode									
Heating capacity (2)	kW	23,6	27,6	33,6	37,8	47,8	54,7	68	75,7
COP		3	3	3	2,91	3	2,94	3	2,92
Electrical data									
Voltage	V/Ph/ Hz	400/3/50							
Refrigeration circuit									
Refrigerant	Type	R410A							
Number of circuits (cooling/heating mode)	Nr	1				1/2			
Compressor	Nr	1				2			
Evaporator	Type	Brazed plates							
Capacity steps	Nr	1				2			
Refrigerant charge per circuit (cooling only/heat pump unit)	kg	5,5/5,8	6,11/6,5	8/8,7	09/10	11/11,4	12,2/12,7	16,1/16,8	18,5/19,3
Pressure drop									
Nominal water flow	m^3/h	3,8	4,45	5,5	6,47	7,59	8,72	10,9	12,98
Pressure drop without water filter	kPa	51	54	30	34	32	34	40	47
Pressure drop with optional water filter	kPa	69	78	60	73	50	57	71	87
Hydraulic connection									
Type		Threaded - Female							
Diameter	Inches	1 1/2"				2"			
Acoustic									
Sound power level (3)	dB(A)	78	81	80	81	81	84	83	84

General data - Standard version - Sizes 1003 to 1804

ECOLEAN™ STD	EAC/EAR	1003	1103	1203	1303	1403	1604	1804
Cooling mode								
Cooling capacity (1)	kW	88,2	102	112	126	139	149	174
EER (3)		2,83	2,9	2,79	2,86	2,87	2,76	2,9
ESEER		4,19	3,97	3,83	3,87	3,98	4,02	4,06
Heating mode								
Heating capacity (2)	kW	95	108	118	130	143	159	180
COP		3,05	3	3	2,92	2,97	3	2,95
Electrical data								
Voltage	V/ Ph/Hz	400/3/50						
Refrigeration circuit								
Refrigerant	Type	R410A						
Number of circuits	Nr	2						
Compressor	Nr	3					4	
Evaporator	Type	Brazed plates						
Capacity steps	Nr	3					4	
Refrigerant charge per circuit (CO/HP)	kg	21,8/22,7	25,3/26,3	26,7/27,9	29,7/31	33,7/35,1	36,2/37,7	42,1/43,9
Pressure drop								
Nominal water flow	m^3/h	15,17	17,61	19,23	21,62	23,87	25,66	29,86
Pressure drop without water filter	kPa	32	38	43	48	53	44	52
Pressure drop with optional water filter	kPa	41	50	61	70	80	62	76
Hydraulic connection								
Type		Threaded - Female						
Diameter	Inches	2 1/2"					3"	
Acoustic								
Sound power level (3)	dB(A)	85	87	88	90	90	89	89

(1) Water: 12°C/7°C - Air: 35°C
(2) Water: 45°C - Air: 7°C
(3) Eurovent conditions

General data - High static version - Sizes 251 to 812

ECOLEAN™ FP1 / FP2	EAC/EAR	251	291	351	431	472	552	672	812
Cooling mode									
Cooling capacity (1)	kW	22,1	25,9	32	37,6	44,1	50,7	63,4	75,4
EER - FP1/FP2		2,56/2,32	2,6/2,38	2,66/2,44	2,65/2,46	2,56/2,32	2,55/2,34	2,64/2,42	2,66/2,47
Heating mode									
Heating capacity (2)	kW	23,6	27,6	33,6	37,8	47,8	54,7	68	75,7
COP - FP1/FP2		2,66/2,41	2,74/2,52	2,80/2,59	2,74/2,54	2,66/2,42	2,7/2,47	2,8/2,59	2,75/2,55
Electrical data									
Voltage	V / Ph / Hz	400/3/50							
Refrigeration circuit									
Refrigerant	Type	R410A							
Number of circuits (cooling/heating mode)	Nr	1				1/2			
Compressor	Nr	1				2			
Evaporator	Type	Brazed plates							
Capacity steps	Nr	1							
Refrigerant charge per circuit (cooling only/heat pump unit)	kg	5,5/5,8	6,11/6,5	8/8,7	9/10	11/11,4	12,2/12,7	16,1/16,8	18,5/19,3
Pressure drop									
Nominal water flow	m^3/h	3,8	4,45	5,5	6,47	7,59	8,72	10,9	12,98
Pressure drop without water filter	kPa	51	54	30	34	32	34	40	47
Pressure drop with optional water filter	kPa	69	78	60	73	50	57	71	87
Hydraulic connection									
Type		Threaded - Female							
Diameter	Inches	1 1/2"				2"			
Acoustic									
Sound power level - FP1 version (3)	dB(A)	86	86	86	86	89	89	89	89
Sound power level - FP2 version (3)	dB(A)	90	90	90	90	93	93	93	93

General data - High static version - Sizes 1003 to 1804

ECOLEAN™ FP1 / FP2	EAC/EAR	1003	1103	1203	1303	1403	1604	1804
Cooling mode								
Cooling capacity (1)	kW	88,2	102	112	126	139	149	174
EER - FP1/FP2		2,59/2,3	2,75/2,46	2,66/2,41	2,8/2,55	2,82/2,59	2,71/2,51	2,64/2,34
Heating mode								
Heating capacity (2)	kW	95	107,8	118,2	130,4	142,5	158,7	179,6
COP - FP1/FP2		2,79/2,48	2,85/2,56	2,86/2,59	2,86/2,62	2,91/2,68	2,94/2,73	2,34/2,39
Electrical data								
Voltage	V / Ph / Hz	400/3/50						
Refrigeration circuit								
Refrigerant	Type	R410A						
Number of circuits (cooling/heating mode)	Nr	2						
Compressor	Nr	3					4	
Evaporator	Type	Brazed plates						
Capacity steps	Nr	3					4	
Refrigerant charge per circuit (CO/HP)	kg	21,8/22,7	25,3/26,3	26,7/27,9	29,7/31	33,7/35,1	36,2/37,7	42,1/43,9
Pressure drop								
Nominal water flow	m^3/h	15,17	17,61	19,23	21,62	23,87	25,66	29,86
Pressure drop without water filter	kPa	32	38	43	48	53	44	52
Pressure drop with optional water filter	kPa	41	50	61	70	80	62	76
Hydraulic connection								
Type		Threaded - Female						
Diameter	Inches	2 1/2"					3"	
Acoustic								
Sound power level - FP1 version (3)	dB(A)	88	88	89	90	90	88	91
Sound power level - FP2 version (3)	dB(A)	97	97	97	97	97	97	100

(1) Water: 12°C/7°C - Air: 35°C
(2) Water: 45°C - Air: 7°C
(3) Eurovent conditions

Operating limits

ECOLEAN™ & ECOLEAN™ FP1 / FP2	EAC/EAR	ALL SIZES
Operating limits (cooling only / heat pump unit)		
Maximum outside air temperature - Standard & FP1 version	°C	48/23
Maximum outside air temperature - FP2 version	°C	46/23
Minimum outside air temperature	°C	0°C (-15°C as an option)/-10°C (-15°C as an option)
Maximum inlet water temperature - Standard version	°C	22/43
Maximum inlet water temperature - High static version	°C	19/43
Minimum outlet water temperature - Standard version	°C	5/20
Minimum outlet water temperature - High static version	°C	+5°C and -10°C (as an option)/+20°C

General data - Integrated hydraulic module

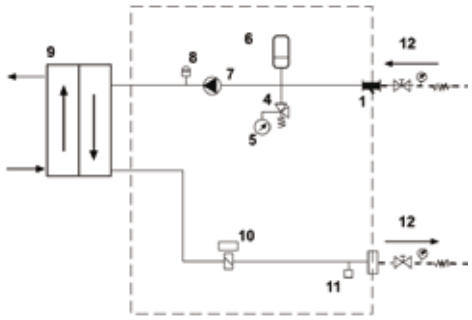
ECOLEAN™ HY / HN	EAC/EAR	251	291	351	431	472	552	672	812
Pump module									
Nominal water flow	m^3/h	3,8	4,45	5,5	6,62	7,59	8,72	10,9	12,98
Available static pressure	kPa	131	106	150	96	128	115	165	107
Voltage	V/Ph/Hz	400/3/50							
Absorbed power	kW	0,72		1,1	1,1	1,17		1,55	
Expansion vessel volume	l	12				18			
Maximum pressure - Expansion vessel	Bar	4							
Weight	kg	16		17		23		24	
Buffer tank (1)									
Volume	l	75				100			
Weight	kg	31				32		33	
Antifreeze heater (option)	kW	2,25							
Additional electrical heater (option for HP units only)	kW	9				12			

ECOLEAN™ HY / HN	EAC/EAR	1003	1103	1203	1303	1403	1604	1804
Pump module								
Nominal water flow	m^3/h	15,17	17,61	19,23	21,62	23,87	25,66	29,93
Available static pressure	kPa	189	172	151	131	115	115	137
Voltage	V/Ph/Hz	400/3/50						
Absorbed power	kW	1,55	1,6	1,7	1,8	2,93		3,7
Expansion vessel volume	l	35					50	
Maximum pressure - Expansion vessel	Bar	4						
Weight	kg	26				29	27	45
Buffer tank (1)								
Volume	l	240					350	
Weight	kg	55					70	
Antifreeze heater (option)	kW	6					8,25	
Additional electrical heater (option for HP units only)	kW	24					36	

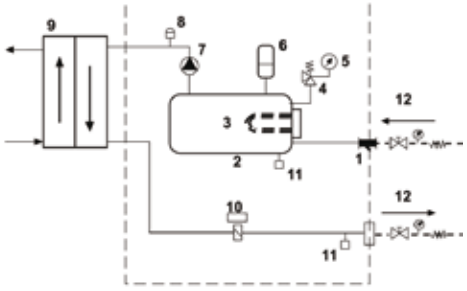
(1) Available only for the "Hydronic" type version

Principle sketch - Integrated hydraulic module

"Hydraulic" module (HY)

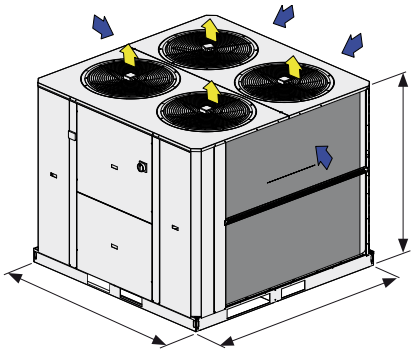


"Hydronic" module (HN)



1. Water filter (removable)
2. Tank
3. Immersion heater for tank (optional)
4. Safety valve
5. Pressure gauge
6. Expansion tank
7. Pump
8. Air bleed valve
9. Plate exchanger
10. Flow switch
11. Drain valve
12. Water isolation valves (optional)

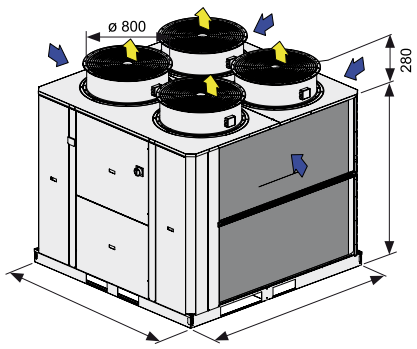
Physical data - Standard version



ECOLEAN™ STD	EAC/EAR	251	291	351	431	472	552	672	812
A	mm	1195	1195	1195	1195	1960	1960	1960	1960
B	mm	980	980	980	980	1195	1195	1195	1195
C	mm	1375	1375	1375	1375	1375	1375	1375	1375
Operating weight (1)	kg	243	251	271	300	480	492	534	578
Additional weight									
«HYDRAULIC» module without water (2)	kg	16		17		23		24	
«HYDRONIC» module without water(2)	kg	47		48		55		57	

ECOLEAN™ STD	EAC/EAR	1003	1103	1203	1303	1403	1604	1804
A	mm	2250	2250	2250	2250	2250	2250	2250
B	mm	1420	1420	1420	1420	1420	2300	2300
C	mm	1875	1875	1875	1875	1875	1975	1975
Operating weight (1)	kg	663	831	964	1016	1045	1167	1503
Additional weight								
«HYDRAULIC» module without water (2)	kg	26				29	27	45
«HYDRONIC» module without water (2)	kg	81				84	97	115

Physical data - High static version



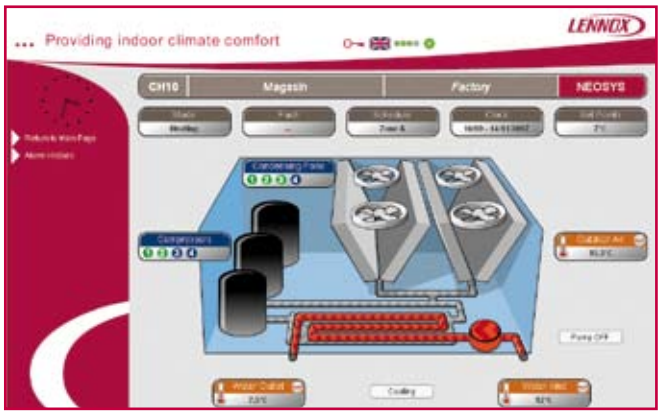
ECOLEAN™ FP1 / FP2	EAC/EAR	251	291	351	431	472	552	672	812
A	mm	1195	1195	1195	1195	1960	1960	1960	1960
B	mm	980	980	980	980	1195	1195	1195	1195
C	mm	1375	1375	1375	1375	1375	1375	1375	1375
Operating weight FP1 (1)	kg	258	266	286	315	510	522	564	608
Operating weight FP2 (1)	kg	278	286	306	335	550	562	604	648

ECOLEAN™ FP1 / FP2	EAC/EAR	1003	1103	1203	1303	1403	1604	1804
A	mm	2250	2250	2250	2250	2250	2250	2250
B	mm	1420	1420	1420	1420	1420	2300	2300
C	mm	1875	1875	1875	1875	1875	1975	1975
Operating weight FP1 / FP2 (1)	kg	703	871	1004	1056	1085	1207	1583

(1) Not including the «HYDRAULIC» or «HYDRONIC» module
(2) Weight to be added to that of the corresponding machine - Warning! Be sure to allow for the volume of the components when calculating the load weight - These data are also available for high static version

Options

- Water tank electrical heater (230V - 400V) (2)
- Inlet Plenum (supplied loose)
- Square discharge duct (7)
- Drip tray
- Epoxy coated Al fins coils treated
- Main ON/OFF switch
- Softstarter (1)
- Three phase protection
- Evaporator antifreeze protection
- Tank antifreeze heater (230V-400V
- Flow switch (3)
- Water filter (supplied loose) (3)
- Coils protection guards
- Twin pump (4)
- Low ambient kit (-15ºC) - EAC only
- Heating Low ambient kit (-15ºC) (2)
- Thermostatic hot gas injection
- Kit low water temperature (water outlet: 0°C / -5°C / -10°C)
- Compressor noise insulation jacket
- Anti-vibration mounts rubber (supplied loose)
- Anti-vibration mounts springs (supplied loose) (6)
- HP & LP refrigerant Gauges
- In/Out isolating valves (supplied loose)
- Interface mod-Bus KPO6 (max. 8 units and supplied loose
- Dynamic set point
- Alarm relay
- Adaptor for interface Mod-Bus (1 per unit - supplied loose)
- Remote display (supplied loose)
- Adalink™ supervision (available during 2008)



ADALINK™ supervision

(1) Heat pump units only
(2) Not available for units EAC0251 FP2 to 0812 FP2
(3) Included on "Hydraulic" and "Hydronic" versions
(4) Filter to be mounted outside the unit (1003 to 1403 models)
(5) Standard for EAC/R 1003 to 1804 and EAR 0472 to 1804
(6) Only on sizes 1003 to 1804
(7) Only on FP1 & FP2 versions

Ecologic™ • 185 ➔ 350 kW

Air cooled chiller

ECOLOGIC™

Introduction to the range

ECOLOGIC™ can be used for **comfort applications such as office buildings, shops, and hotels air conditioning.**
ECOLOGIC™ is a good value solution: simple, reliable and cost effective.

Energy performance

- Scroll compressor
- R407C refrigerant

Quiet performance

- Unit design with compressor enclosure
- Latest fan design with external rotor technology
- Pulse Wave Modulation (PWM) fan control

Easy installation, operation and maintenance

- Hydraulic modules incorporated in the same cabinet
- Victaulic hydraulic connections
- Optimal access to the various components

Advanced control

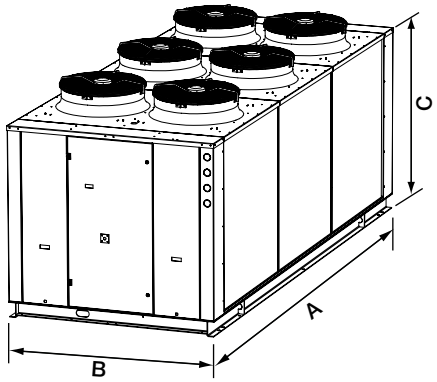
- CLIMATIC™ electronic controller as standard
- PID control
- Start/stop programming - Set point change
- Compressor operating time balancing
- Set point adjustment according to external temperature
- General alarm with report
- Control of one or more pumps
- Connectable to a BMS

General data

ECOLOGIC™ STD	WA	200	230	270	300	370
Cooling mode						
Cooling capacity (1)	kW	185	221	267	283	351
EER		2,27	2,26	2,18	2,06	2,18
ESEER		3,08	3,35	3,29	3,3	3,17
Cooling capacity with free-cooling option (2)	kW	119,0	111,4	181,8	183,4	172,0
Electrical data						
Voltage	V/Ph/Hz	400/3/50				
Refrigeration circuit						
Number of circuits	Nr	2	2	2	2	2
Compressor	Nr	4	4	4	4	6
Evaporator	Type	AISI 316 stainless steel plate brazed copper heat exchanger				
Capacity steps	Nr	6	6	6	4	6
Refrigerant charge per circuit	kg	18,6	28,2	28,2	28,2	42,6
Hydraulic connection						
Type		VICTAULIC				
Diameter	Inches	2"	2"	2" 1/2	2" 1/2	2" 1/2
Acoustic						
Global sound power level (3)	dB(A)	96	97	98	99	99
Operating limits						
Maximum outside air temperature	°C	49	49	51	51	48
Minimum outside air temperature	°C	+6°C as standard and -10°C with "all seasons operation" kit				
Maximum inlet water temperature	°C	20				
Minimum outlet water temperature	°C	+5°C and -10°C with 30% glycol				

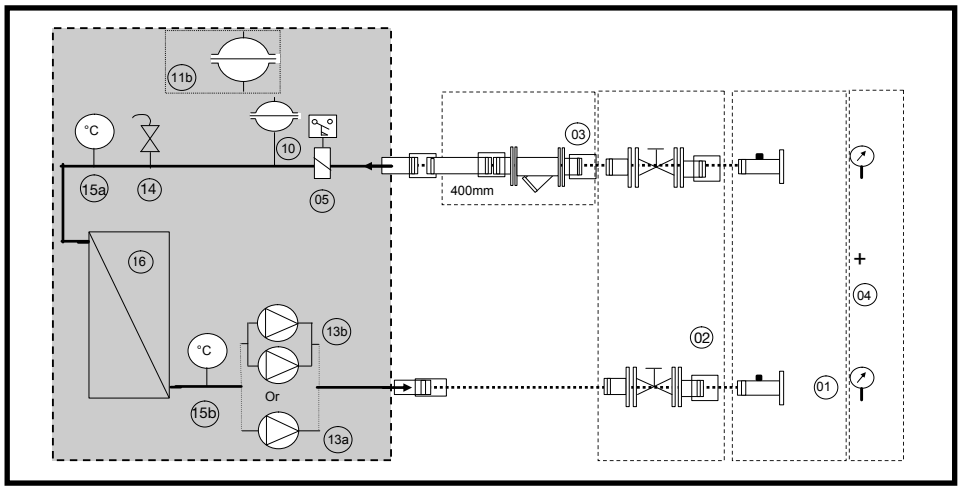
(1) Water : 12°C/ 7°C - Air : 35°C / (2) Water : 15° - Air : 0°C / (3) EUROVENT conditions

Physical data



ECOLOGIC™ STD	WA	200	230	270	300	370
A	mm	3304	3304	4704	4704	4704
B	mm	1904	1904	1904	1904	1904
C	mm	1959	1959	1961	1961	1961
Weight without water - kg						
Standard weight, without hydraulic module	kg	**1703**	**1848**	**2344**	**2393**	**2843**
With single pump	kg	1737	1882	3389	2437	2887
With double pump	kg	1767	1912	2426	2474	2924
Operating weight - kg						
Standard weight, without hydraulic module	kg	**1722**	**1867**	**2368**	**2417**	**2874**
With single pump	kg	1757	1901	2413	2461	2919
With double pump	kg	1786	1931	2450	2498	2956
Extra weight for coil guard	kg	38	38	57	57	57

Integrated hydraulic module



01	Groove lock coupling (1)	**13a**	Single pump (2)
02	Unit isolation valve (1)	**13b**	Double pump (2)
03	Inlet water filter (1)	**14**	Air purge (2)
04	Inlet/outlet manometers (1)	**15a**	Return temperature sensor (2)
05	Paddle flow switch (2)	**15b**	Supply temperature sensor (2)
10	25L expansion vessel (2)	**16**	Plate heat exchanger (2)
11b	Single 50L expansion vessel (WA = 150D) (2)		

(1) Items supplied loose
(2) Items mounted inside the unit

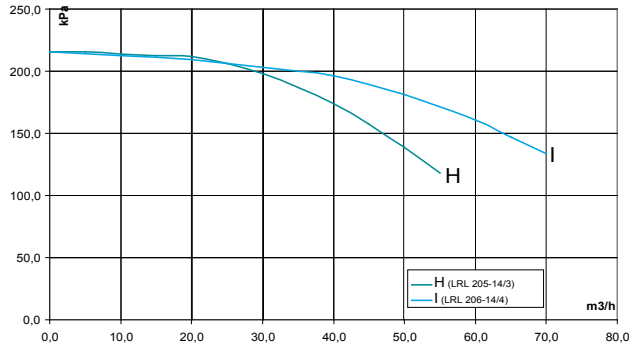
Separate system : The HYDROPACK™ is a complete hydronic module, delivered separately (pump and buffer tank). The finish and colour of the casing are identical to those of the liquid chillers. There is a very wide range of pumps and buffer tanks (500 to 2000 litres). For more information, please consult **HYDROPACK™** part.

Pump size configuration

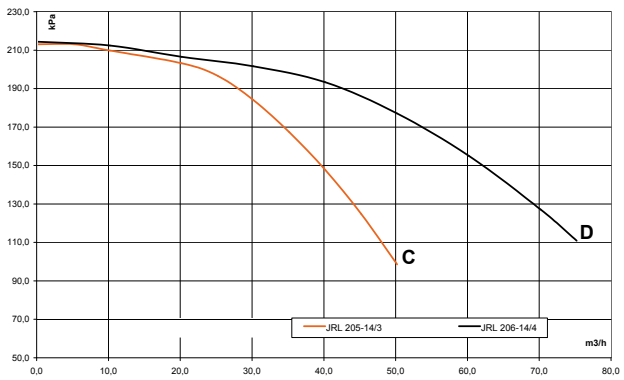
	Single pump	Double pump
200D	H	C
230D	H	C
270D	I	D
300D	I	D
370D	I	D

Pump pressure curves

Single pump curve



Double pump curve



Options

- Double insulation for evaporator
- Evaporator anti-freeze resistance heater
- Condensers protected with Alucoat
- Condenser protection grilles
- Electronic expansion valve
- Flow switch (2)
- Water intake filter for mounting outside the machine (1)
- Pressure differential flow switch (1)
- Low temperature kit (start-up down to -10°C)
- Main switch with door lock
- Power factor correction
- Soft starters
- Discharge valve per circuit
- Suction valve per circuit
- HP/LP pressure gauges
- Sight glass
- Water intake/outlet pressure gauges
- Water isolation valves
- Rubber anti-vibration mountings (1)
- Anti-vibration springs (1)
- Flanged hydraulic connection
- "Hydraulic" module
- Pump module line tracing (incorporated with "anti-freeze" option)
- CLIMATIC™ 50
- DC 50 Comfort display
- DS 50 maintenance display

(1) Accessories, delivered separately
(2) Not compatible with the Hydraulic Module option

NEOSYS™ • 200 ➔ 460 kW

Air cooled chiller/heat pump

NEOSYS ™

3 YEAR WARRANTY*

*Quality makes the difference**

R410A

CE

Introduction to the range

NEOSYS™ is providing chilled and hot water for all applications with fan coils, chilled beams, air handling units, floor heating or chilled ceiling use **in office buildings, hotels, administrations, ...**

Sustainable performance

- Extended qualification tests (vibration tests, run tests, field tests) to ensure superior reliability.
- High efficiency aluminium micro channel heat exchanger (MCHX) with improved corrosion resistance for moderate marine or urban applications (Cooling only version).
- Specific MCHX coil design with high mechanical fin resistance that offers easy cleaning with high pressure air or water washers for extended life cycle.
- Compressor and hydraulic enclosure, V-coil design to protect the unit against climatic aggressions (e.g. UV light, hail).
- Exclusive Compliant Scroll® compressor design with both axial and radial compliance to increase compressor operation tolerance of liquid refrigerant, substantially improving durability and reliability.
- Exclusive fan design with hybrid ceramic bearings to maximise the service-life of motors and to reduce noise level.

Quiet performance

- Unique design with compressors, pump(s) and fan acoustic enclosure to reduce radiated noise emissions.
- Variable speed driven fans using external rotor technology associated with high performance aluminium fan blades of the latest generation.
- Elimination of intrusive fan start/stop noise that is irritating to the human ear.
- Active Acoustic Attenuation System™ (A^3) to meet changing building load requirements while automatically adjusting the air flow to meet night and day sound level constraints (Time schedule with 4 time zones per day).

A^3 ACTIVE ACOUSTIC ATTENUATION SYSTEM

Start-up and service performance

- Complete hydraulic module with single or twin, low or high pressure pump (options) that includes all necessary equipment for quick connection: pump(s), regulating valve, expansion vessel with pressure gauge, pressure tapping points, water filter, air vent, pressure relief valve and victaulic connections.
- 400V, 50 Hz, 3 phases power supply (without neutral) with a single point of power connection. Main on/off switch included as standard.
- Air spring powered Butterfly electrical panel™ with top opening provding protection to service engineers against rain or snow during commissioning and maintenance operations.

Energy performance

- High Seasonal Energy Efficiency Ratio in cooling and heating mode (ESEER above 4; EER up to 2,9; COP up to 3,2) for improved energy consumption all around the year
- Aluminium micro channel heat exchanger offering outstanding system efficiency (Cooling only version).
- R410A refrigerant for optimized system performance.
- Energy savings due to lower system minimum water content buffer tank elimination reducing the time to reach setpoint.

Architectural integration

- State of the art design with hidden compressors, fans and pump for perfect architectural integration.
- Flat top, aesthetic grilles, very low unit height (< 2m) for discrete installation on a roof reducing the requirement of costly cladding solutions around the unit.

* Quality makes the difference : 3 year warranty on parts. This warranty only applies on compressors, fans, exchanger coils. Subject to LENNOX warranty policy and to maintenance contract by an accredited LENNOX company.

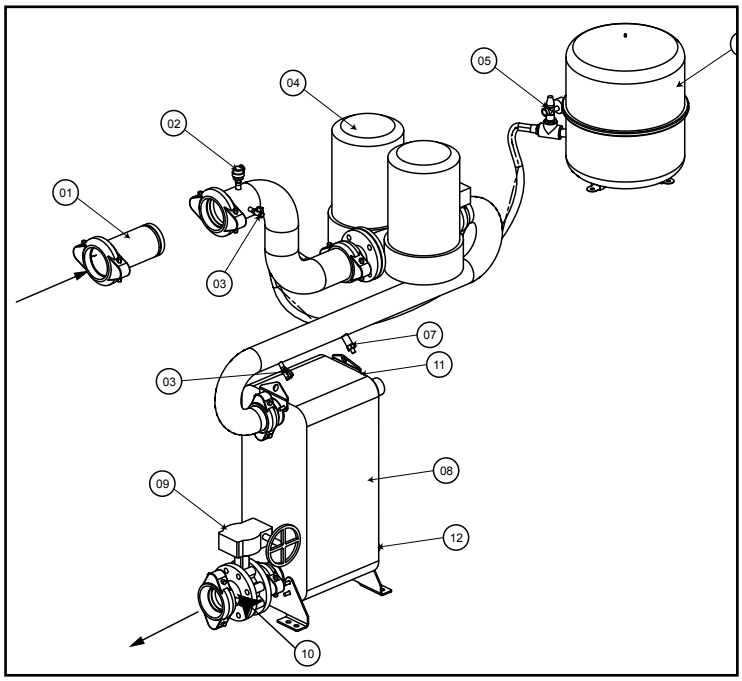
General data

NEOSYS™	NAC	200	230	270	300	340	380	420	480
Cooling mode									
Cooling capacity (1)	kW	202	229	266	299	337	377	420	460
EER (2)		2,9	2,72	2,56	2,85	2,76	2,57	2,82	2,71
ESEER (2)		4,18	3,97	3,93	4,11	4,09	3,92	4,48	3,95
Electrical data									
Voltage	V/Ph/Hz	400/3/50							
Refrigeration circuit									
Number of circuit	Nb	2							
Compressor	Nb	4				5		6	
Evaporator	Type	AISI 316 stainless steel plate brazed with copper heat exchanger							
Capacity steps	%	6	6	6	5	6	5	7	6
Condenser	Type	Microchannel Aluminium Tube & Fins - Air cooled							
Pressure drop									
Pressure drop (1)	kPa	28,6	36,6	37,5	47,2	45,3	38,6	39,2	46,9
Hydraulic connections									
Type		Victaulic							
Diameter In/Out	Inches	4"				5"			
Acoustic									
Global sound power level (1)	dB(A)	89	89	90	91	91	91	93	93
Operating limits									
Min. outlet water temperature	°C	5							
Max. Intlet water temperature	°C	20							
Min. difference water inlet/outlet	°C	3							
Max. difference water inlet/outlet	°C	8							
Min. outside air temperature	°C	6							
Max. outside air temperature	°C	46							

NEOSYS	NAH	200	230	270	300
Cooling mode					
Cooling capacity (1)	kW	191	215	271	295
EER (2)		2,75	2,54	2,79	2,65
ESEER (2)		4,00	3,76	3,99	3,94
Heating mode					
Heating capacity (1)	kW	219	252	313	346
COP		3,21	3,13	3,20	3,12
Electrical data					
Voltage	V/Ph/Hz	400/3/50			
Refrigeration circuit					
Number of circuit	Nb	2			
Compressor	Nb	4			
Evaporator	Type	AISI 316 stainless steel plate brazed with copper heat exchanger			
Capacity steps	%	6			4
Pressure drop					
Pressure drop (1)	kPa	25,7	32,5	38,8	46,2
Hydraulic connections					
Type		Victaulic			
Diameter In/Out	Inches	4"			
Acoustic					
Global sound power level (1)	dB(A)	89	89	91	91
Operating limits					
Min. Outlet water temp Cooling	°C	5			
Max. inlet water temperature	°C	20			
Min. outside air temp Cooling	°C	6			
Max. outside air temp Cooling	°C	46			
Max. Outlet water temp Heating	°C	50			
Max. Outdoor air Temp Heating	°C	-12			

(1) All data are at Eurovent condition.
(2) ESEER according to EN14511 Eurovent calcultaion method

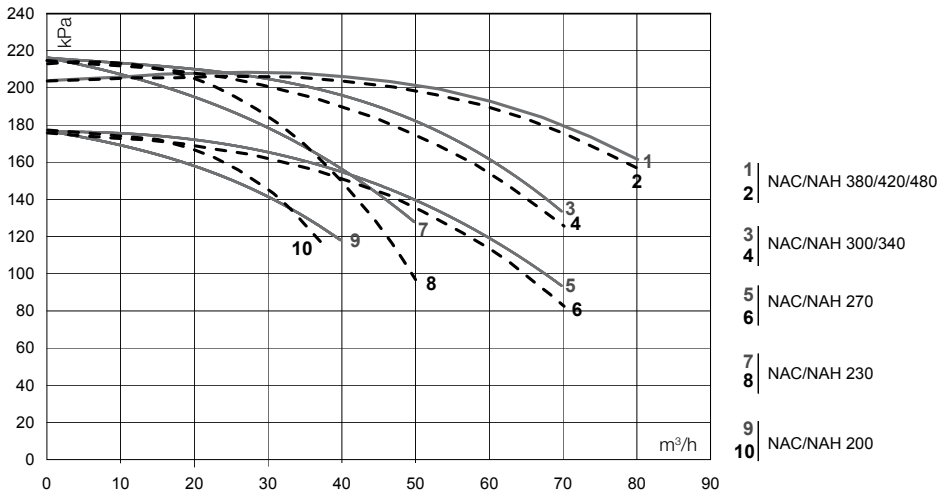
Integrated hydraulic module



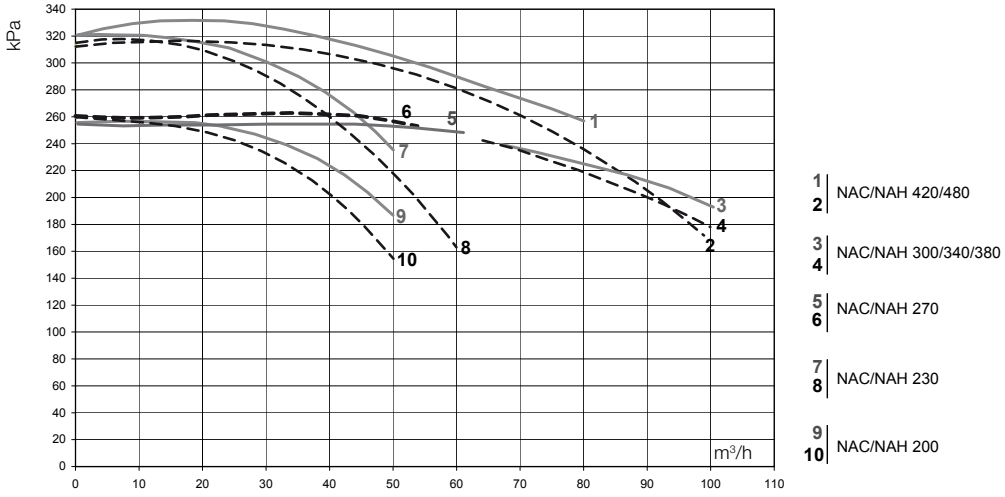
01	Water filter (supplied loose)
02	Air purge
03	Pressure tap
04	Pump
05	Safety valve with manometer
06	Espansion vessel
07	Electronic flow switch
08	Plate heat exchanger
09	Setting valve
10	Pressure tap and drain valve
11	Return temperature sensor
12	Supply temperature sensor

Pump pressure curves

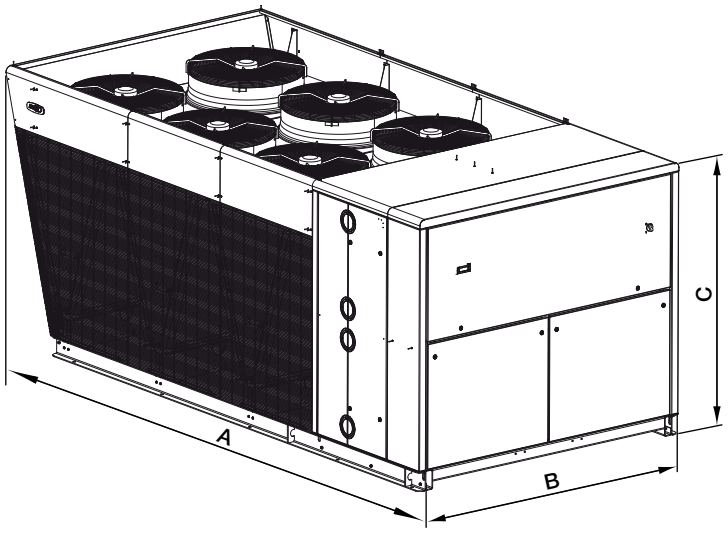
Single / Double pump - Low pressure



Single / Double pump - High pressure



Physical data



NEOSYS™	NAC	200	230	270	300	340	380	420	480
A	mm	3590	3590	3590	4620	4620	4620	5650	5650
B	mm	2280	2280	2280	2280	2280	2280	2280	2280
C	mm	1964	1964	1964	1964	1964	1964	1964	1964
Weight without water	kg	2215	2245	2465	2880	3115	3210	3760	3800

NEOSYS™	NAH	200	230	270	300
A	mm	3590	3590	4620	4620
B	mm	2280	2280	2280	2280
C	mm	1964	1964	1964	1964
Weight without water	kg	Please consult us			

Options

- Rear coil guard
- Heavy anti-corrosion coil treatment
- Anti-freeze protection
- Soft-starter
- Power factor correction
- Winter cooling operation down to -10°C
- Brine operation down to -10°C
- Hydraulic module with low-pressure single pump
- Hydraulic module with low-pressure twin pump
- Hydraulic module with high-pressure single pump
- Hydraulic module with high-pressure twin pump
- Water filter (supplied loose)
- Victaulic connection sleeve (supplied loose)
- DC50™ remote comfort display (supplied loose)
- DS50™ service display (supplied loose)
- Modbus communication interface
- LonWorks® communication interface
- Bacnet® communication interface
- Adalink™ supervision (available during 2008)
- BE 50 extension board for additional I/O
- Anti-vibration mounts

ADALINK™ supervision

Hydrolean™ • 18 - 165 kW

Water cooled chiller / Heat pump

Introduction to the range

HYDROLEAN™ can be used for **comfort applications such as office buildings, shops, and hotels air conditioning when there are severe noise and architectural constraints.**

Compact unit the **HYDROLEAN™** liquid chiller is easily installed **in small spaces.** Since it is fully enclosed, it does not need a dedicated machine room. One unit can be placed on top of another for better use of space, if required.

The **HYDROLEAN™** range is available in three versions: Cooling only is the SWC, Heat pump SWH and Remote condenser SWR. The **HYDROLEAN™** is connectable with a remote dry cooler (**LFC/LFC-V**), with a remote condenser **(ECA**) or directly with a geothermal water source.

Dry cooler
LFC

Energy performance

- **HYDROLEAN™** can be used as a geothermal heat-pump
- Scroll compressor
- R407C refrigerant

Dry cooler
LFC-V

Quiet performance

- When associated with a Lennox **LFC** dry-cooler, **HYDROLEAN™** can offer unbeatable low noise solution
- Sound proofing compressor casing
- Independant compressor chassis mounted with anti-vibration mounts
- Both **HYDROLEAN™** and **LFC** dry-coolers are Eurovent certified

Condenser
ECA

Easy installation, operation and maintenance

- Reduced dimensions (width of 645 mm maximum)
- Victaulic hydraulic connections
- Two **HYDROLEAN™** units can be mounted on top of each other
- Optimal access to the various components

Advanced control

- CLIMATIC™ electronic controller
- Microprocessor control
- Front panel display
- General alarms with report
- Time counter and run time equlization
- Remote ON/OFF
- Connectable to a BMS

General data

HYDROLEAN™	SWC - K	20	25	35	40	50	65	80	90	100	120	135	165
Cooling mode													
Cooling capacity (1)	kW	18,9	24,2	34,6	42,2	49,3	69,6	75,8	86	103	111	140	165
EER (2)		4,14	3,75	3,76	3,85	3,81	3,74	3,67	3,9	3,66	3,72	3,8	3,68
ESEER (2)		4,76	4,34	4,32	4,43	5,31	5,14	5,16	5,24	5,28	5,13	5,12	4,97
Electrical data													
Voltage	V/Ph/Hz	400/3/50											
Refrigeration Circuit													
Number of circuit	Nr	1									2		
Number of compressor	Nr	1				2					3		
Capacity steps	Nr	1				2				3	4		
Refrigerant charge per circuit	kg	1,3	1,5	2	2,5	3,3	4,5	4,5	5,9	5,9	5,3	7,4	
Hydraulic connections													
Hydraulic connections	Type	Victaulic											
Water inlet / outlet	Inches/DN	1"1/4 / DN32				2" / DN50							
Condenser													
Condenser	Type	AISI 316 stainless steel plate brazed with copper heat exchanger											
Water flow	m³/h	4	5,3	7,5	9,2	10,7	15,2	16,6	18,6	22,5	24,2	30,4	36,1
Water volume	l	1,6	1,6	2,5	3,1	4,1	5,6	5,6	7,4	7,4	13,4	18,6	18,6
Pressure drop	kPa	46	77	71	69	51	57	67	50	71	65	57	79
Water operating pressure	kPa	600											
Evaporator													
Evaporator	Type	AISI 316 stainless steel plate brazed with copper heat exchanger											
Water flow	m³/h	3,3	4,2	6	7,3	8,5	12	13,1	14,8	17,7	19,1	24,1	28,4
Water volume	l	1,6	1,6	2,5	3,1	4,1	5,6	5,6	7,4	7,4	13,4	18,6	18,6
Pressure drop	kPa	30	49	45	44	33	36	43	32	45	41	37	50
Water operating pressure	kPa	600											
Acoustic													
Global sound power level (1)	dB(A)	72	78	80	80	81	83	83	83	87	85	88	91

HYDROLEAN™	SWH - K	20	25	35	40	50	65	80	90	100	120	135	165
Cooling mode													
Cooling capacity (1)	kW	17,5	22,6	32,2	39,3	45,9	64,9	70,7	80,1	95,7	103	130	154
EER (2)		3,83	3,48	3,48	3,56	3,53	3,47	3,4	3,61	3,4	3,45	3,53	3,41
ESEER (2)		4,05	4,05	4,02	4,11	4,94	4,79	4,81	4,88	4,91	4,76	4,76	4,61
Heating mode													
Heating capacity (1)	kW	19,4	26	37	45,2	52,4	74,4	81,9	91	110	119	147	177
COP (2)		3,29	3,21	3,19	3,23	3,21	3,18	3,14	3,24	3,13	3,16	3,18	3,12
Electrical data													
Voltage	V/Ph/Hz	400/3/50											
Refrigeration Circuit													
Number of circuit	Nb	1									2		
Number of compressor	Nb	1				2					3		
Capacity steps	Nb	1				2				3	4		
Refrigerant charge per circuit	kg	1,3	1,5	2	2,5	3,3	4,5	4,5	5,9	5,9	5,3	7,4	
Hydraulic connections													
Hydraulic connections	Type	Victaulic											
Water inlet / outlet	Inches/DN	1"1/4 / DN32				2" / DN50							
Condenser													
Condenser	Type	AISI 316 stainless steel plate brazed with copper heat exchanger											
Water flow	m³/h	3,8	5	7,1	8,7	10,1	14,4	15,8	17,6	21,3	22,9	28,8	34,2
Water volume	l	1,6	1,6	2,5	3,1	4,1	5,6	5,6	7,4	7,4	13,4	18,6	18,6
Pressure drop	kPa	41	69	64	62	46	51	61	45	64	59	52	71
Water operating pressure	kPa	600											
Evaporator													
Evaporator	Type	AISI 316 stainless steel plate brazed with copper heat exchanger											
Water flow	m³/h	3	3,9	5,6	6,8	7,9	11,2	12,2	13,8	16,5	17,8	22,4	26,5
Water volume	l	1,6	1,6	2,5	3,1	4,1	5,6	5,6	7,4	7,4	13,4	18,6	18,6
Pressure drop	kPa	26	42	40	38	29	32	37	28	39	36	32	44
Water operating pressure	kPa	600											
Acoustic													
Global sound power level (1)	dB(A)	72	78	80	80	81	83	83	83	87	85	88	91

(1) All data are at Eurovent condition
(2) EER and COP compressors only
(3) Given for «Cooling Mode» and an evaporator outlet water temperature below 12°C
(4) Can be reduced if a water pressure regulated valve is used.

General data

HYDROLEAN™	SWR - K	20	25	35	40	50	65	80	90	100	120	135	165
Cooling mode													
Cooling capacity (1)	kW	17,6	23,1	32,8	40	46,9	66,4	72,8	81,8	98,5	106,1	132,7	158,3
EER (2)		3,33	3,22	3,2	3,26	3,28	3,23	3,23	3,33	3,24	3,26	3,26	3,26
Electrical data													
Voltage	V/Ph/Hz	400/3/50											
Refrigeration Circuit													
Number of circuit	Nr	1									2		
Number of compressor	Nr	1				2					3		
Capacity steps	Nr	1				2				3	4		
Hydraulic connections													
Hydraulic connections	Type	Victaulic											
Discharge line	Inches/DN	7/8"			1" 1/8			1" 3/8			1" 3/8 & 1" 3/8		
Liquid line	Inches/DN	5/8"				7/8"							
Evaporator													
Evaporator	Type	AISI 316 stainless steel plate brazed with copper heat exchanger											
Water flow	m^3/h	3,0	4,0	5,7	6,9	8,1	11,4	12,5	14,1	17,0	18,3	22,9	27,3
Water volume	l	1,6	1,6	2,5	3,1	4,1	5,6	5,6	7,4	7,4	13,4	18,6	18,6
Pressure drop	kPa	26,2	44,3	41,2	39,7	29,9	33,2	39,5	29,3	41,7	38,2	33,6	46,7
Water operating pressure	kPa	600											
Acoustic													
Global sound power level (1)	dB(A)	72	78	80	80	81	83	83	83	87	85	88	91

(1) All data are at Eurovent condition
(2) EER and COP compressors only
(3) Given for «Cooling Mode» and an evaporator outlet water temperature below 12°C
(4) Can be reduced if a water pressure regulated valve is used.

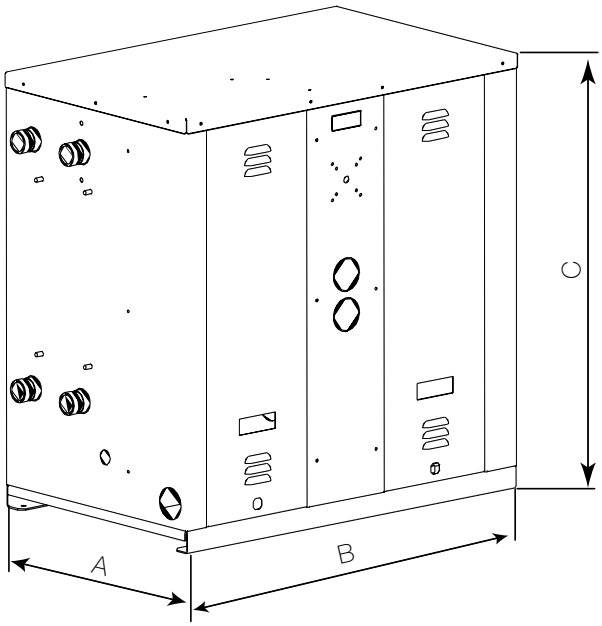
Operating limits

HYDROLEAN™	SWH/SWC	20	25	35	40	50	65	80	90	100	120	135	165
Min. evap outlet water temperature	°C	5											
Max. evap inlet water temperature	°C	20											
Min. difference water inlet/outlet	°C	3											
Max. difference water inlet/outlet	°C	8											
Max. cond outlet water temperature (3)	°C	53											
Min. cond inlet water temperature (4)	°C	25											

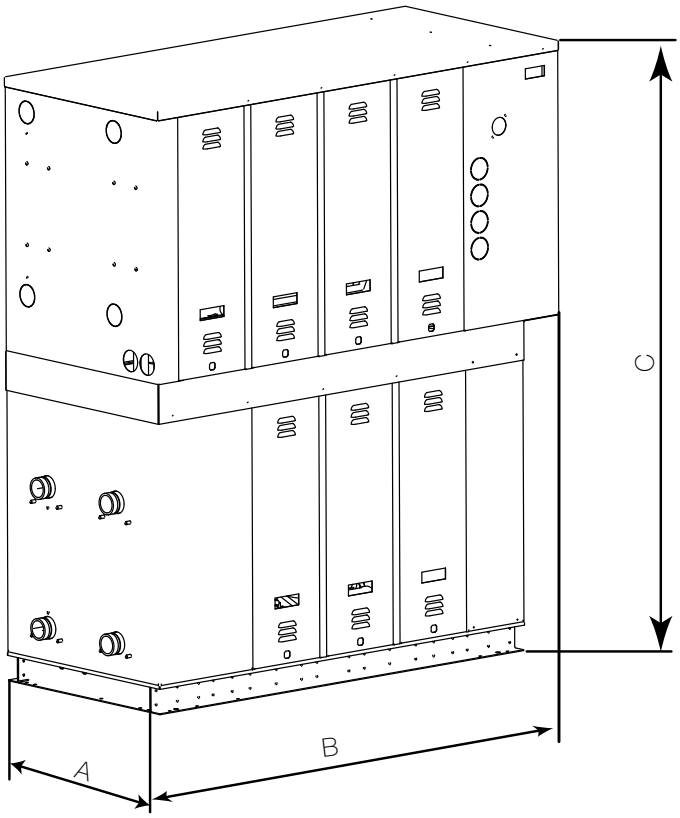
HYDROLEAN™	SWR - K	20	25	35	40	50	65	80	90	100	120	135	165
Min. evap outlet water temperature	°C	5											
Max. evap inlet water temperature	°C	20											
Min. difference water inlet/outlet	°C	3											
Max. difference water inlet/outlet	°C	8											
Min. Discharge temperature (3)	°C	35											
Max. Discharge temperature (4)	°C	60											

Physical data

Sizes 020 to 100



Sizes 120 to 165



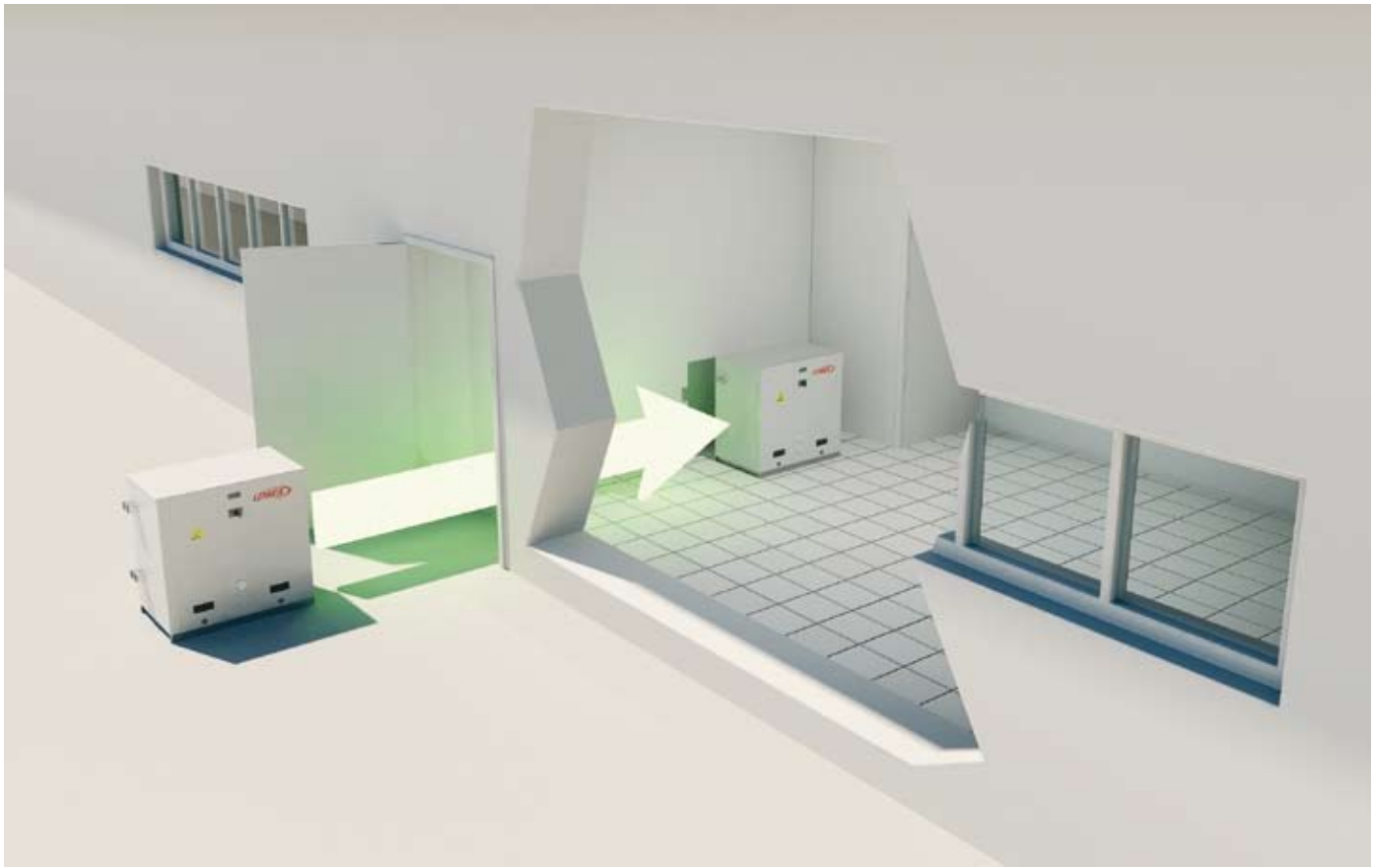
HYDROLEAN™	SWC	20	25	35	40	50	65	80	90	100	120	135	165
A	mm	502	502	502	502	645	645	645	645	645	645	645	645
B	mm	802	802	802	802	1470	1470	1470	1470	1470	1470	1470	1470
C	mm	815	815	815	815	854	854	854	854	854	1705	1705	1705
Operating weight	kg	124	192	213	239	393	426	444	485	531	690	760	803
Weight without water	kg	121	189	208	233	385	415	433	470	517	663	723	766

HYDROLEAN™	SWH	20	25	35	40	50	65	80	90	100	120	135	165
A	mm	502	502	502	502	645	645	645	645	645	645	645	645
B	mm	802	802	802	802	1470	1470	1470	1470	1470	1470	1470	1470
C	mm	815	815	815	815	854	854	854	854	854	1705	1705	1705
Operating weight	kg	125	194	215	241	398	432	450	490	539	698	768	813
Weight without water	kg	122	191	210	235	390	421	439	475	524	671	731	776

HYDROLEAN™	SWR	20	25	35	40	50	65	80	90	100	120	135	165
A	mm	502	502	502	502	645	645	645	645	645	645	645	645
B	mm	802	802	802	802	1470	1470	1470	1470	1470	1470	1470	1470
C	mm	815	815	815	815	854	854	854	854	854	1705	1705	1705
Operating weight	kg	118	188	202	230	380	403	409	438	486	640	693	736
Weight without water	kg	112	180	195	217	361	385	403	431	479	627	674	718

Options

- Electrical equipment + control of outside fans
- Electrical equipment + control of outside pumps
- Pressure regulated water valve
- Water filter for evaporator
- Water filter for condenser
- Hot Gas by-pass
- Flanged external water connections
- Low Noise with compressor jackets
- Anti-vibration mounts rubber
- Low water temperature kit on evaporator (- 8°C)
- HP / LP pressure gauge
- J-BUS interface KP06
- Remote display
- Dynamic Set Point
- Hot water control
- Communication interface :
- RS485 / «Modbus INTERFACE»



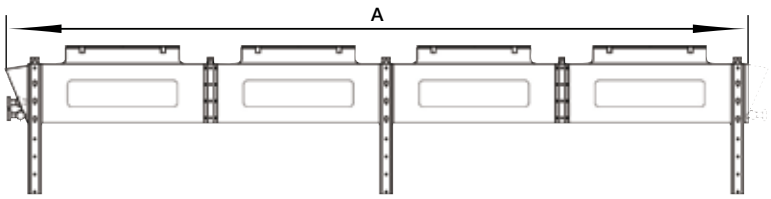
Dry-Cooler pre-selection (LFC)

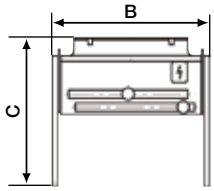
HYDROLEAN™ Model	Capacity (kW)	06P - 900 rpm				08P - 700 rpm			
		Model [1]	Sound Level (dB(A))		Dimensions	Model	Sound Level (dB(A))		Dimensions
			Lw	Lp [2]	L / l / H (mm)		Lw	Lp [2]	A/B/C (mm)
SWC 020 K	22,4	LFC 01S 06P 141	94	56,0	1680/1226/1251	LFC 01S 12N 142	82	44	1680/1226/1251
SWC 025 K	29,7	LFC 01S 06P 142	94	56	1680/1226/1251	LFC 01S 08P 142	86	48	1680/1226/1251
SWC 035 K	42,4	LFC 01S 06P 173	94	56	2030/1226/1251	LFC 01S 08P 214	86	48	2380/1226/1251
SWC 040 K	51,6	LFC 02S 06P 141	97	59	3082/1226/1251	LFC 02S 08P 142	89	51	3082/1226/1251
SWC 050 K	60,2	LFC 02S 06P 142	97	59	3082/1226/1251	LFC 02S 08P 143	89	51	3082/1226/1251
SWC 065 K	85,4	LFC 02S 06P 173	97	59	3782/1226/1251	LFC 03S 08P 142	91	53	4484/1226/1251
SWC 080 K	93,7	LFC 02S 06P 174	97	59	3782/1226/1251	LFC 03S 08P 143	91	53	4484/1226/1251
SWC 090 K	104,6	LFC 02S 06P 214	97	59	4482/1226/1251	LFC 03S 08P 173	91	53	5534/1226/1251
SWC 100 K	125,7	LFC 03S 06P 173	99	61	5534/1226/1251	LFC 04S 08P 143	92	54	5886/1226/1251
SWC 120 K	136	LFC 04S 06P 142	100	62	5886/1226/1251	LFC 05S 08P 142	93	55	7288/1226/1251
SWC 135 K	169,8	LFC 04S 06P 173	100	62	7286/1226/1251	LFC 06D 08P 142	94	56	4484/2310/1251
SWC 165 K	202,7	LFC 05S 06P 144	101	63	7288/1226/1251	LFC 08D 08P 141	95	57	5886/2310/1251

HYDROLEAN™ Model	Capacity (kW)	12P - 430 rpm				16P - 320 rpm			
		Model [1]	Sound Level (dB(A))		Dimensions	Model	Sound Level (dB(A))		Dimensions
			Lw	Lp [2]	L / l / H (mm)		Lw	Lp [2]	A/B/C (mm)
SWC 020 K	22,4	LFC 01S 12P 211	72	34	2380/1226/1251	LFC 02S 16P 101	60	22	2282/1226/1218
SWC 025 K	29,7	LFC 02S 12P 141	75	37	3082/1226/1251	LFC 02D 16P 141	65	27	1680/2310/1251
SWC 035 K	42,4	LFC 02S 12P 171	75	37	3782/1226/1251	LFC 03S 16P 141	67	29	4484/1226/1251
SWC 040 K	51,6	LFC 02S 12P 212	75	37	4482/1226/1251	LFC 03S 16P 171	67	29	5534/1226/1251
SWC 050 K	60,2	LFC 03S 12P 142	77	39	4484/1226/1251	LFC 04S 16P 141	68	30	5886/1226/1251
SWC 065 K	85,4	LFC 04S 12P 171	78	40	7286/1226/1251	LFC 06D 16P 141	70	32	4484/2310/1251
SWC 080 K	93,7	LFC 05S 12P 141	79	41	7288/1226/1251	LFC 06D 16P 171	70	32	5534/2310/1251
SWC 090 K	104,6	LFC 05S 12P 142	79	41	7288/1226/1251	LFC 06D 16P 171	70	32	5534/2310/1251
SWC 100 K	125,7	LFC 06D 12P 171	80	42	5534/2310/1251	LFC 08D 16P 171	71	33	7286/2310/1251
SWC 120 K	136	LFC 06D 12P 211	80	42	6584/2310/1251	LFC 08D 16P 171	71	33	7286/2310/1251
SWC 135 K	169,8	LFC 08D 12P 171	81	43	7288/2310/1251	LFC 10D 16P 171	72	34	9038/2310/1251
SWC 165 K	202,7	LFC 10D 12P 142	82	44	7288/2310/1251	LFC 10D 12P 142	82	44	7288/2310/1251

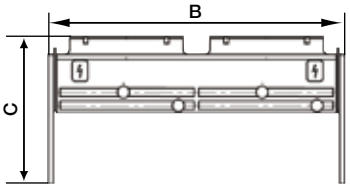
(1) Pre-selection with:
Water conditions: in/out 45°C/40°C, 34% glycol
35°C ambient temperature
(2) Sound pressure level in dB(A) measured at 10 meters distance, at fan blade level, in a free field on a reflective plan, given as indicative value. Only the acoustic power and the Lw value, are contractual and usable for the calculation of the sound pressure level data at owner land limits.
For any other condition, please consult your Lennox representative.

For any other condition or to select a V-type dry-cooler, please consult your Lennox representative.





Single fan line



Double fan line

Hydropack™ • 500 - 2000 L

Separated hydraulic module - HYD

CE

Introduction

HYDROPACK™ is a free-standing module comprising a pumps and a reservoir with a capacity of 500 to 2000 litres. Steel section support frame and extra-thick galvanized sheet casing, painted RAL 9002 (white). Removable panels for access to the various components; machine welded for enhanced rigidity.

Reservoir and expansion tank

Steel reservoir with automatic air bleed, safety valve with pressure gauge and membrane-type expansion tank. The water inlet and outlet connections are threaded female coupling sleeves (not projecting beyond the casing, thus avoiding problems in transit).

Pump

Pump according to en 1092/2. The «2» models have double pumps.

Filter

Stainless steel 500 micron mesh filter with very large surface area, for lower maintenance, easily cleaned and dismounted (ΔP = 10kPa max).

Insulation

Vapour-proof close cell foam thermal insulation.

Access

The front panel provides access to:

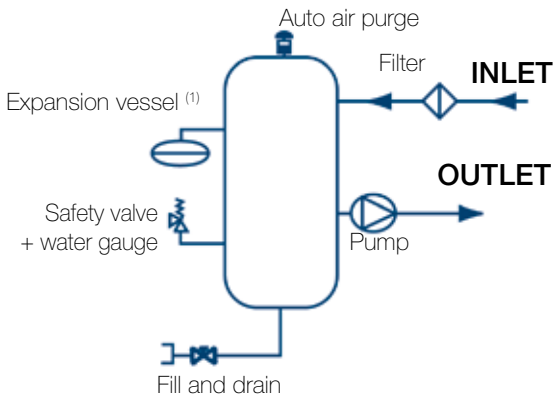
- The pump motors
- The expansion tank, for maintaining the inflation pressure

The side panel provides access to:

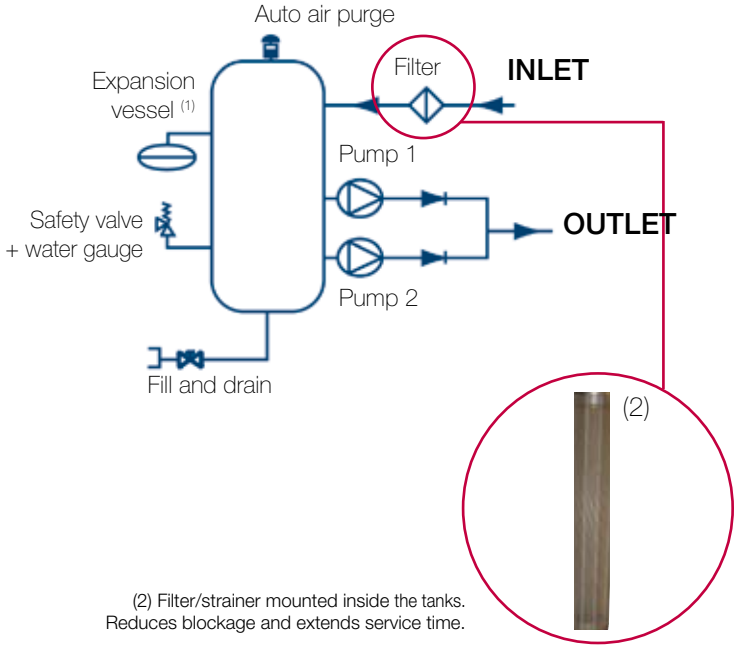
- The mesh filter
- The automatic air bleed
- The safety valve

Principle sketch

SINGLE PUMP



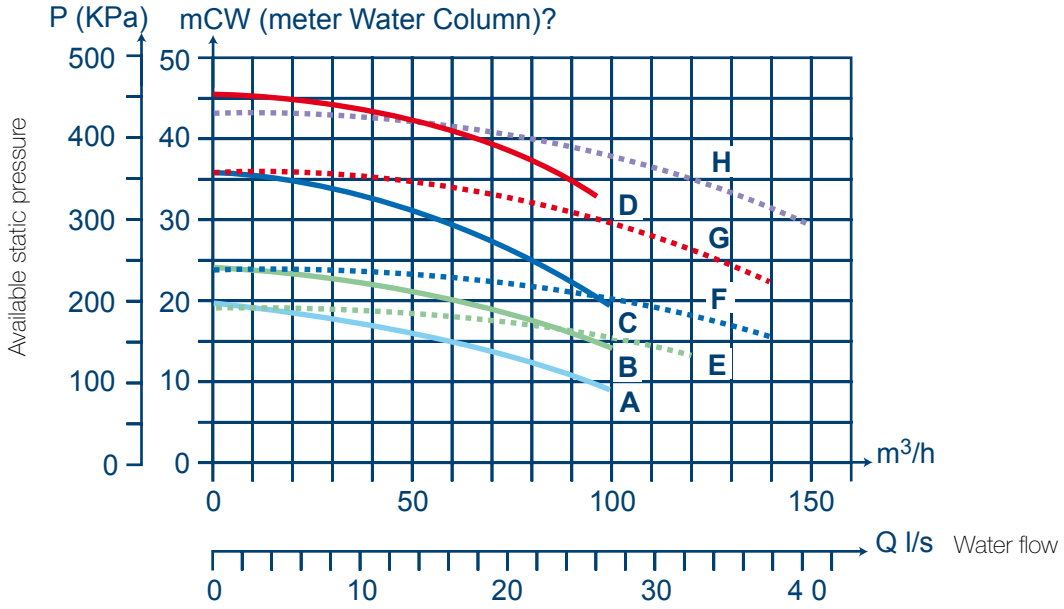
DUAL PUMP



(1) 1 x 25 l if 500, 750, 1000 l / 2 x 25 l if 1500, 750 x 2000 l

(2) Filter/strainer mounted inside the tanks.
Reduces blockage and extends service time.

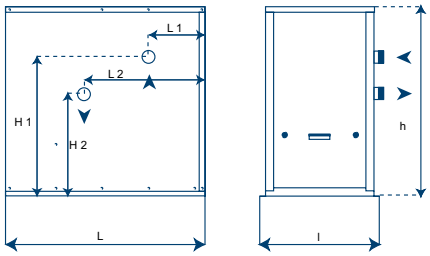
Characteristics of available pumps



Pump reference		A	B	C	D	E	F	G	H
Motor power input (2)	kW	4	5,5	7,5	11	5,5	7,5	11	15
Nominal current (2)	A	7,7	11,1	14,7	21,2	11,1	14,7	21,2	28,2
Rotation speed	rpm	2900	2900	2900	2900	2900	2900	2900	2900
Sound pressure level	LpA (dB) (1)	71	73,5	75,5	78	73,5	75,5	78	80

(1) Measured at 1 meter from the pump, in normal operating conditions

(2) Supply : 400V/3/50Hz



Buffer tank volume	l	500	750	1000	1500	2000
Weight						
1 pump - Weigth without water	kg	330	500	700	850	1100
1 pump - Operating weight	kg	830	1250	1700	2350	3100
2 pumps - Weigth without water	kg	400	600	800	1000	1300
2 pumps - Operating weight	kg	900	1350	1800	2500	3300
Dimensions						
Length	mm	1745	2000	2000	2400	2400
Height	mm	1875	1650	2050	1800	2150
Width	mm	900	1150	1150	1500	1500
L1	mm	490	580	580	790	790
H1	mm	1350	1200	1500	1200	1600
L2	mm	1065	1305	1305	1707	1707
H2 (+/-43mm)	mm	788	838	838	888	888
Ø inlet/outlet	mm	3”	3”	3”	4”	4”

OPERATING CONDITIONS:
Working fluid: mains water type, using liquid antifreeze (M.E.G./M.P.G.) 35% maximum, maximum fluid temperature 50 °C, minimum fluid temperature -10 °C .

Options (factory fitted)

- 12 kW immersion heaters
- 2 x 12 kW immersion heaters
- 3 x 12 kW immersion heaters
- Antifreeze protection (-15°C)
- Power supply transformer (without neutral)
- Electrical equipment box

Accessories (delivered separately)

- Flow switch
- Water intake isolation valve
- Water outlet isolation valve

Air side Products

Providing indoor climate comfort

HC • 1 ➔ 11 kW

Centrifugal fan coil unit

COMFAIR ™

Introduction to the range

The **COMFAIR™ HC** can be used with our chillers for **comfort applications such as office buildings, shops, and hotels air conditioning.**

The **COMFAIR™ HC** is a floor-standing centrifugal fan coil available in 12 sizes in 7 different configurations:

- Vertical, cased (3 versions)
- Horizontal, cased (2 versions)
- Chassis versions, vertical and horizontal

The units are available in the following versions:

- 2 pipes
- 2 pipes + electrical resistance heater
- 4 pipes

Extended life cycle

- Class G1 side air filter

Sustainable performance

- Galvanized sheet steel cabinet, painted with 0.8 mm thickness
- ABS diffusers
- Copper-aluminium heat exchanger, test pressure 30 bars, left- or right-hand connection (specify when ordering)
- Centrifugal double intake fan system (1, 2 or 3 fans) with aluminium blades

Control

- Control panel on cased units and wall mounted thermostats

Options

Auxiliary heating

- **Electrical resistance heater** (1)**:** the heating element kit is used during heating to integrate the heating power of the meain coil or alternative as the only heating element. The kit comprises the heating element with aluminium heatsink, safety thermostat, control relay and relative wiring and is already built into the fan coil complete with all electrical connections.
- **Auxiliary coils for 4 pipes operation** (1)**:** this is used in 4-pipe systems, which comprise 2 independent water circuits: one for cooling and the other for heating. In this case, the auxiliary coil is used for heating.

Security & extended lifecycle

- **Auxiliary condensate collection tray (also available in horizontal version)** (2)**:** it is used to collect condensate from the valves and the pipes connecting to the unit.

Flexibility

- **Distribution and intake plenum** (2)**:** in galvanised sheet metal, they are used to convey the air with vertical or horizontal built-in fan coil installation.
- **Fresh air dampers (also available in motorized version)** (2)**:** to ensure sufficient air in the rooms, it is installed at the bottom of the fan coil on the intake line.
- **Intake grille with filter** (2)**:** in high-strength enamelled sheet metal, it is complete with fixed louvres in thermosplastic material for the intake of air.
- **Various panels** (2)
- **Feet** (2)**:** pair of feet in pre-enamelled sheet metal designed to support the fan coil for floor-standing installation.
- **Adjustable distribution outlets, etc.** (2)

Service

- **Isolation and control valve** (1)
- **2 or 3 ways valves (different models available)** (1)**:** the kit comprises valve body, electrothermal actuator, flared copper pipes, ring nuts and gaskets for fixing to the fan coil. The valve kit is already installed on the fan coil complete with the water and electrical connections necessary for operation.

Control

- **Integrated controls** (1)
- **Bulb thermostat for heated environment (TA)** (2)**:** standard thermostat fitted on the unit: ON/OFF, heating/cooling, 3 speeds and ambient temperature knob adjustement.
- **Minimum water temperature thermostat (TC)** (2)
- **Remote controls (CD1, CD2/X6, RCE10E, etc.)** (2)**:** with or without display: ON/OFF, heating/cooling, 3 speeds and ambient temperature knob adjustement.

(1) Options factory fitted
(2) Accessories (deliver unassembled)

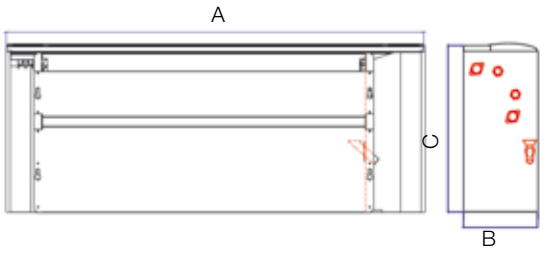
General data

COMFAIR™		HC	10	20	30	40	50	60	70	80	90	100	110	120
2 pipes system - 3 rows coil														
Cooling capacity (1)	Sensible	kW	0,74	1,02	1,76	2,17	2,18	3,08	3,15	3,96	4,82	6,06	7,91	8,48
	Total	kW	0,86	1,28	2,17	2,53	3,11	3,85	4,33	5,59	6,9	7,98	10,02	11,01
Heating capacity (2)		kW	1,25	1,87	2,59	3,28	3,66	4,48	5,14	6,69	8,13	10,06	13,08	14,15
Water flow		l/h	149	220	357	436	536	664	808	964	1186	1376	1727	1898
Water pressure drop	Cooling	kPa	0,9	2	6,3	8,8	16,1	25,9	37,6	27,9	19,1	26,6	21,5	26,8
	Heating	kPa	0,7	1,4	4,9	7,5	13,7	22	34,7	23,7	17,6	23,3	18,8	21,8
Electrical heater		kW	-	1			2			3		-	-	-
		A	-	4,55			9,1			13,65		-	-	-
Airflow		m³/h	227	289	404	453	575	685	708	1058	1242	1356	2012	2003
Sound power level (4)		dB(A)	46	44	44	47	47	52	52	58	64	63	67	66
4 pipes system - 3 +1 rows coil														
Cooling capacity (1)	Sensible	kW	0,71	1,12	1,69	1,93	2,49	2,91	3,34	4,11	5,26	5,86	7,66	8,21
	Total	kW	0,84	1,23	2,08	2,38	2,96	3,69	4,47	5,35	6,57	7,71	9,7	10,66
Heating capacity (3)		kW	1,26	1,89	2,73	2,89	3,49	4,14	5,04	6,21	7,67	8,39	10,11	11,43
Water flow	(1) Cooling	l/h	144	213	358	410	511	635	771	919	1133	1330	1673	1837
	(3) Heating	l/h	109	163	235	249	301	356	435	534	661	739	891	1008
Water pressure drop	Cooling	kPa	0,61	2	5,7	8,2	10,7	20	49,8	11,6	37,8	24,9	21,7	25,1
	Heating	kPa	2,1	5,7	13,9	16,4	27,9	35,1	61,5	99,1	177	48,4	27	34
Airflow		m³/h	216	275	384	430	546	651	673	1005	1180	1291	1916	1908
Sound power level (4)		dB(A)	45	47	44	47	46	53	53	59	65	63	67	67
Available static pressure (high speed)														
2 pipes system		Pa	25	25	19	27	32	36	44	55	53	75	76	84
4 pipes system		Pa	19	19	15	22	25	28	36	42	44	74	75	85

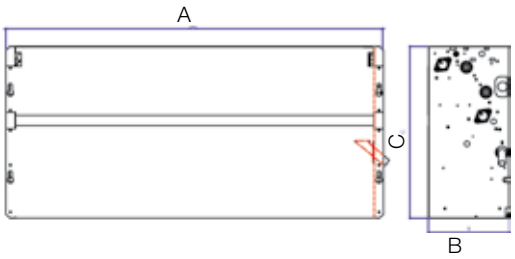
Nominal measurement conditions: Maximum speed - Unit not connected (ESP = 0 Pa)
(1) Cooling: Water inlet temperature: 7°C; water outlet temperature: 12°C; air inlet temperature: 27°C D.B - 19°C W.B
(2) Heating: Water inlet temperature: 50°C; water flow rate as in cooling mode; air inlet temperature: 20°C
(3) Heating: Water inlet temperature: 70°C; water outlet temperature: 60°C ; air inlet temperature: 20°C
(4) Sound power level: according to ISO 23741

Physical data

Cased units



Chassis units



COMFAIR™		HC	10	20	30	40	50	60	70	80	90	100	110	120
Standard coil	Rows	Nb	3											
	Connections	Ø mm	3/4"											
Auxiliary coil	Rows	Nr	1											
	Connections	Ø mm	1/2"											
Drain connection (out)		Ø mm	20											
Cased units														
A		mm	660	620	1060		1260			1460		1660	1960	
B		mm	225									257		
C		mm	480						585			602		
Net weight		kg	14	17	22	23	27	28	30	35	36	46	55	57
Chassis units														
A		mm	420	620	820		1020			1220		1380	1680	
B		mm	220									252		
C		mm	460						580			585		
Net weight		kg	11	14	19	20	23	24	26	31	32	41	50	52

HH • 4 ➔ 51 kW

High pressure modular fan coil unit

COMFAIR ™

Introduction to the range

The **COMFAIR™ HH** can be used with our chillers for **comfort applications such as office buildings, shops, and hotels air conditioning.**

The **COMFAIR™ HH** fan coil features a high available pressure (105 to 260 Pa) and is offered in 7 sizes.

The units are available in the following versions:

- 2 pipes
- 2 pipes + electrical resistance heater
- 4 pipes

Quiet operation

- Three operating speeds overload-protected electric motor, directly coupled to the fans and is mounted on elastic mountings.
- Fan constructed for quiet-running.

Sustainable performance

- Fan consisting of one or two centrifugal twin-intake fans with horizontally extending aluminium blades, with static and dynamic balancing.
- Frame made from galvanized sheet (1 mm)
- Exchangers made from copper tube with aluminium fins crimped by mechanical expansion of the tubes.

Easy installation, operation and maintenance

- Exchangers connection of the twist-proof female type
- Exchangers headers fitted with easily accessible air bleed valves.

Control

- **COMFAIR™ HH** fan convectors must be controlled by a remote control module, to be ordered separately. There is a wide range of models to meet all requirements

Options

Auxiliary heating

- **Electrical resistance heater (SRE) (2):** the heating element kit is used during heating to integrate the heating power of the meain coil or alternative as the only heating element.
- **Auxiliary coils for 4 pipes operation (1):** this is used in 4-pipe systems, which comprise 2 independent water circuits: one for cooling and the other for heating. In this case, the auxiliary coil is used for heating.

Indoor air quality

- **G3 Air filter (SFA) et G2 activated carbon Air filter (2)**

Security & extended lifecycle

- **Auxiliary condensate tray (UTC) (2):** it is used to collect condensate from the valves and the pipes connecting to the unit.
- **Condensate drain pump (1):** This pump is used to eliminate the condensation that collects in the tray in installations where there is no self-emptying outlet.

Quiet operation

- Antivibration duct (GAM) (2)

Flexibility

- **Section with manual fresh air damper (SSP) (2):** to ensure sufficient air in the rooms, it is installed at the bottom of the fan coil on the intake line.
- **Intake or discharge plenum (PAM) / 90° intake or discharge plenum (RAM) / Intake or distribution section with circular connections (BAM) (2):** in galvanised sheet metal, they are used to convey the air with vertical or horizontal built-in fan coil installation.
- Connecting flange (FAM) (2)

Service

- **2 or 3ways valves (1):** the kit comprises valve body, electrothermal actuator, flared copper pipes, ring nuts and gaskets for fixing to the fan coil. The valve kit is already installed on the fan coil complete with the water and electrical connections necessary for operation.
- **Shut-off valves (1)**

Control

- **Bulb thermostat for heated environment (TA) (2):** standard thermostat fitted on the unit: ON/OFF, heating/cooling, 3 speeds and ambient temperature knob adjustement.
- **Minimum water temperature thermostat (TC) (2)**
- **Remote controls (CD1, CD2/X6, RCE10E,**

(1) Options factory fitted

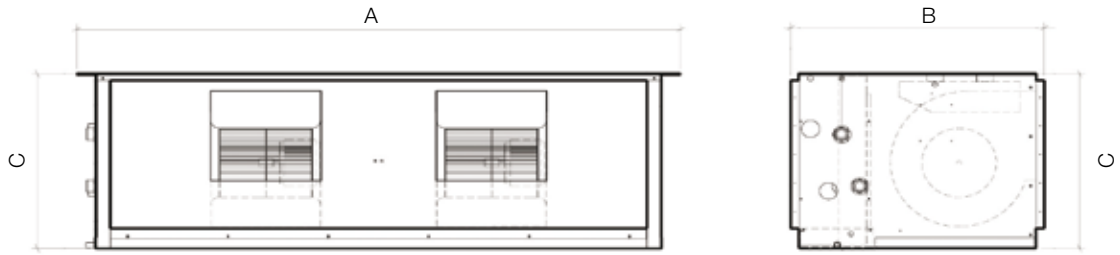
(2) Accessories (deliver unassembled)

General data

COMFAIR™		HH	10	20	30	40	50	60	70
2 pipes system - 3 rows coil									
Cooling capacity (1)	Sensible	kW	2,87	5,64	7,36	8,63	11	21,13	39,5
	Total	kW	3,64	7,05	9,2	10,6	13,1	27,81	50,64
Heating capacity (2)		kW	4,98	8,51	11,2	12,8	16,9	32,19	59,65
Water flow		l/h	691	1215	1586	1827	2257	4795	8731
Water pressure drop	Cooling	kPa	24	35,9	33,8	31,9	35,9	34	40
	Heating	kPa	22,2	31,7	28,9	27,9	33,2	29	34
Electrical heater	Standard	kW	3	6	6	9	9	12	18
	High	kW	4,5	9	9	12	12	18	24
Airflow		m^3/h	837	1423	1951	2131	3002	4678	9250
Sound power level (4)		dB(A)	68	66	70	69	75	78	81
4 pipes system - 3 +1 rows coil									
Cooling capacity (1)	Sensible	kW	3,1	5,63	7,07	8,04	10,6	20,19	37,79
	Total	kW	3,6	7	8,3	9,57	12,3	24,99	45,56
Heating capacity (3)		kW	4,18	7	9,17	10,6	14	38,83	70,2
Water flow	Cooling	l/h (1)	621	1095	1429	1646	2114	4308	7856
	Heating	l/h (3)	361	603	789	909	1206	3348	6051
Water pressure drop	Cooling	kPa	15,9	26,8	28	29,2	30,8	27	32
	Heating	kPa	26,8	22,9	37	21,7	33,8	33	36
Airflow		m^3/h	795	1352	1853	2024	2852	4444	8788
Sound power level (4)		dB(A)	69	66	70	70	73	78	81
Available static pressure									
2 pipes system	Min speed	Pa	90	80	115	105	135	220	220
	Med speed	Pa	95	95	130	130	180	240	240
	Max speed	Pa	105	105	135	135	205	260	260
4 pipes system	Min speed	Pa	75	70	95	90	110	180	180
	Med speed	Pa	85	80	115	115	155	210	210
	Max speed	Pa	95	90	120	120	180	220	220

Nominal measurement conditions: Maximum speed - Unit not connected (ESP = 0 Pa)
(1) Cooling: Water inlet temperature: 7°C; water outlet temperature: 12°C; air inlet temperature: 27°C D.B - 19°C W.B
(2) Heating: Water inlet temperature: 50°C; water flow rate as in cooling mode; air inlet temperature: 20°C
(3) Heating: Water inlet temperature: 70°C; water outlet temperature: 60°C; air inlet temperature: 20°C
(4) Sound power level: according to ISO 23741

Physical data



COMFAIR™		HH	10	20	30	40	50	60	70
Standard	Rows	Nr	3					4	
coil	Connections	Ø mm	1/2"		3/4"		1"	1" 1/4	1" 1/2
Auxiliary	Rows	Nr	1					2	
coil	Connections	Ø mm	1/2"				3/4"	1"	1" 1/4
Drain connection (out)		Ø mm	20						
A		mm	650	1000		1339		1341	2028
B		mm	533					852	
C		mm	299		323			674	
Net weight		kg	28	36	41	46	57	117	192

HD • 2 ➔ 4 kW

High wall fan coil unit

COMFAIR ™

Introduction to the range

The **COMFAIR™ HD** can be used with our chillers for **comfort applications such as office buildings, shops, and hotels air conditioning.**

The **COMFAIR™ HD** is a wall-mounted fan coil with the same design as the wall-mounted split systems, available in 3 sizes.

The units are available in the following versions:

- 2 pipes

Indoor air quality

- Air filtration and ionization

Quiet operation

- Tangential fan for quieter running

Sustainable performance

- ABS outer cabinet
- Galvanized steel wall support
- Copper-aluminium coils

Easy installation, operation and maintenance

- Automatic horizontal deflection system (35° for cooling and 10° for heating)

Control

- Infrared remote controller with LCD screen and wall mounted thermostat

Accessories (delivered unassembled)

Quiet operation

- **Tangential fan for quieter running**

Security & extended lifecycle

- **Stainless steel flexible piping**

Service

- **3 ways valves:** the kit comprises valve body, electrothermal actuator, flared copper pipes, ring nuts and gaskets for fixing to the fan coil. The valve kit is already installed on the fan coil complete with the water and electrical connections necessary for operation.
- **Valve box**

Control

- **Remote controls (CD2/X6, RCE10E, etc.)** [2]: with or without display: ON/OFF, heating/cooling, 3 speeds and ambient temperature knob adjustement.

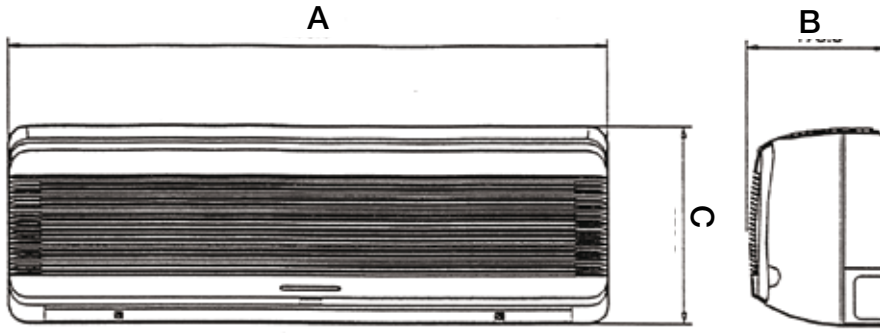
General data

COMFAIR™		HD	1	2	3
Cooling capacity (1)	Sensible	W	1 700	1 990	3 440
	Total	W	2 040	2 460	4 420
Heating capacity (2)		W	2 590	3 320	5 640
Water flow		l/h	351	423	760
Water pressure drop	Cooling	kPa	18	20	68,1
	Heating	kPa	16,7	17	59,8
Heating capacity (3)		W	4 650	5 610	9 470
Airflow		m^3/h	440	433	860
Sound power level (4)		dB(A)	56	54	61

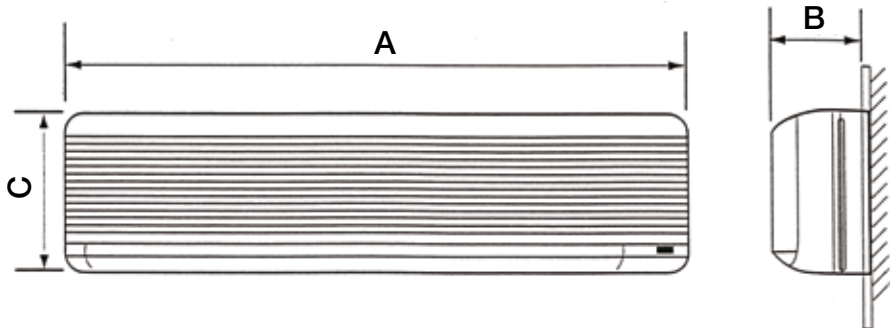
Nominal measurement conditions: Maximum speed - Unit not connected (ESP = 0 Pa)
(1) Cooling: Water inlet temperature: 7°C; water outlet temperature: 12°C; air inlet temperature: 27°C D.B - 19°C W.B
(2) Heating: Water inlet temperature: 50°C; water flow rate as in cooling mode; air inlet temperature: 20°C
(3) Heating: Water inlet temperature: 70°C; water outlet temperature: 60°C; air inlet temperature: 20°C
(4) Sound power level: according to ISO 23741

Physical data

Sizes 1 and 2



Size 3



COMFAIR™	HD	1	2	3
A	mm	795		1 200
B	mm	178		210
C	mm	270		320
Net weight	kg	8	9	13

CWC • 2 ➔ 9 kW

Chilled water cassette

COMFAIR™

Introduction to the range

The **COMFAIR™ CWC** can be used with our chillers for **comfort applications such as office buildings, shops, and hotels air conditioning.**

The units are available in the following versions:

- 2 pipes
- 2 pipes + electrical resistance heater - not available in 050 size
- 4 pipes

The units can be supplied in 2 configurations:

- Plastic diffuser
- Metallic Coanda diffuser

Quiet operation

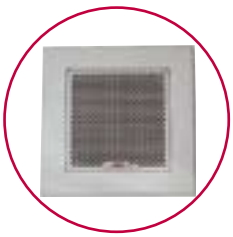
- Three-speed centrifugal direct drive fans with low noise level

Sustainable performance

- Galvanized sheet casing, fully insulated inside
- Plastic of metal diffuser, with internal insulation, easily accessible and suitable for any interior

Easy installation, operation and maintenance

- Washable and easily accessible air filter
- Condensate drain pump as standard, with 500 mm delivery head
- Drainage tube



Options

Auxiliary heating

- **Electrical resistance heater (1):** the heating element kit is used during heating to integrate the heating power of the meain coil or alternative as the only heating element.

Security & extended lifecycle

- **Auxiliary condensate tray (1):** it is used to collect condensate from the valves and the pipes connecting to the unit.
- **Float kit for activating condensate pump, plus alarm contact (1)**

Flexibility

- **Fresh air kit (1):** to ensure sufficient air in the rooms, it is installed at the bottom of the fan coil on the intake line.

Service

- **2 or 3ways valves (2):** the kit comprises valve body, electrothermal actuator, flared copper pipes, ring nuts and gaskets for fixing to the fan coil. The valve kit is already installed on the fan coil complete with the water and electrical connections necessary for operation.
- **Duct connection sleeve kit (1)**

Control

- **Remote controls (311X2, 311XVM, 311XVA) (1)**
- **Master / slave panel (1 master and up to 3 slaves) (1)**

(1) Options factory fitted

(2) Accessories (deliver unassembled)

General data

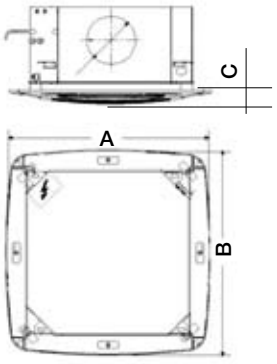
COMFAIR™ CWC - 2 pipes version	CWC	20	30	40	50	70	90
Cooling capacity (1)							
Cooling capacity	W	1870	3410	4090	5330	7400	8710
Sensible capacity	W	1480	2730	3190	3960	5760	6490
Chilled water flow	l/h	329	577	712	930	1343	1513
Pressure drop	kPa	14,2	22	37,9	37,2	26,2	28,7
Heating capacity (2)							
Heating capacity	W	2600	4050	4610	6090	8310	9790
Hot water flow	l/h	329	595	712	930	1343	1513
Pressure drop	kPa	17	21,8	37,7	44,4	24,9	24,8
Electrical heater							
Capacity	kW	1,5	2		-	4	
Electrical data							
Voltage	V / Ph / Hz	230/1/50					
Motor power input	W	46		69	94	180	220
Nominal current	A	0,2		0,3	0,5	0,8	0,9
Blowing							
Minimum airflow	m^3/h	445	400	553	650	987	1126
Maximum airflow	m^3/h	650	598	779	920	1342	1569
Sound power level at minimum airflow (4)	dB(A)	44	40	47	53	51	56
Sound power level at maximum airflow (4)	dB(A)	52	50	55	62	60	65

COMFAIR™ CWC - 4 pipes version	CWC	20	30	40	50	70	90
Cooling capacity (1)							
Cooling capacity	W	2030	2730	3270	4250	6060	7890
Sensible capacity	W	1770	2250	2880	3450	5010	6240
Chilled water flow	l/h	358	489	647	809	1124	1369
Pressure drop	kPa	13,5	33	27	36,5	18,4	25
Heating capacity (3)							
Heating capacity	W	1510	2260	3250	4410	6750	7650
Hot water flow	l/h	126	213	295	373	575	653
Pressure drop	kPa	2,6	9,4	34,9	38	27	25,6
Electrical data							
Voltage	V / Ph / Hz	230/1/50					
Motor power input	W	46		69	94	180	220
Nominal current	A	0,2		0,3	0,5	0,8	0,9
Blowing							
Minimum airflow	m^3/h	445	400	553	650	987	1126
Maximum airflow	m^3/h	650	598	779	920	1342	1569
Sound power level at minimum airflow (4)	dB(A)	41	40	47	53	52	56
Sound power level at maximum airflow (4)	dB(A)	51	50	55	62	60	64

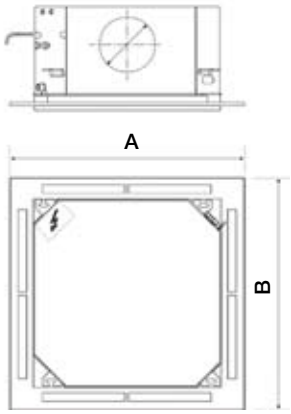
(1) At high speed : Cooling : Water inlet temperature: 7°C; water outlet temperature: 12°C; air inlet temperature: 27°C D.B - -19°C W.B
(2) At high speed : Heating : Water inlet temperature: 50°C; water flow rate as in cooling mode; air inlet temperature: 20°C
(3) At high speed : Heating : Water inlet temperature: 70°C; water outlet temperature: 60°C; air inlet temperature: 20°C
(4) Sound power level dB(A) ref 10 (-12) W

Physical data

Sizes 20 to 50

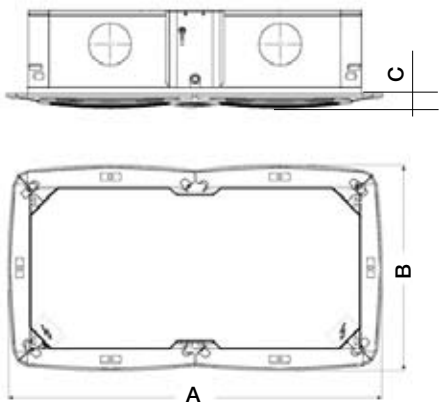


Plastic diffuser

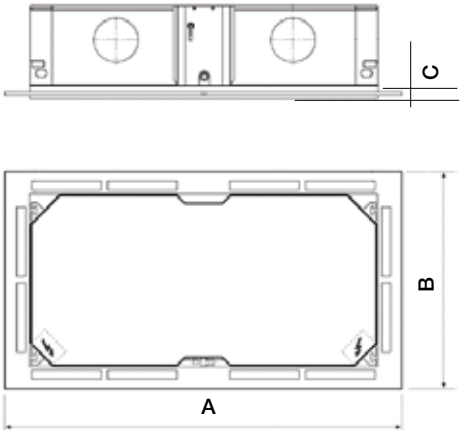


Metallic diffuser

Sizes 70 and 90



Plastic diffuser

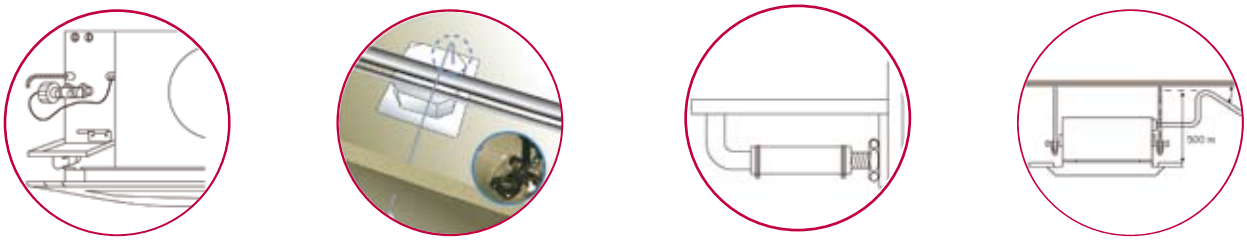


Metallic diffuser

COMFAIR™	CWC	20	30	40	50	70	90
Casing							
A	mm	575				1175	
B	mm	575					
C	mm	298					
Weight	kg	21	22	23	24	43	45
Plastic Diffuser							
A	mm	720				1320	
B	mm	720					
C	mm	48					
Weight	kg	3				5	
Metallic Diffuser							
A	mm	619				1219	
B	mm	619				619	
C	mm	27					
Weight	kg	5				11	

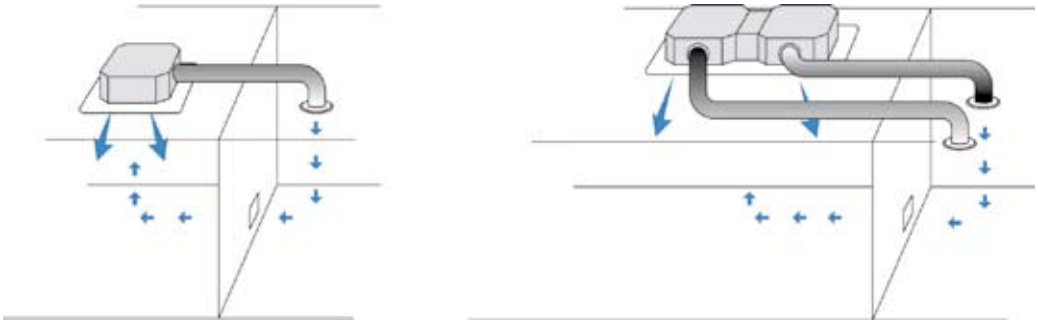
Principle drawings

Condensate drain

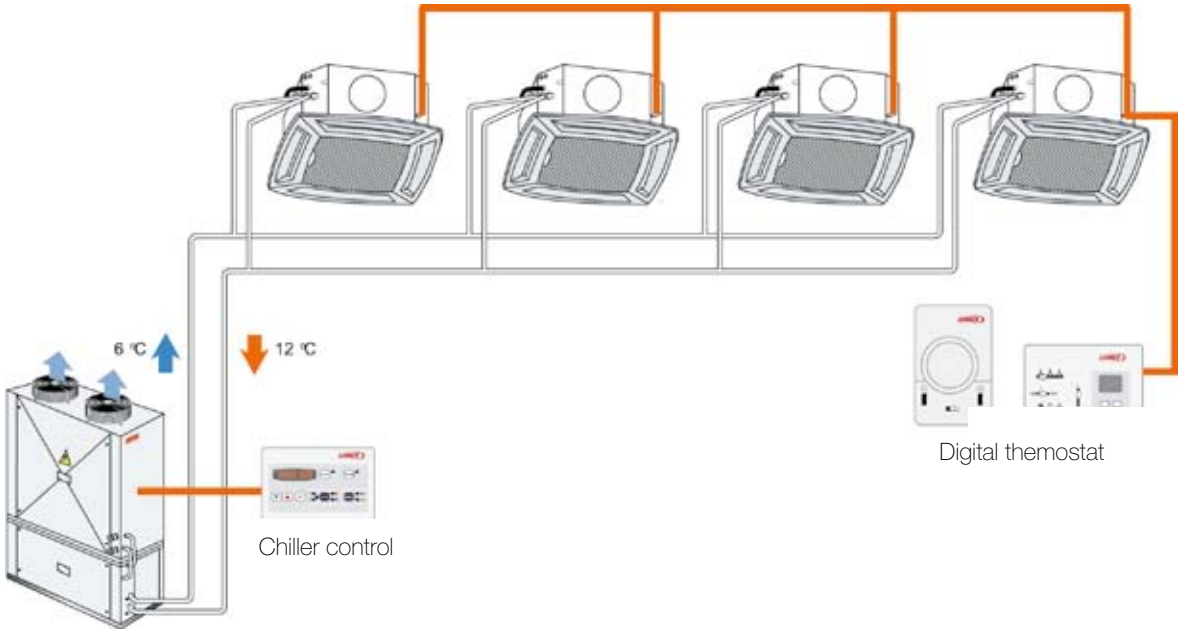


Fresh air supply

Duct for blowing in an adjacent room



Installation with a chiller



CoandAir™ • 2 ➔ 4 kW

Coanda diffusion cassette

COANDAIR ™

Introduction to the range

The **COANDAIR™** cassette can be used with our chillers for **comfort applications such as office buildings, hospitals and light commercial.** The **COANDAIR™** is available in 3 sizes, providing air conditioning for 12 to 30 m². They fit perfectly into false ceilings with modular dimensions of 600,900 or 1200x600.
The units are available in the following versions:

- 2 pipes
- 2 pipes + electrical resistance heater
- 4 pipes

Extended life cycle

- Class G3 side air filter

Sustainable performance

- Galvanized sheet steel cabinet, with 1 mm thickness of paint
- Copper-aluminium heat exchanger, left- or right-hand connection (specify when ordering)
- Double intake centrifugal fan system (1, 2 fans)
- The diffuser is made of an electro galvanized 10/10 mm thick steel plate, coated with a white epoxy polyester (RAL 9010) and oven baked. With overall dimensions of 595 x 595, 595 x 895 and 595 x 1195, it can be mounted on or under the false ceiling.

Control

- Remote ambient thermostat

Options

Auxiliary heating

- **Electrical resistance heater** (1): it is a bare wire resistor placed in the airflow directly in the hearing or gills blowing fan, thus offering an optimum scan and an exchange maximum.
- **4-pipes operation:** only available in 3 rows cooling coil version, it's a 1 row heating coil in a common fin packing with 1/2" G connection.

Safety & extended lifecycle

- **Condensate drain pump** (2)**:** This pump is used to remove the condensation that collects in the tray in installations where there is no self emptying outlet.

Flexibility

- **Hygienic air supply** (2)**:** The unit can be equipped with an optional hygienic air spigot } to provide air individually from outside as required by the regulations. This spigot may be equipped with a constant flow regulator to limit the airflow to a predetermined value precisely control any pressure fluctuations in the ventilation network.
- **Raised Option** (1)(2)**:** in the event that there is insufficient slope for draining the condensate, and to avoid having to purchase, install and maintain a pump, there are two options available to raise the unit: +65 mm factory raised cabinet or 150 mm raising accessory.
- **Ductable option:** for some applications, especially for hotels or hospitals, it is possible to separate the supply of air to the unit . In this kind of application, the diffuser can be connected, to a rectangular flange at the supply of the unit. The unit can provide up to 60 Pa static pressure available.
- **Special diffuser dimensions:** different dimensions may be requested for the diffuser.

Service

- **Isolation and control valve** (1)
- **2- or 3-way valves (different models available)** (1)**:** the kit comprises valve body, electro thermal actuator, flared copper pipes, ring nuts and gaskets for fixing to the fan coil. The valve kit is already installed on the fan coil complete with the water and electrical connections necessary for operation.

Control

- **Remote thermostats** (2)**:** there are 2 types available, one for 2-pipe applications, one for 4-pipe applications.
- **Aquastat** (2)**:** for automatic management of the changeover operations.

(1) Options factory fitted

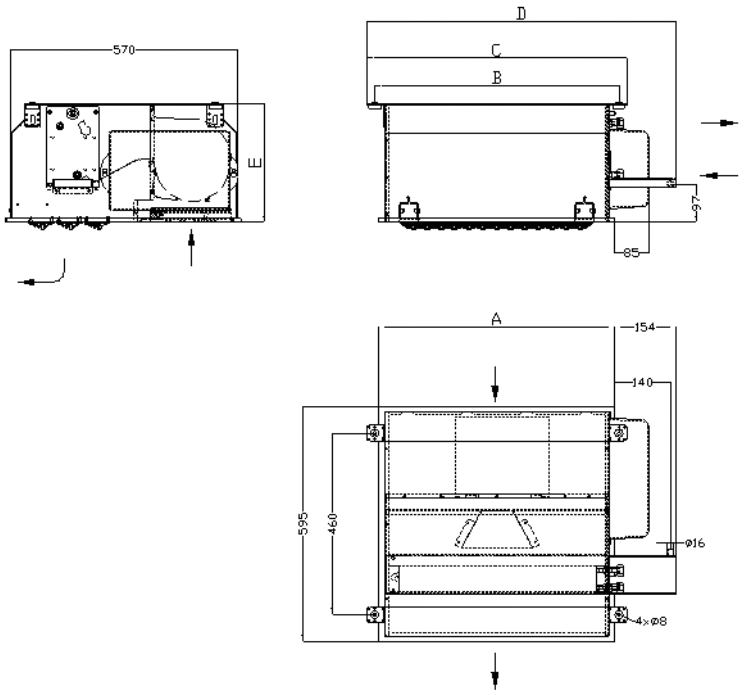
(2) Accessories (deliver unassembled)

General data

COANDAIR™	Speed	CD	06-3	06-4	09-3	09-4	12-3	12-4
Airflow	1	m^3/h	182		210		220	
	2		225		240		280	
	3		293		350		400	
	4		447		480		600	
	5		511		550		750	
Cooling capacity								
Sensible cooling capacity	1	kW	0,901	1,01	1,11	1,21	1,23	1,32
	2		1,07	1,21	1,24	1,36	1,51	1,64
	3		1,31	1,5	1,68	1,88	2,04	2,24
	4		1,8	2,11	2,16	2,44	2,82	3,16
	5		1,99	2,34	2,39	2,72	3,35	3,79
Total cooling capacity	1	kW	1,33	1,53	1,66	1,86	1,88	2,05
	2		1,56	1,82	1,85	2,08	2,13	2,54
	3		1,88	2,24	2,47	2,83	3,05	3,43
	4		2,5	3,06	3,1	3,61	4,13	4,75
	5		2,72	3,36	3,4	4	4,84	5,63
Water flow - Cooling	1	l/h	229	264	286	319	323	353
	2		268	313	318	357	395	436
	3		324	385	424	486	524	590
	4		430	526	533	621	710	816
	5		468	577	585	687	882	968
Water pressure drop - Cooling	1	kPa	4,79	8,18	3,43	5,12	5,34	7,68
	2		6,38	11,2	4,16	6,28	7,67	11,3
	3		9,01	16,2	7,04	11	12,8	19,5
	4		15,1	28,5	10,7	17,2	22,4	35,2
	5		17,6	33,8	12,7	20,7	29,8	48
Heating capacity								
Heating capacity 2 pipes	1	kW	1,53	1,68	1,85	1,99	2,02	2,13
	2		1,81	2,01	2,08	2,25	2,5	2,67
	3		2,24	2,53	2,85	3,13	3,41	3,7
	4		3,09	3,57	3,67	4,1	4,74	5,25
	5		3,41	3,97	4,08	4,6	5,67	6,33
Water pressure drop - Heating 2 pipes	1	kPa	4,08	6,9	2,94	4,36	4,5	6,5
	2		5,42	9,4	3,57	5,35	6,5	9,5
	3		7,65	13,7	6,03	9,4	11	16,6
	4		12,8	24,2	9,17	14,7	19	30
	5		14,9	28,6	10,9	17,7	28,3	40,9
Heating capacity 4 pipes	1	kW	1	NA	1,33	NA	1,54	NA
	2		1,15	NA	1,45	NA	1,81	NA
	3		1,36	NA	1,86	NA	2,3	NA
	4		1,77	NA	2,28	NA	2,99	NA
	5		1,87	NA	2,48	NA	3,45	NA
Water flow - Heating 4 pipes	1	l/h	87,6	NA	116	NA	134	NA
	2		100	NA	127	NA	159	NA
	3		119	NA	163	NA	201	NA
	4		154	NA	199	NA	261	NA
	5		163	NA	217	NA	301	NA
Water pressure drop - Heating 4 pipes	1	kPa	1,13	NA	2,59	NA	4,29	NA
	2		1,45	NA	3,04	NA	5,78	NA
	3		1,96	NA	4,75	NA	8,87	NA
	4		3,15	NA	6,86	NA	14,3	NA
	5		3,5	NA	8,02	NA	18,5	NA
Electrical data								
Voltage		V / Ph / Hz	230/1/50					
Fan absorbed power	1	kW	41,7		36,8		37	
	2		42,7		39,8		39,6	
	3		43,3		44,4		45,7	
	4		45,2		54,3		58,3	
	5		45,7		67,6		74,5	
Acoustic								
Sound power level	1	dB(A)	35		34		27	
	2		40		39		34	
	3		46		45		38	
	4		54		50		48	
	5		56		54		53	

Physical data

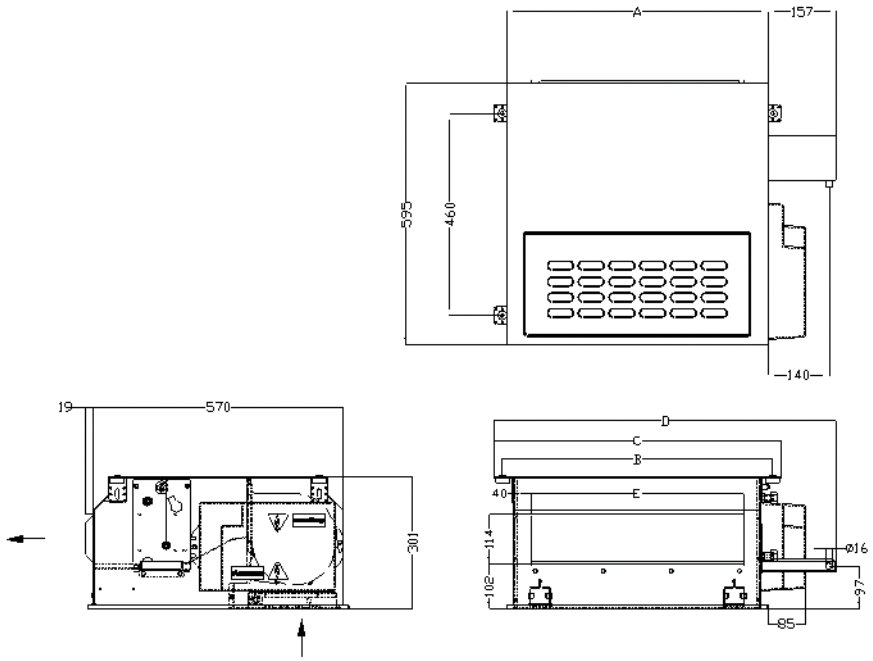
Standard and raised version



COANDAIR™	CD	06	09	12
Standard				
A	mm	595	895	1195
B	mm	616	916	1216
C	mm	655	955	1255
D	mm	779	1079	1379
E	mm	301	301	301
Weight	kg	25	36	47
Raised				
A	mm	595	895	1195
B	mm	616	916	1216
C	mm	655	955	1255
D	mm	779	1079	1379
E	mm	366	366	366
Weight	kg	25	36	47

Physical data

Ductable version



COANDAIR™	CD	06	09	12
Ducted				
A	mm	595	895	1195
B	mm	616	916	1216
C	mm	655	955	1255
D	mm	779	1079	1379
Weight	kg	25	36	47

Quantum™ M • 2 - 7 kW

High static uncased fan coil

QUANTUM™M

Introduction to the range

The **QUANTUM™ M** can be used with our chillers for **comfort applications such as office buildings, shops, and hotels air conditioning.**

The standard unit is monobloc including return and supply plenum fitted with a 3/4/5 rows coil available in 2 configurations:

- «U» type, with lateral 200 mm spigots (on hydraulic side or not)
- «L» type, with 200 mm spigots in line

The units are available in the following versions:

- 2 pipes
- 2 pipes + electrical resistance heater
- 4 pipes

Quiet operation

- Mounting brakets with anti-vibration grommets

Sustainable performance

- Galvanized steel steel cabinet 1 mm thickness with thermal insulation
- 3/4/5 rows copper-aluminium heat exchanger, test pressure 13 bars, left or right-hand connection
- Centrifugal double intake fan system (1, 2 or 3 fans) with aluminium blades
- Primary condensate traymade from galvanized steel with a thick coat of bituminous paint
- Glass G2, mounted on a galvanized steel frame, easily dismantled
- All electrical connections are made via the screw terminal block, positioned on the same side as the hydraulic connections, protected by a plastic box

Options

Auxiliary heating

- **Electrical resistance heater** (1)**:** the heating element kit is used during heating to integrate the heating power of the meain coil or alternative as the only heating element.
- **Auxiliary coils for 4 pipes operation** (1)**:** only available in 3 and 4 rows cooling coil version, it's a 1 row heating coil in a common fin packing with 1/2" G connection.

Indoor air quality

- **G4 filter** (1)

Security & extended lifecycle

- **Condensate drain pumps** (2)**:** This pump is used to eliminate the condensation that collects in the tray in installations where there is no self-emptying outlet.

Flexibility

- **Fresh air spigot (2 diameters, with or without damper)** (1)**:** to ensure sufficient air in the rooms, it is installed at the bottom of the fan coil on the intake line.

Service

- **2 or 3ways valves** (1)**:** the kit comprises valve body, electrothermal actuator, flared copper pipes, ring nuts and gaskets for fixing to the fan coil. The valve kit is already installed on the fan coil complete with the water and electrical connections necessary for operation.
- **Isolation and control valve** (1)

Control

- **Free issue controls kit** (1)
- **Remote controls** (2)

(1) Options factory fitted

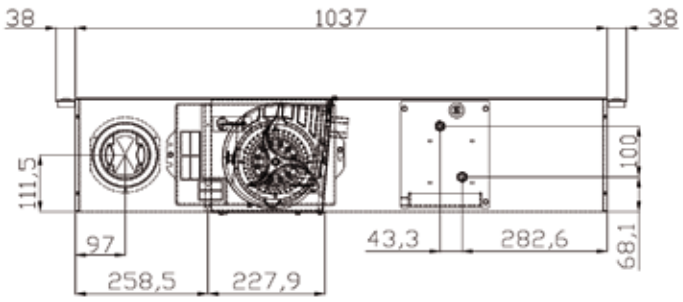
(2) Accessories (deliver unassembled)

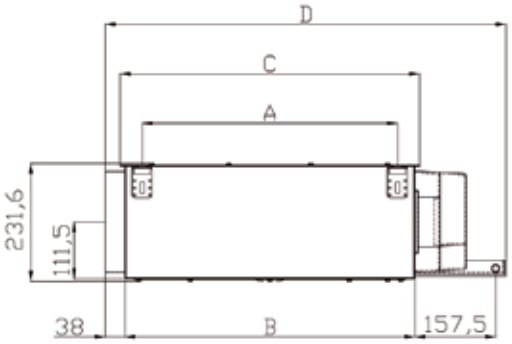
General data

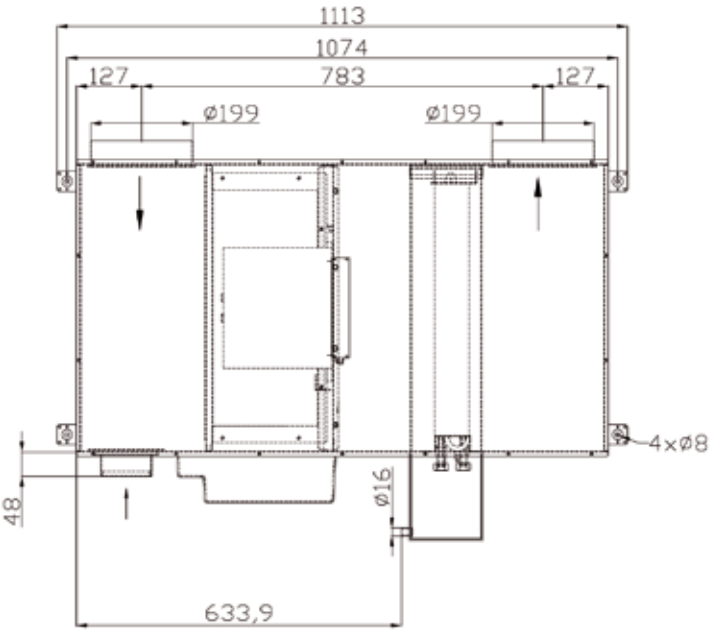
Quantum™ M		Speed	QLMC	103	104	105	203	204	205	303	304	305
Airflow	Asp = 50 Pa	1	m^3/h	640	640	640	950	950	950	1060	1060	1060
	Asp = 40 Pa	2		550	550	550	850	850	850	940	940	940
	Asp = 24 Pa	3		440	440	440	660	660	660	730	730	730
	Asp = 15 Pa	4		330	330	330	500	500	500	560	560	560
	Asp = 5 Pa	5		200	200	200	310	310	310	350	350	350
Cooling capacity (Air in 27°C 50% - Water 7/12°C)												
Sensible cooling capacity		1	kW	2330	2770	3200	3560	4140	5000	4320	4970	5910
		2		2090	2470	2830	3290	3810	4560	3960	4530	5330
		3		1780	2080	2350	2740	3140	3690	3280	3710	4270
		4		1440	1660	1840	2220	2520	2900	2670	2980	3370
		5		973	1090	1180	1530	1690	1890	1820	2000	2180
Total cooling capacity		1	kW	3120	2770	4610	4840	5830	7410	6100	7210	8960
		2		2850	2470	4130	4520	5420	6810	5640	6630	8130
		3		2480	2080	3490	3850	4650	5590	4750	5510	6580
		4		2050	1660	2780	3190	3720	4450	3930	4500	5230
		5		1430	1090	1820	2250	2560	2940	2740	3070	3430
Water flow - Cooling		1	l/h	537	670	792	831	1002	1273	1049	1240	1540
		2		490	607	710	777	932	1171	969	1140	1397
		3		426	520	600	661	783	961	816	948	1131
		4		352	421	478	548	640	765	675	773	899
		5		245	285	313	387	441	505	472	527	589
Water pressure drop - Cooling		1	kPa	22,5	44,3	23,7	24,1	41,4	74,8	45,4	75,2	71,8
		2		19,1	37	19,4	21,3	36	64,2	39,4	64,5	60,1
		3		14,8	28	14,3	15,8	26,2	44,8	28,8	46,1	40,8
		4		10,5	19,1	9,43	11,2	18,2	29,6	20,3	31,8	26,8
		5		5,45	9,4	4,37	5,95	9,21	13,9	10,6	15,9	12,4
Heating capacity (Heating 2 pipes Air in 20°C, Water in 50°C same water as cooling mode above; Heating 4 pipes Air in 20°C water 70/60°C)												
Heating capacity 2 pipes		1	kW	3660	4370	5160	5600	6560	7970	6770	7830	8320
		2		3290	3900	4560	5170	6040	7270	6200	7130	8400
		3		2810	3280	3780	4310	4960	5850	5130	5820	6710
		4		2270	2610	2950	3500	3980	4580	4170	4670	5270
		5		1530	1720	1880	2420	2680	2970	2860	3130	3400
Water pressure drop - Heating 2 pipes		1	kPa	7,4	13,4	7,2	7,76	12,6	21,1	13,5	21,5	19,1
		2		6,12	10,9	5,74	6,72	10,8	17,8	11,5	18,1	15,7
		3		4,57	7,99	4,08	4,8	7,57	12	8,16	12,5	10,4
		4		3,1	5,27	2,59	3,28	5,05	7,68	5,6	8,42	6,71
		5		1,41	2,47	1,14	1,67	2,46	3,49	2,82	4,07	3,02
Heating capacity 4 pipes		1	kW	2120		NA	3370		NA	4260		NA
		2		1950		NA	3160		NA	3960		NA
		3		1750		NA	2780		NA	3390		NA
		4		1470		NA	2340		NA	2860		NA
		5		170		NA	1720		NA	2110		NA
Water flow - Heating 4 pipes		1	l/h	185		NA	294		NA	372		NA
		2		170		NA	276		NA	347		NA
		3		153		NA	243		NA	296		NA
		4		128		NA	204		NA	250		NA
		5		93		NA	150		NA	184		NA
Water pressure drop - Heating 4 pipes		1	kPa	4,4		NA	13,9		NA	27		NA
		2		3,77		NA	12,4		NA	23,7		NA
		3		3,1		NA	9,83		NA	17,8		NA
		4		2,25		NA	7,18		NA	13,1		NA
		5		1,26		NA	4,12		NA	7,55		NA
Electrical data												
Voltage			V / Ph / Hz	230/1/50								
Fan absorbed power		1	kW	100			200			200		
		2		102			204			204		
		3		103			206			206		
		4		104			208			208		
		5		105			210			210		
Acoustic												
Sound power level		1	dB(A)	65			72			67		
		2		61			68			63		
		3		58			65			61		
		4		53			58			55		
		5		50			55			52		

Physical data

QUANTUM™ M with 4 rows coil, «U» type, right connection



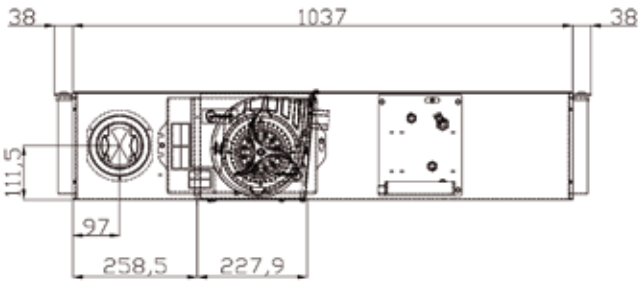


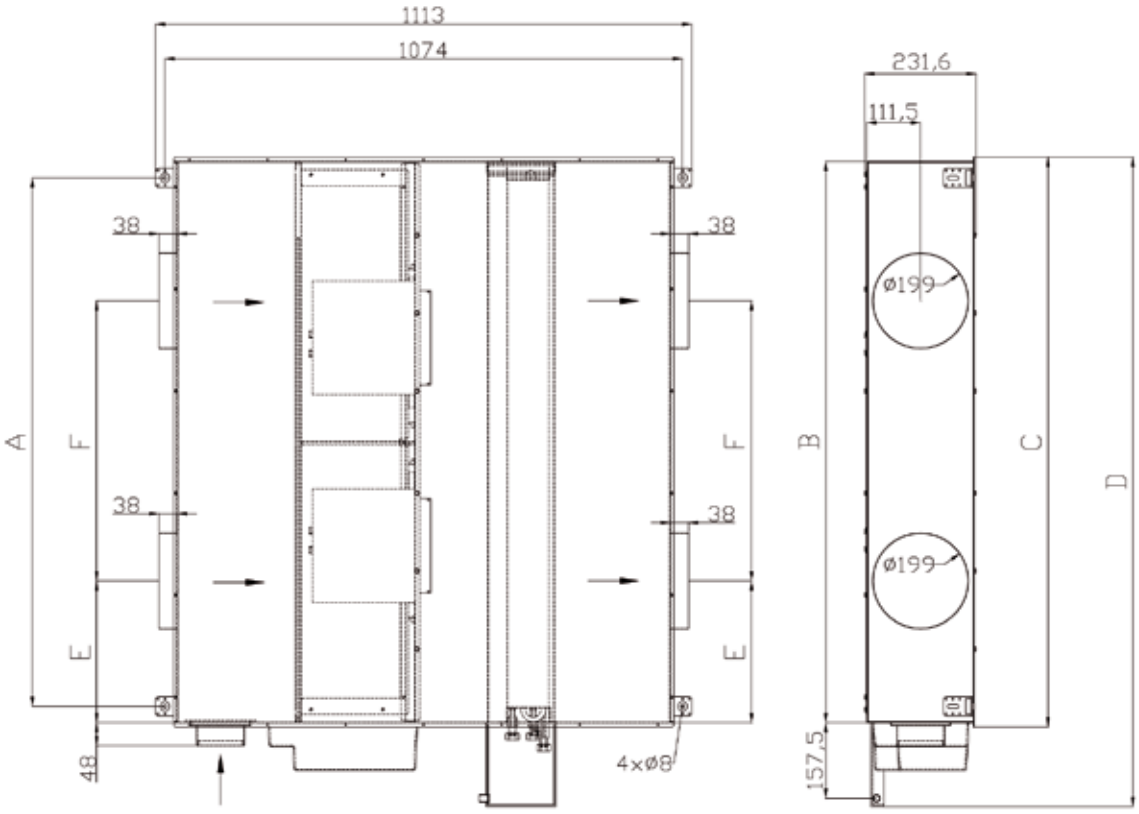


QUANTUM™ M	QMLC	10	20	30
A	mm	498	798	1098
B	mm	566	866	1166
C	mm	584	884	1184
D	mm	781,5	1081,5	1381,5
Weight	kg	24	37	45

Physical data (cont'd)

QUANTUM™ M with 3+1 rows coil, «L» type, right connection





QUANTUM™ M	QMLC	10	20	30
A	mm	498	798	1098
B	mm	566	866	1166
C	mm	584	884	1184
D	mm	749,5	1049,5	1349,5
E	mm	283	214	294,5
F	mm	-	432	582
Weight	kg	24	37	45

Inductair™ • 0,4 ➔ 2,7 kW

Induction unit for 2 or 4 pipes system

INDUCTAIR™

Introduction to the range

The Lennox **INDUCTAIR™** induction units are suitable for those installations where **air quality and low noise is a must, e.g. hospitals, office buildings.**

The extremely low noise levels are a result of efficient nozzle configuration, specially constructed primary air chamber with insulated guide plate and aerodynamically designed primary air connection.

Wide range flexibility, two types of dimensions and units completely ready for operation

Designation

ML 64-2-L-6-580	
ML	TYPE : **ML :** Low height Induction unit for vertical installation with a 2 pipes hot water coil **MLD :** Low height Induction unit for vertical installation with a 4 pipes hot water coil **MG :** Induction unit for vertical installation with a 2 pipes hot water coil **MGD :** Induction unit for vertical installation with a 4 pipes hot water coil **MH :** Induction unit for horizontal installation with a 2 pipes hot water coil **MHD :** Induction unit for horizontal installation with a 4 pipes hot water coil
64	Size : 48/64/88/120
2	Nozzle plate : 1/2/3/4/5/6
L	Optionals : **F :** Filter Scott **L :** Filter Lintscreen **S :** Series connection **W :** Drain connection (14 mm)
6	Air/Water connection : 1/3/4/6
580	Height : 580/440

Optionals

Optionals F and L : air filters

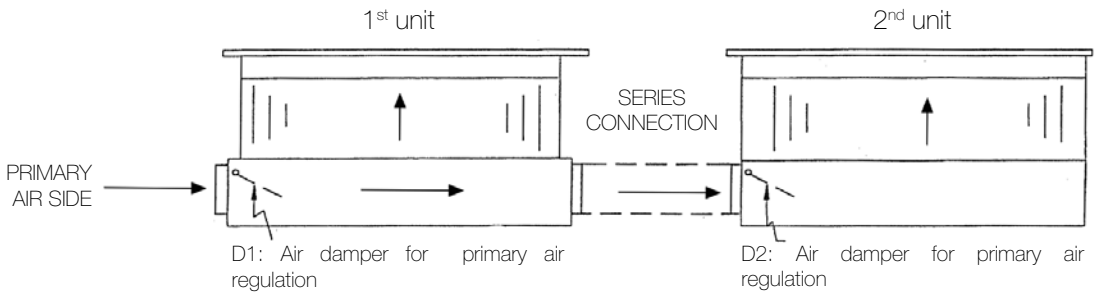
- Air filters F : Filter Scott cleanable polyurethane material of 6mm thickness.
- Air filters L : Filter Lintscreen cleanable woven aluminium

Optional W : drain connection (14mm)

- The standard delivered drain pan, can have as an optional a drip tray with a diameter of 14mm.

Optional S : series connection

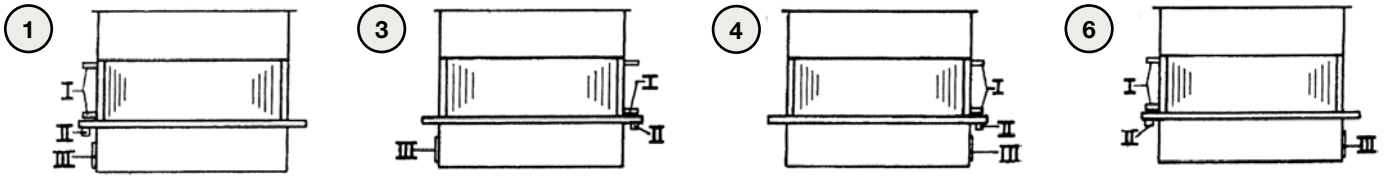
- You can connect two units in series as in the drawings below



Capacity table

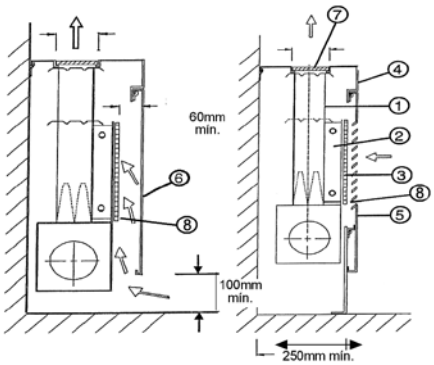
MODELS MG, MH, ML	COOLING CAPACITY (W)				HEATING CAPACITY (W)			
Size	Minimum		Maximum		Minimum		Maximum	
	2 pipes system	4 pipes system	2 pipes system	4 pipes system	2 pipes system	4 pipes system	2 pipes system	4 pipes system
48	425	493	1200	1450	725	1000	2100	2000
64	527	578	1500	1800	890	1200	2600	2400
88	612	646	2000	2125	1000	1500	3450	3100
120	714	731	2400	2700	1100	1900	4200	4250

Water/air connection possibility

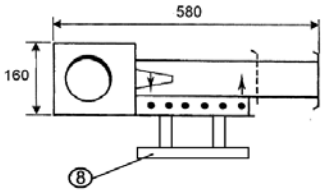


I Water connection / **II** Drain connection / **III** Air connection

Installation possibility



FLOOR MOUNTED

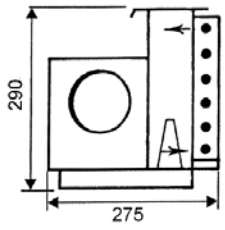


MH Induction unit
HORIZONTAL MOUNTED

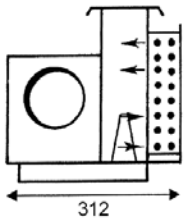
DESCRIPTION	
1	Air discharge
2	Coil
3	Filter
4	In build space
5	Removable front panel with grills
6	Removable front panel
7	Air discharge grills
8	Drain pan

Physical data

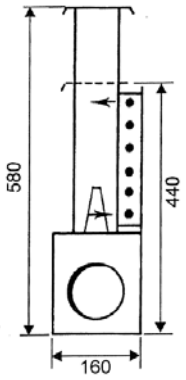
ML



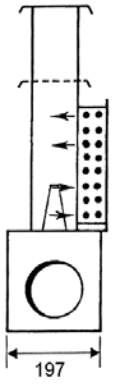
MLD



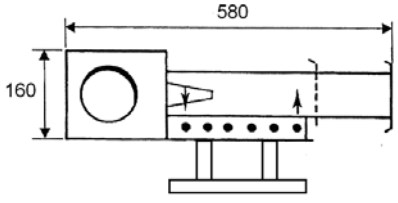
MG



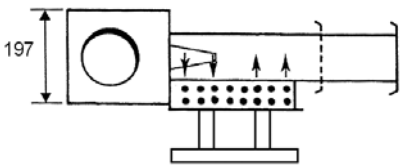
MGD



MH



MHD



AXIL™

Unit heater

Introduction to the range

- **AXIL™:** hot water version
- **AXIL™ F:** chilled water version
- **AXIL™ Z:** electrical heating version
- **AXIL™ V:** steam heating and superheated water version
- **EQUITHERM™:** Destratifier without heating

Equipements

- Pre-lacquered galvanized sheet steel cabinet
- Adjustable deflectors, single deflection (double deflection optional)
- Casing made from galvanized sheet steel, minimum sheet thickness 0.8 mm, thickness of supporting structure 1.0 mm.
- Propeller fan with aluminium blades
- 2-speed motor (**AXIL™** version), single-speed motor for **AXIL™ Z** and **EQUITHERM™** 400/3/50 - IP55 with clixon thermal protection
- **AXIL™** version: water coil made from copper tube with aluminium fins, 2 or 3 sets
- **AXIL™ F** version: water coil made from copper tube with aluminium fins, 3 sets, with condensate tray
- **AXIL™ V** version: steel coil tube with aluminium fins for steam and superheated water
- **AXIL™ Z** version: electrical heater consisting of spiral-wound resistances, embedded in mineral powder in steel finned tubes, plus external terminal bloc for electrical connections

Operating limits

- **AXIL™** and **AXIL™ F**
  Hot water: 130°C - 16 bars
- **AXIL™ V**
  Steam: 215°C - 20 bars
  Superheated water: 215°C -20 bars

Options

- Double-deflection diffuser
- Diffuser cone
- Enhanced capacity outlet
- Hot air curtain outlet
- Exterior intake grille
- Vertical duct
- Roof-mounted vertical air intake duct
- Roof-mounted air intake
- Fresh air intake
- Fresh air intake with filter
- Fresh air intake with regulator
- Fresh air intake with regulator and filter
- Manual mixing box
- Manual mixing box with filter
- Motorizable mixing box
- Motorizable mixing box with filter
- Return duct
- Return duct with filter
- Return duct with mixer
- Return duct with mixer and filter
- 3-speed, 4/6/8 pole motor
- 5-speed motor, 230/1/50
- Star/delta switch
- 5-speed switch
- 5-speed switch with thermostat

General data

AXIL™		402 -4	403 -4	502 -4	503 -4	602 -6	603-6	902 -6	903 -6
Technical information									
Motor pole qty		4/6					6/8		
Fan speed	rpm	1350/950					950/700		
Water connection		1"				1"1/4		1"1/2	
Heating capacity									
Heating capacity (1)	kW	15,4/13,2	20,9/17	27,1/21,5	36,5/28,2	41,8/36	54,3/46,5	78,3/68,9	105,4/89,8
Airflow	m^3/h	2200/1500	2100/1500	3800/2600	3600/2600	4400/3500	4100/3200	9500/7500	9200/7000
Sound pressure level at 5 m	dB(A)	59/51		64/54		60/52		68/62	
Air stream - Horizontal discharge									
Height (high speed)	m	3 - 4		3,5 - 4,5		4 - 5,5		4 - 6	
Height (low speed)	m	2,5 - 3,5		3 - 4		4 - 5,5	3,5 - 5	3,5 - 5,5	
Air stream (high speed)	m	11	10	16	15	25	16	28	25
Air stream (low speed)	m	7,5		12	10	18	13	21	18
Air stream - Vertical discharge									
Maximum height (high speed)	m	4,5		5,5		7	6	11	
Maximum height (low speed)	m	3,5		4,5		6	5,5	9	
Surface (high speed)	m^2	60	58	80	75	130	100	200	180
Surface (low speed)	m^2	45		60	55	100	90	160	140

(1) Return air temperature : 12°C, Hot water temperature: 90/70°C

AXIL™F		403-6	503-6	603-6	903-6
Technical information					
Motor pole qty		6			
Fan speed	rpm	950			
Total cooling capacity (1)	kW	3,9	7,3	12,5	24,4
Airflow	m^3/h	1400	2400	4100	9200
Sound pressure level at 5 m	dB(A)	51	54	60	68
Air stream - Horizontal discharge					
Height (high speed)	m	3 - 4	3,5 - 4,5	4 - 5,5	4 - 6
Height (low speed)	m	2,5 - 3,5	3 - 4	4 - 5,5	3,5 - 5,5
Air stream (high speed)	m	10	15	25	25
Air stream (low speed)	m	7,5	10	16	18

(1) Return air temperature : 25°C, Chilled water temperature : 7/12°C

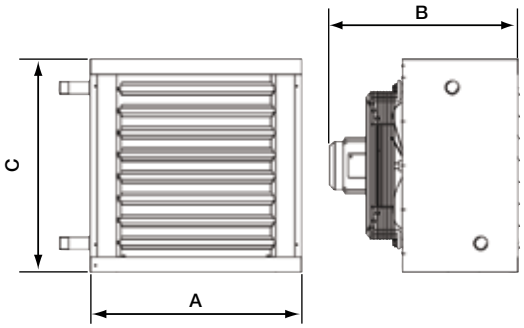
AXIL™ Z		414	524	639
Technical information				
Motor pole qty		6		
Fan speed	rpm	900		
Heating capacity	kW	14	24	39
Airflow	m^3/h	1560	2910	4790
Motor power	W	50	90	185
Sound pressure level at 5 m	dB(A)	51	54	60

AXIL™ V		402-4	502-4	602-4	902-6
Technical information					
Motor pole qty		4/6			6/8
Fan speed	rpm	1350/950			950/700
Heating capacity 2 rows coil (1)	kW	21,4/18,2	34,8/30	62,3/47,8	101,7/91,8
Airflow 2 rows coil	m^3/h	2100/1400	3600/2400	6300/4100	9200/7000
Sound pressure level at 5 m	dB(A)	59/51	64/54	69/60	68/62
Air stream - Horizontal discharge					
Height (high speed)	m	3 - 4	3,5 - 4,5	4 - 5,5	4 - 6
Height (low speed)	m	2,5 - 3,5	3 - 4	4 - 5,5	3,5 - 5
Air stream (high speed)	m	11	16	25	28
Air stream (low speed)	m	7,5	12	18	21

(1) Steam: Pressure 8 Bars, temperature 145°C

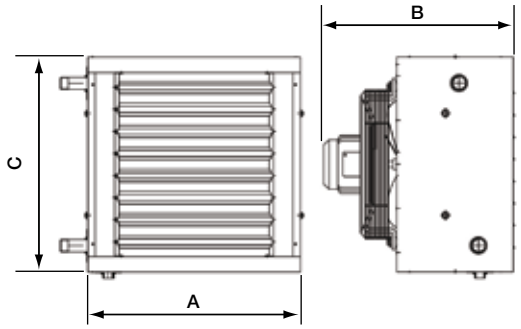
Physical data

AXIL™



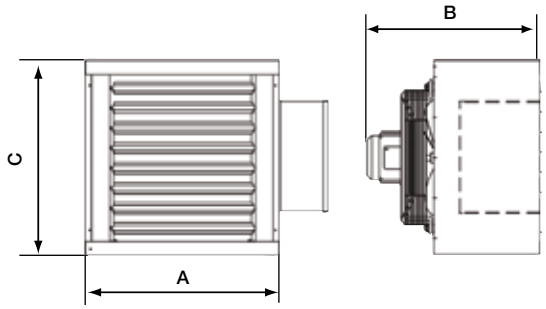
AXIL™		402	403	502	503	602	603	902	903
A	mm	525	525	633	633	741	741	1009	1009
B	mm	515	515	515	515	515	515	532	532
C	mm	526	526	636	636	743	743	1011	1011
Weight	kg	20	23	27	31	35	42	60	73

AXIL™ F



AXIL™ F		403	503	603	903
A	mm	525	633	741	1009
B	mm	515	515	515	532
C	mm	526	636	743	1011
Weight	kg	25	33	45	76

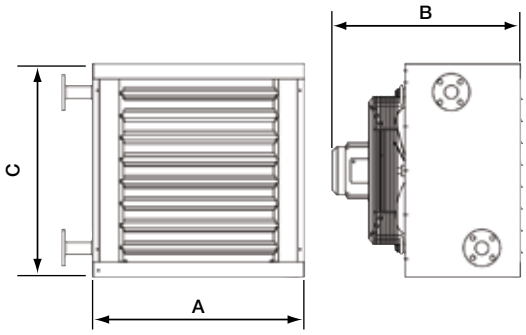
AXIL™ Z



AXIL™Z		414	524	639
A	mm	525	633	741
B	mm	515	515	515
C	mm	526	636	743
Weight	kg	22	30	38

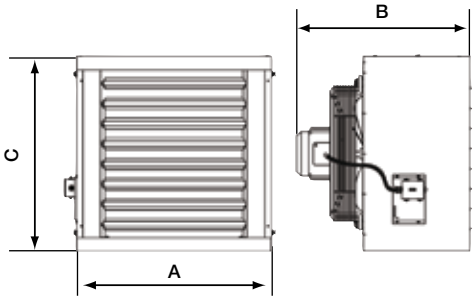
Physical data (cont'd)

AXIL™ V



AXIL™ V		402	502	602	902
A	mm	525	633	741	1009
B	mm	515	515	515	532
C	mm	526	636	743	1011
Weight	kg	34	47	65	140

EQUITHERM™



EQUITHERM™		400	500	600	900
A	mm	525	633	741	1009
B	mm	515	515	515	532
C	mm	526	636	743	1011
Weight	kg	14	20	25	42

Miniair™ • 6 - 42 kW

Compact Air Handling unit

MINIAIR™

Introduction to the range

MINIAIR™ series consists of 7 sizes, to cover 500 ÷ 6400 m³/h airflow range, with 2, 4, 6 row water coils

Quiet operation

- Thermal and sound insulation made from Rockwool, 10 mm (10 to 40 model) or 20 mm thickness (50 and 60 models)
- 3- speed double inlet forward curved direct driven fans; fan groups mounted on anti-vibrators

Sustainable performance

- Precoated steel frame RAL 9002
- Sandwich panels, galvanized steel sheet metal inside and RAL 9002 precoated steel sheet metal outside
- G3 efficiency class synthetic filter

Easy installation, operation and maintenance

- Unit inspection by lower panels, removable for fan ,coils and filter
- Copper tubes and Aluminium fins water coils with steel or copper headers, easy removable
- Stainless steel drain tray with a special fixing system for an easy extraction; side condensate outlet

Available versions as basic units

- MiniAir 2 : single 2 row water coil
- MiniAir 4 : single 4 row water coil
- MiniAir 6 : single 6 row water coil
- MiniAir 42 : two water coils (4+2 row)
- MiniAir 62 : two water coils (6+2 row)
- MiniAir 4E : single 4 row water coil and electric heater (max 2 stages)
- MiniAir 6E : single 6 row water coil and electric heater (max 2 stages)
- MiniAir 4S : single 4 row water coil and droplet eliminator
- MiniAir 6S : single 6 row water coil and droplet eliminator

Options

Auxiliary heating

- Water coil re-heating section
- Electric heater section (max 3 stages)

Quiet operation

- Return sound attenuator
- Supply sound attenuator

Indoor air quality

- F6 soft bag filter section

Flexibility

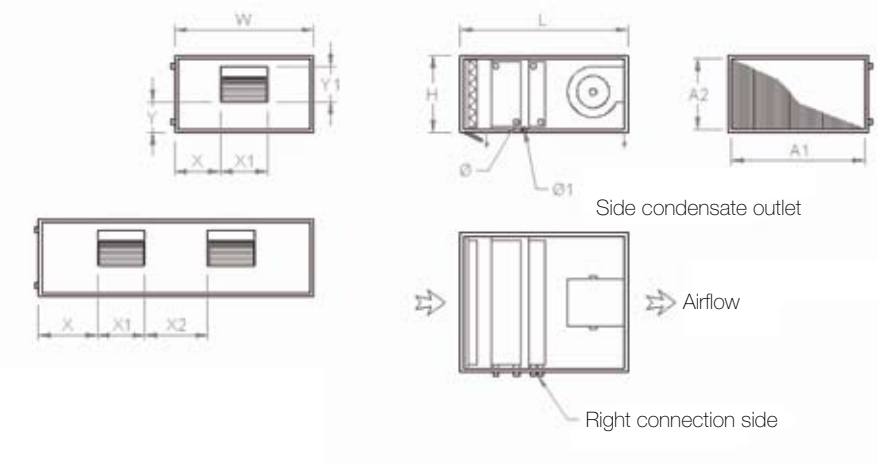
- Intake grill
- Adjusting damper
- Return plenum
- 2 damper mixing box
- Circular duct connections supply adaptor
- Supply plenum
- Adjusting fins supply grill

General data

MINIAIR™				10	20	25	30	40	50	60
Airflow rate			m^3/h	1040	2150	2740	3360	3950	5070	6450
E.S.P.			Pa	150	150	150	150	150	150	150
Sound level at 1 m (1)			dB(A)	51	55	55	57	58	57	59
Shaft power			W	147	350	2 x 350	2 x 350	2 x 350	2 x 420	3 x 420
Poles				4	4	4	4	4	4	4
Fan speeds				3	3	3	3	3	3	3
Max current			A	1,9	3	2 x 3,0	2 x 3,0	2 x 3,0	2 x 3,8	3 x 3,8
Protection class				min. IP31						
Isolation class				B	F	F	F	F	B	B
Power supply			V/Ph/Hz	230/1/50						
Heating (3)	2R	Max capacity	kW	9,5	18,5	24,2	27,7	33,3	34,9	41,2
		Water flow	m^3/h	0,84	1,63	2,13	2,44	2,93	3,07	3,63
		Water pressure drop	kPa	22	23	21	27	26	26	17
	4R	Max capacity	kW	13,8	27,7	35,8	42,5	50,3	58,1	71,3
		Water flow	m^3/h	1,21	2,44	3,15	3,74	4,43	5,12	6,28
		Water pressure drop	kPa	21	29	23	32	26	19	23
	6R	Max capacity	kW	14,9	30,5	39,1	47,1	55,7	67	83,3
		Water flow	m^3/h	1,31	2,68	3,44	4,14	4,9	5,89	7,33
		Water pressure drop	kPa	22	26	21	30	23	18	19
Cooling (2)	4R	Max capacity	kW	6	12,1	15,7	18,2	21,6	24,1	32,5
		Sensible cap.	kW	4,5	8,9	11,6	13,6	16,1	19,7	25,6
		Water flow	m^3/h	1,04	2,07	2,69	3,12	3,69	4,13	5,57
		Water pressure drop	kPa	21	29	23	32	26	19	23
	6R	Max capacity	kW	7,1	14,3	18,5	21,9	26,2	34,3	42,1
		Sensible cap.	kW	5	10,2	13,2	15,7	18,7	24,6	30,6
		Water flow	m^3/h	1,21	2,46	3,17	3,76	4,49	5,88	7,21
		Water pressure drop	kPa	26	29	24	33	25	23	24

(1) Sound pressure calculated in free field of the fan at 1m from unit.
(2) Entrance air temperature 27 °C DB - 19 °C WB, water temperature entrance/exit 7/12 °C.
(3) Entrance air temperature 20 °C, RH 50 %, Water temperature entrance/exit 70/60 °C.

Physical data



MINIAIR™		10	20	25	30	40	50	60
W	mm	710	1070	1400	1400	1680	1780	2000
H	mm	390	390	390	390	390	480	480
L	mm	850	850	850	850	850	960	960
Ø 2R		3/4"				1"		
Ø 4R		3/4"		1"				1" 1/4
Ø 6R		3/4"	1"			1" 1/4		
Ø1	mm	20	20	20	20	20	20	20
X1	mm	240	306	240	240	306	306	306
Y1	mm	216	270	216	270	270	270	270
X2	mm	-	-	318	318	418	435	-
X3	mm	-	-	-	-	-	-	285
A1	mm	670	1030	1360	1360	1640	1720	1940
A2	mm	350	350	350	350	350	420	420
X	mm	235	382	301	301	325	366	256
Y	mm	136	82	136	82	82	160	160
Weight	kg	52 ÷ 60	60 ÷ 70	75 ÷ 88	78 ÷ 90	96 ÷ 110	101 ÷ 120	120 ÷ 140

Miniair™ + • 3 - 28 kW

Compact Air Handling unit

MINIAIR™+

Introduction to the range

MINIAIR™ series consists of 8 sizes, to cover 500 ÷ 4000 m³/h airflow range

Quiet operation

- Panel thermal and acoustic insulation by means of Rockwool panels with a medium thickness of 10 mm (up to size 10 model) or 20 mm (for upper sizes models)
- Fan mounted on anti-vibrators devices

Flexibility

- Multi speed directly coupled electric motors

Sustainable performance

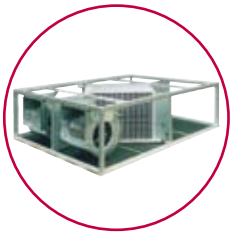
- High efficiency aluminium plate static type heat recovery, with airflows separated by special seals
- Terminal block with a relay board fitted
- Stainless steel condensation collecting tray, with condensation drainage towards the lower part

Easy installation, operation and maintenance

- Completely removable Aluzinc plate side panels
- G3 efficiency air filters, which may be easily removed from the sides allowing their periodic cleaning
- Double inlet centrifugal renewal collection and blow out fans which may be removed from the sides for their periodic maintenance

Available versions as basic units

- Horizontal configuration
- Vertical configuration



Options

Auxiliary heating

- Post-heating electric element
- Post-heating water coil

Indoor air quality

- F6 soft bag filter section

Flexibility

- Cooling auxiliary section (additional chamber to be added to the unit)
- Adjusting damper
- Circular connection
- Mixing box with 3 dampers

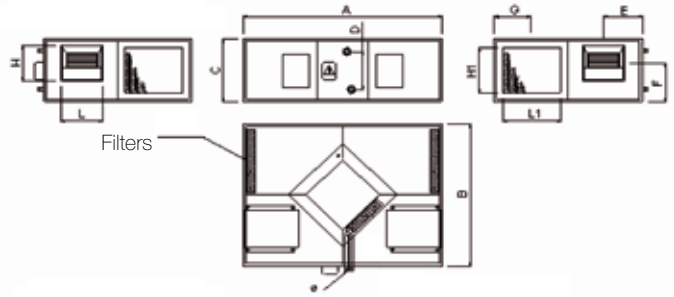
General data

MINIAIR™ +		RKE	03	06	10	14	19	25	30	40
Airflow rate		m^3/h	290	550	1000	1400	1900	2500	3200	4000
E.S.P.		Pa	60	65	90	140	120	110	170	170
Sound level at 1 m (1)		dB(A)	53	54	53	60	59	56	59	62
Shaft power		W	2 x 45	2 x 65	2 x 147	2 x 350	2 x 350	2 x 350	2 x 550	2 x 750
Poles			1,3	1,6	3	5,8	6,2	6	11,4	6,2
Fan speeds			2	2	3	3	3	3	3	2
Protection class			Min 20							
Isolation class			Min. B							
Power supply		V/Ph/Hz	230/1/50							400/3/50
Recovery efficiency			52,3	54,9	53,4	52,1	51,8	57,6	56	55,6
Recovery capacity		kW	1,4	2,8	4,6	6,2	8,4	12,3	15,3	19,4
Electrical coil	Capacity	kW	2	4	4,5	6	9	12	12	12
	Power supply	V/Ph/Hz	230/1/50		400/3/50					
	Absorb curent	A	8,7	17,4	6,5	8,7	13	17,3	17,3	17,3
	Air pressure drop	Pa	5	5	6	6	8	6	9	13
Heating coil (2)	Max capacity	KW	not available		11,3	16,3	20,4	29,7	35,1	44,3
	Air oulet temperature	°C			40,5	41,5	39	42,2	39,6	39,9
	Water flow	Pa			65	64	85	62	85	92
	Water pressure drop	kPa			13	31	18	20	27	49
Cooling coil (3)	Max capacity	KW	2,5	3,8	6,5	9,6	13,1	18,1	21,2	28,1
	Water flow	Pa	23	67	79	87	96	70	105	96
	Water pressure drop	kPa	9	11	12	25	32	18	24	41

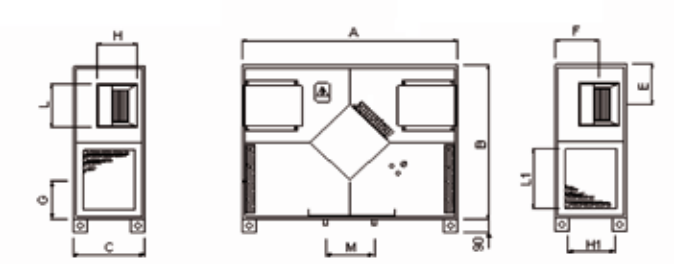
(1) Sound pressure calculated in free field of the fan at 1m from unit.
(2) Entrance air temperature 27 °C DB - 19 °C WB, water temperature entrance/exit 7/12 °C.
(3) Entrance air temperature 20 °C, RH 50 %, Water temperature entrance/exit 70/60 °C.

Physical data

Horizontal configuration



Vertical configuration

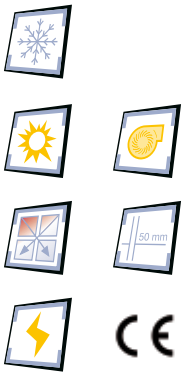


MINIAIR™ +	RKE	03	06	10	14	19	25	30	40
A	mm	990	990	1150	1300	1450	1700	1700	1700
B	mm	750	750	860	900	900	1230	1230	1230
C	mm	270	270	385	410	470	490	530	630
D	mm	-		230	230	280	305	305	405
L	mm	127	164	240	240	240	306	339	339
H	mm	108	100	218	270	270	270	297	297
L1	mm	275	275	330	337	337	502	502	502
H1	mm	153	153	267	267	327	347	387	487
E	mm	120	197	225	241	230	323	308	308
F	mm	135	171	238	224	284	304	331	431
G	mm	197	197	225	241	241	323	323	323
M	mm	100	100	100	100	145	100	100	100
Ø		-		G 3/4"					
Weight	kg	39	41	68	91	99	140	155	179

Ecoair™ • 720 - 17 800 m³/h

Packaged air handling unit

ECOAIR™



Introduction to the range

ECOAIR™ can be used with our chillers and condensing units for **comfort applications such as office buildings, shops, and hotels air conditioning.**

ECOAIR™ consists of 6 sizes, to cover 720 to 17 800 m³/h airflow range

Quiet operation

- Thermal and acoustic insulation provided by double-skin panels with 50 mm of mineral wool

Indoor air quality

- Filtration G3 to F9

Flexibility

- Self-supporting structure
- The following types of centrifugal fan, selected for their high performance, are incorporated: Forward and backward fans with high available pressure, for dealing with problems of central conditioning where the duct system has a high pressure drop
- The units can carry out many different air treatment functions, with numerous standard configurations complemented with a varied range of accessories.

Sustainable performance

- Double wall thickness 50 mm with rock wool insulation
- Lacquered paint finish - RAL 9002
- Plate heat exchangers
- Conforms to EN 1886 standard

Easy installation, operation and maintenance

- Small overall dimensions, requiring less space for installation in machine rooms; the unit can also be fitted in false ceilings
- Service panel on left or right; horizontal or vertical discharge
- Standardized internal components, mounted on sliding panels for easy interchangeability

Options and accessories

Security & extended lifecycle

- Cu / Cu coils
- Thermoguard® coated coil

Flexibility

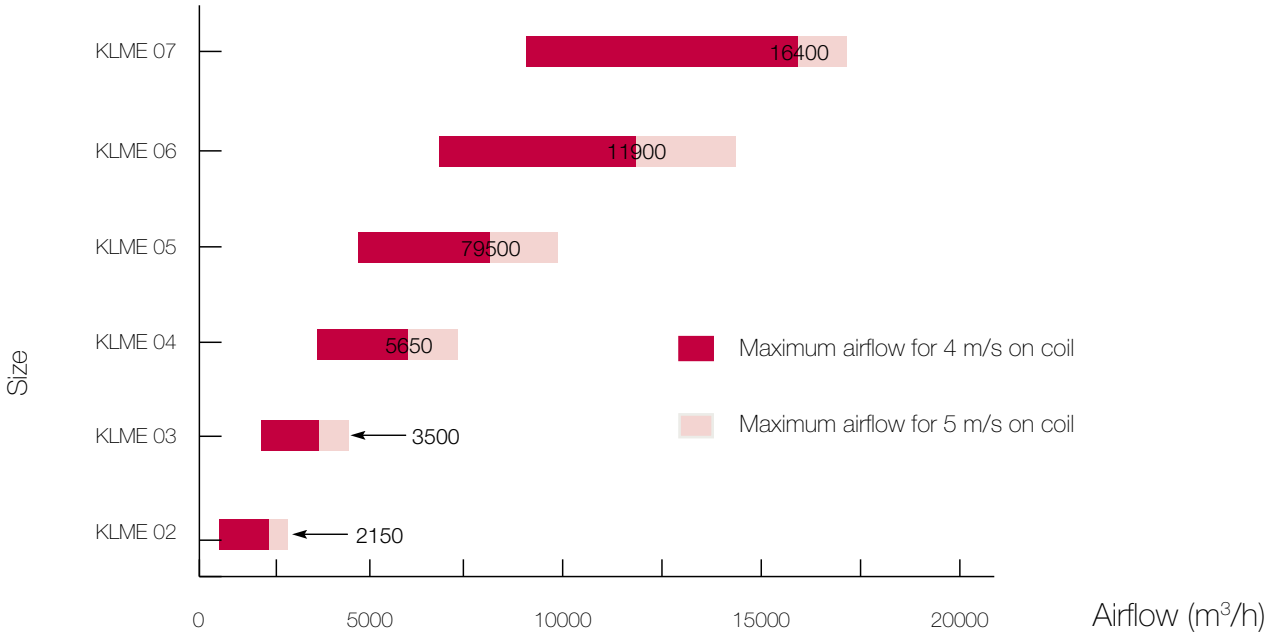
- Exterior installation (roof, rain hoods)
- Flexible connexion

Service

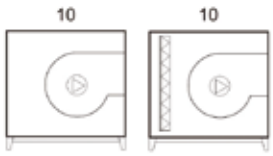
- Pressure taps, manometer
- Service switches
- Frequency converters

General data

ECOAIR™	KLME	2	3	4	5	6	7
Quick selection							
Minimum airflow	m^3/h	720	1800	3000	4100	6200	8500
Maximum airflow	m^3/h	2700	4350	7100	9900	14800	17800
Section	mmxmm	470x715	715x715	715x1020	715x1325	1020x1325	1325x1325
Insulation							
Thickness	mm	50					
Insulation material		Rockwool					
Heat transfer ratio	$W/m^2.K$	0,8					
Structure							
Panels		Inside : galvanized steel sheet Outside : galvanized lacquered sheet (RAL 9002)					
Classification							
Casing strength (EN 1886)		Classe 2A					
Casing air leakage (EN 1886)		Classe 3A					
Thermal transmittance		Classe TB3					

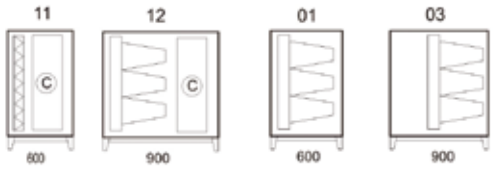


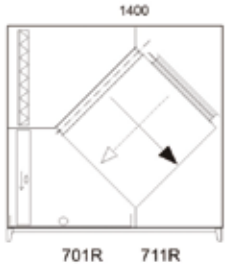
Configurations



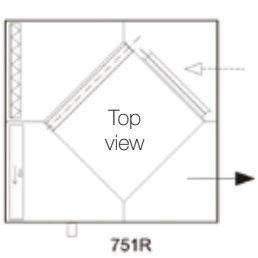
KLME 02 - 800
KLME 03 - 800
KLME 04 - 900
KLME 05 - 1000
KLME 06 - 1200
KLME 07 - 1300

KLME 02 - 07

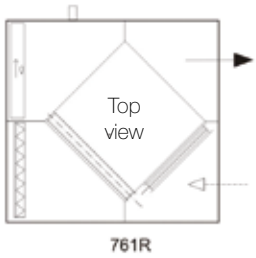




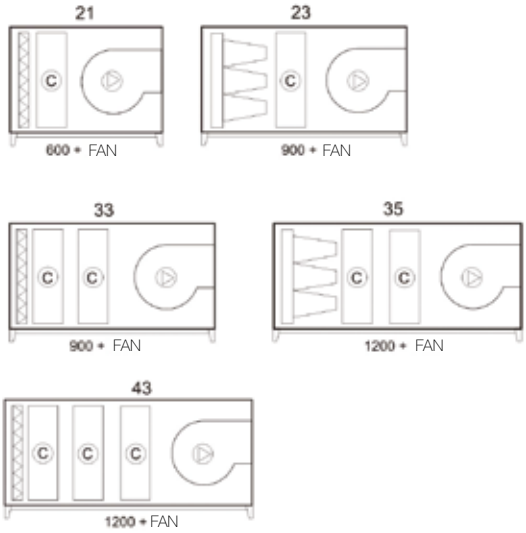
KLME 02 - 1100
KLME 03 - 1400
KLME 04 - 1400
KLME 05 - 1400
KLME 06 - 2000
KLME 07 - 2000



KLME 02 - 1400
KLME 03 - 1400
KLME 04 - 1700
KLME 05 - 1700
KLME 06 - 2000
KLME 07 - 2000



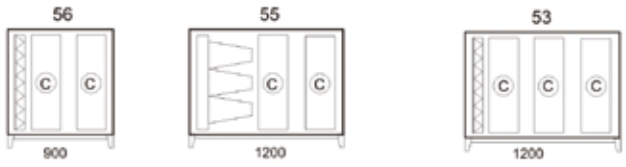
KLME 02 - 1400
KLME 03 - 1400
KLME 04 - 1700
KLME 05 - 1700
KLME 06 - 2000
KLME 07 - 2000



FAN =

KLME 02 - 800
KLME 03 - 800
KLME 04 - 900
KLME 05 - 1000
KLME 06 - 1200
KLME 07 - 1300

KLME 02 - 05



KLME 06 - 07

Control system

The compact parametric solution for small AHUs and large fan coils is offering its customers a smart solution that is easy to manage, ensures increased ambient comfort and considerable energy savings.

- In a compact IP65 plastic box houses you find: a controller, a contactor (single or thee phase) and an MCB with adjustable overload protector.
- Many different accessories and sensors are available.
- BMS integration (Modbus RTU on RS485) and e-drobus on CANbus are the solutions in terms of integration and interconnection.
- CANbus in particular, the fast and reliable peer-to-peer bus derived directly from the automotive industry, allows the AHU and fan-coil interconnections and control of up to 99 devices with the possibility to specify and set up the interrelation in terms of dependency and logic.

The large and intuitive LCD, with integrated real time clock and room sensor, makes the programming and control of the units user-friendly and fast.

General software features:

- Fan coil management with automatic fan speed control
- Control of small AHUs: up to two modulating valves (0 to 10V) and 1 ON/OFF damper, or 1 modulating valve and 1 modulating damper.
- Return or room air temperature control
- Multifunction 6 digital inputs: “ocucupoancy”, remote ON/OFF, window alarm, heating/cooling, economy, pump management with external air temperature
- Freecooling and freeheating management with external air temperature
- Antifreeze functions with NTC sensor or with antifreeze thermostat on digital input

Electrical box

Display

Senator™ 25 • 720 - 81 500 m³/h

Modular air handling unit

SENATOR™ 25

Introduction to the range

SENATOR™ 25 can be used with our chillers and condensing units for **comfort applications such as office buildings, shops, hotels and factory buildings air conditioning.**
SENATOR™ 25 is modular unit - Up to size 16, it is available in block version
SENATOR™ 25 consists of 13 sizes to cover 720 to 81 500 m³/h airflow range.

Quiet operation

- Silencer – 4 length
- Thermal and acoustic insulation provided by double-skin panels with 25 mm of expanded polyurethane insulation

Indoor air quality

- Filtration G3 to F9 + active carbon filtration
- Humidification section – steam, water, and cell pack

Sustainable performance

- Structure: framework reinforced with a galvanized profile structure and plastic corners
- Lacquered paint finish - RAL 9002
- High-efficiency forward or backward fans
- IP54 class f motor + thermal protection
- Conforms to EN 1886 standard
- The **SENATOR™ 25** unit can cover the full range of air treatment and recovery functions, with components selected for their excellent performance and reliability.
- The system of galvanized sections and plastic corners provides a rigid and robust framework, complemented by a high level of insulation and air-tightness.
- The use of pre-lacquered sheet outer panels gives the unit a particularly pleasing appearance and provides excellent corrosion resistance.

Easy installation, operation and maintenance

- Service panel - door or lift of panel on left or right; horizontal or vertical discharge
- Detailed technical specifications available on request

Comfort precision and energy efficiency

- 25 mm expanded polyurethane double wall panels or Rockwool
- Recovery section for all systems – plate heat exchanger, rotary wheel, round around circuits

Options and accessories

Security & extended lifecycle

- Ex proof execution - Zone 1
- Cu/Cu coil, Thermoguard® coated coils
- Lacquered sheet inside panel

Flexibility

- Exterior installation (roof, rain hoods)
- Lacquered profiles

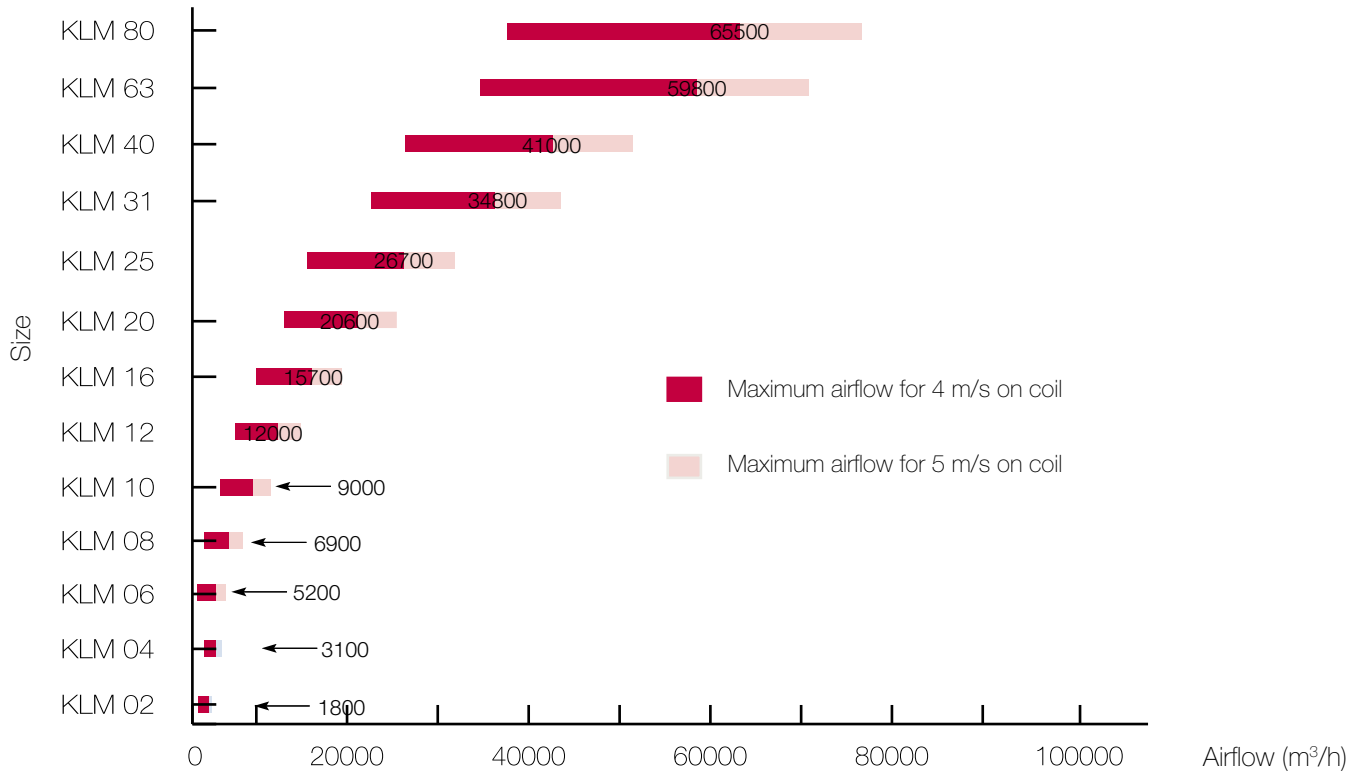
Service

- Wide spectrum of accessories (pressure taps, manometer, lights, service switches, frequency converters, antifrost protection, …)

General data

SENATOR™ 25	KLM	02	04	06	08	10	12	16
Quick selection								
Minimum airflow	m³/h	720	1600	2700	3600	4700	6300	8300
Maximum airflow	m³/h	2250	3900	6550	8700	11300	15000	19600
Section	mm x mm	550x550	650x650	800x800	1000x800	1000x1000	1250x1000	1250x1250
Insulation								
Thickness	mm	25						
Insulation material		Polyurethane foam/Rockwool						
Heat transfer ratio	W/m².K	0,95 / 1,6						
Structure								
Profiles		Galvanized steel profil						
Corners		Plastic						
Panels		Inside : galvanized steel / Outside : galvanized lacquered sheet (RAL 9002)						
Classification								
Casing strength (EN 1886)		Classe 2A						
Casing air leakage (EN 1886)		Classe B						
Thermal transmittance		Classe T2						

SENATOR™ 25	KLM	20	25	31	40	63	80
Quick selection							
Minimum airflow	m³/h	11000	14000	18500	21500	31500	35000
Maximum airflow	m³/h	25800	33400	43500	51500	74500	81500
Section	mm x mm	1600x1250	1600x1600	2000x1600	2250x1700	2400x2250	2600x2250
Insulation							
Thickness	mm	25					
Insulation material		Polyurethane foam/Rockwool					
Heat transfer ratio	W/m².K	0,95 / 1,6					
Structure							
Profiles		Galvanized steel profil					
Corners		Plastic					
Panels		Inside : galvanized steel / Outside : galvanized lacquered sheet (RAL 9002)					
Classification							
Casing strength (EN 1886)		Classe 2A					
Casing air leakage (EN 1886)		Classe B					
Thermal transmittance		Classe T2					



Senator™ 50 • 720 - 115000 m³/h

Modular air handling unit

SENATOR™ 50

Introduction to the range

SENATOR™ 50 can be used with our chillers and condensing units for **comfort applications such as office buildings, shops, hotels and factory buildings air conditioning.**

SENATOR™ 25 is a modular unit which consists of 14 sizes to cover 720 to 115 000 m³/h airflow range.

Quiet operation

- Silencer – 2 length
- Thermal and acoustic insulation provided by double-skin panels with 50 mm of high density rock wood

Indoor air quality

- Filtration G3 to H13 + active carbon filtration
- Humidification section – steam, water, and cell pack

Sustainable performance

- Structure: framework reinforced with a galvanized profile structure and plastic corners
- Lacquered paint finish - RAL 9002
- High-efficiency forward or backward fans
- IP54 class f motor + thermal protection
- Conforms to EN 1886 standard
- The **SENATOR™ 50** unit can cover the full range of air treatment and recovery functions, with components selected for their excellent performance and reliability.
- The system of galvanized profiles and plastic corners provides a rigid and robust framework, complemented by a high level of insulation and air-tightness.
- The use of pre-lacquered sheet outer panels gives the unit a particularly pleasing appearance and provides excellent corrosion resistance

Easy installation, operation and maintenance

- Smooth wall, easily cleaned steel interior
- Service panel – door or lift of panel on left or right; horizontal or vertical discharge
- Detailed technical specifications available on request

Comfort precision and energy efficiency

- 50 mm high density rock wool double wall panels or PUR
- Recovery section for all systems – plate heat exchanger, rotary wheel, round around circuits

Options and accessories

Security & extended lifecycle

- Cu/Cu coil, Thermoguard® coated coils
- Lacquered sheet inside panel
- Stainless steel sheet inside panels

Flexibility

- Exterior installation (roof, rain hoods)
- Lacquered profiles

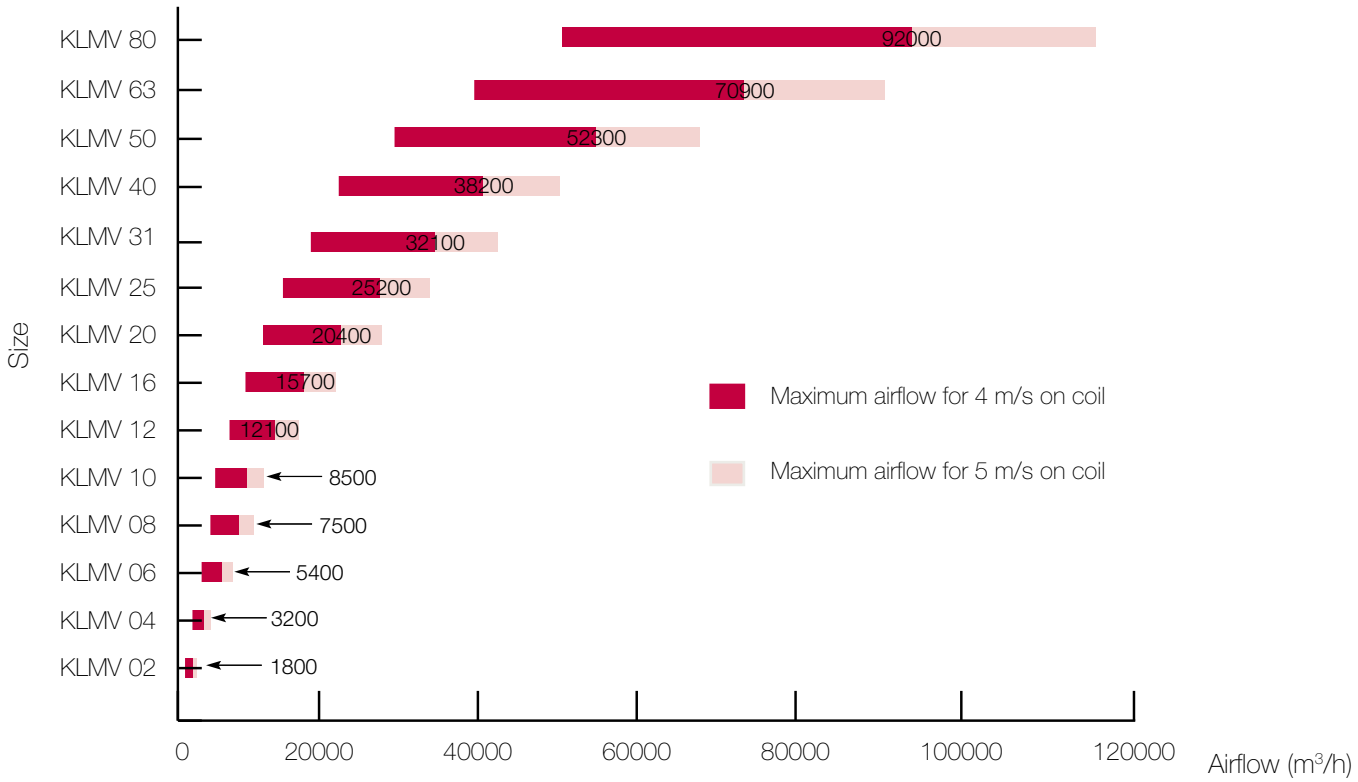
Service

- Wide spectrum of accessories (pressure taps, manometer, lights, service switches, frequency converters, antifrost protection, …)

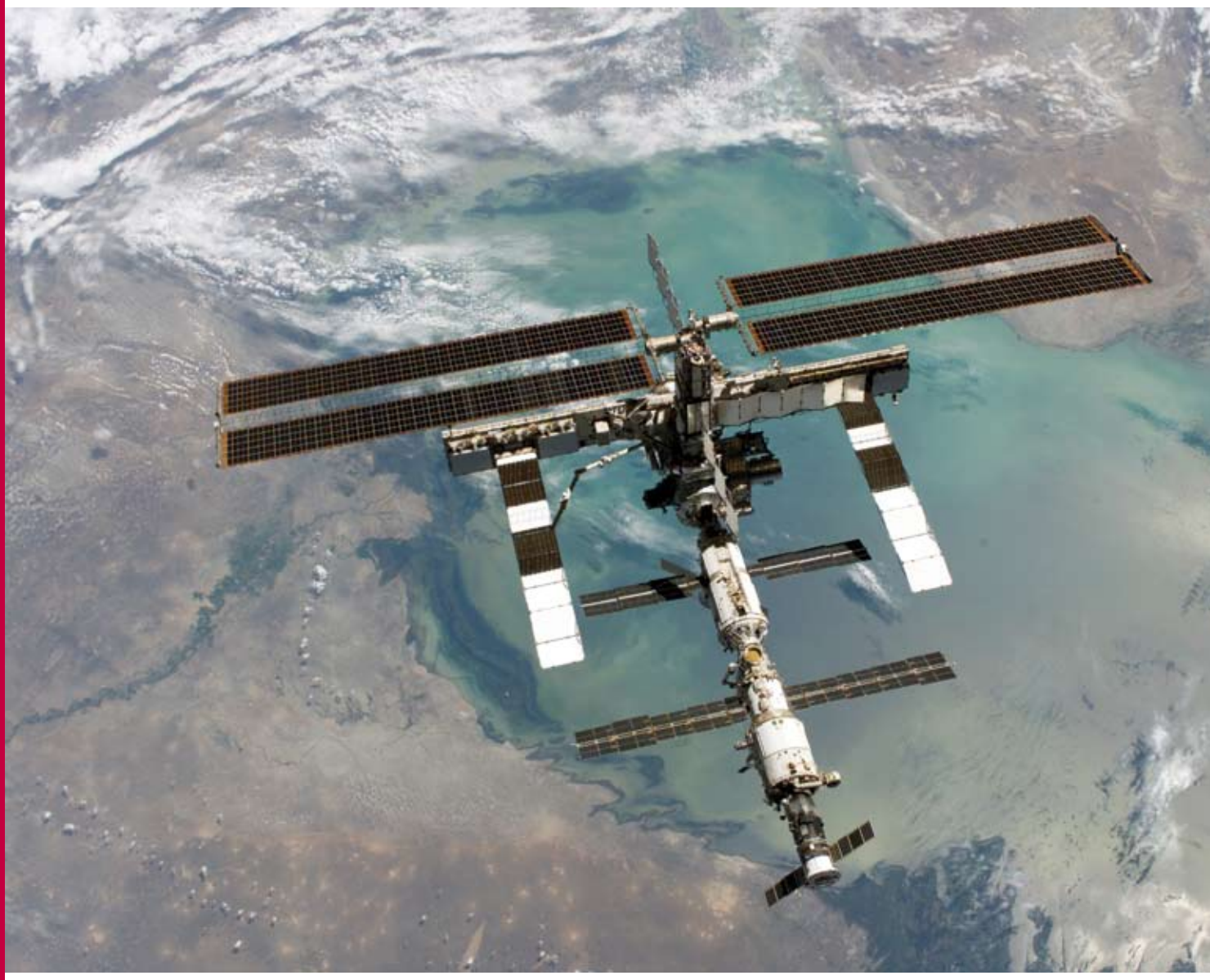
General data

SENATOR™ 50	KLM V	02	04	06	08	10	12	16
Quick selection								
Minimum airflow	m^3/h	720	1650	2800	3900	4500	6300	8300
Maximum airflow	m^3/h	2250	4000	6750	9400	10700	15100	19700
Section	mm x mm	715x470	715x715	1020x715	1325x715	1020x1020	1325x1020	1635x1020
Insulation								
Thickness	mm	50						
Insulation material		Rockwool/Polyurethane foam						
Heat transfer ratio	$W/m^2.K$	0,96/0,47						
Structure								
Profiles		Galvanized steel profil						
Corners		Plastic						
Panels		Inside : Galvanized steel / Outside : galvanized lacquered sheet (RAL 9002)						
Classification								
Casing strength (EN 1886)		Classe 1A						
Casing air leakage (EN 1886)		Classe B						
Thermal transmittance		Classe T2						

SENATOR™ 50	KLM V	20	25	31	40	50	63	80
Quick selection								
Minimum airflow	m^3/h	10500	13000	16500	20000	27000	37000	48000
Maximum airflow	m^3/h	25500	31500	40000	47800	65400	88600	115000
Section	mm x mm	1635x1325	1940x1325	1940x1635	2245x1635	2550x1940	2860x2245	3160x2550
Insulation								
Thickness	mm	50						
Insulation material		Rockwool/Polyurethane foam						
Heat transfer ratio	$W/m^2.K$	0,96/0,47						
Structure								
Profiles		Galvanized steel profil						
Corners		Plastic						
Panels		Inside : Galvanized steel / Outside : galvanized lacquered sheet (RAL 9002)						
Classification								
Casing strength (EN 1886)		Classe 1A						
Casing air leakage (EN 1886)		Classe B						
Thermal transmittance		Classe T2						



Close Control Units



Providing IT climate technology

Telecom Units

THS

THX

THN

Introduction to the range

The **@DNOVA™** units are designed for **inside or outside installation of Telecom shelters.** They are used for efficient and reliable management of temperature of technological environments with high thermal loads.

- THX : Wall mounted monobloc outdoor unit
- THN : Wall mounted monobloc indoor unit
- THS : Ceiling mounted split unit

Quiet operation

- Condensing axial fan (THX, THS) all use 6 poles motor to limit the sound emissions.

Sustainable performance

- The unit supports are made of thick galvanised sheet, while the outer part is in aluminium alloy 5005 (THX) or in painted galvanized sheet metal RAL 9002 (THN, THS)
- The refrigerant circuit is entirely in house manufactured, using welders certified according to the PED 97/23, and relevant components are certified according to the same directive. Rotary or scroll compressors are available in refrigerant HFC (R407C, R134a).
- The **@DNOVA™** (THX, THN) units are fitted with centrifugal fans, with backward curved blades and single intake
- The evaporator is made with copper tubes and aluminium fins, the drip tray in galvanized still is in standard (stainless steel as an option)

Easy installation, operation and maintenance

- The installation is a simple and fast, plug and play system which requires just screw fitting and electrical cable connections.
- For maintenance and service activities, all components are fully accessible from the front of the units. No further access of service staff to the sensitive internal is required.

Control

- The **@DNOVA™** are fitted as standard with Basic Microprocessor with user interface 4x20 LCD

Options

Security & extended lifecycle

- Emergency Free-cooling
- Dual power supply
- Potential free contacts for alarms

Indoor air quality

- Clogged filter sensor

Precision and energy efficiency

- High sensible heat ratio
- Electronic expansion valve
- Free-cooling
- Side Free-cooling technology

Control

- Microprocessor
- Electronic condenser fans speed control
- Interconnectivity (ModBus, TCP/IP, Bacnet ...)

General Data

@DNOVA™ AIRCOOLED (PACKAGED INDOOR UNIT) UPFLOW/DOWNFLOW/DISPLACEMENT	THN	0045	0056	0073	0090	0105	0120	0150	0170	0180	0200	0220	0250
Total cooling capacity (1)	kW	4,4	5,6	7,1	9,0	10,9	11,9	15,0	17,2	17,1	20,0	22,0	24,5
Sensible Cooling capacity	kW	4,4	5,5	7,1	9,0	10,9	11,9	15,0	16,9	17,1	20,0	22,0	24,5
SHR		1	0,99	1	1	1	1	1	0,98	1	1	1	1
Number of compressors (2)	scroll	1	1	1	1	1	1	1	1	1	1	1	1
Air Flow	m^3/h	1450	2100	2100	3020	3020	3020	3800	3800	6500	6500	6500	6500
Sound Power Level	dB(A)	69	69	69	72	72	72	72	72	80	80	81	82
Sound Pressure (10m free field)	dB(A)	41	41	41	44	44	44	44	44	-	-	-	-
Height	mm	1850	1850	1850	1850	1850	1850	1850	1850	2050	2050	2050	2050
Width	mm	800	800	800	1000	1000	1000	1160	1160	1500	1500	1500	1500
Depth	mm	550	550	550	550	550	550	550	550	800	800	800	800

(1) Indoor conditions 27°C/ 40% relative humidity Outdoor condition: 35 °C

(2) Rotary compressor on model THN0045

@DNOVA™ AIRCOOLED (PACKAGED OUTDOOR UNIT) UPFLOW (1)	THX	0045	0056	0073	0090	0105	0120	0145	0902	1102	1302
Total cooling capacity (2)	kW	4,5	5,6	7,1	8,9	10,2	11,8	14,1	9,1	10,8	13,2
Sensible Cooling capacity	kW	4,5	5,5	6,8	8,9	10,2	11,8	14,1	8,7	9,7	11,7
SHR		1	0,99	0,96	1	1	1	1	0,96	0,9	0,89
Number of compressors (3)	scroll	1	1	1	1	1	1	1	2	2	2
Air Flow	m^3/h	1450	1450	2150	3020	3020	3020	3020	2800	2800	2800
Sound Power Level	dB(A)	69	70	70	71	71	71	74	72	72	72
Sound Pressure (10m free field)	dB(A)	42	43	43	44	44	44	46	45	45	45
Height	mm	1580	1580	1580	1630	1630	1790	1790	1790	1790	1790
Width	mm	804	804	804	1000	1000	1000	1000	1000	1000	1000
Depth	mm	498	498	498	596	596	596	596	596	596	596

(1) Downflow on request for several models
(3) Rotary compressor on model THX0045

(2) Indoor conditions 27°C/ 40% relative humidity Outdoor condition: 35 °C

@DNOVA™ AIRCOOLED (SPLIT SYSTEM) WALL / CEILING MOUNTED	THS	0025	0035	0045	0056	0073	0090	0105	0120	0145
Total cooling capacity (1)	kW	2,6	3,6	4,5	5,6	7,2	9,0	10,4	12,0	14,3
Sensible Cooling capacity	kW	2,6	3,6	4,5	5,5	7,2	8,9	10,1	12,0	13,3
SHR		1	1	1	0,99	1	0,99	0,97	1	0,93
Number of compressors (2)	scroll	1	1	1	1	1	1	1	1	1
Evaporator airflow	m^3/h	950	930	1400	1400	2200	2200	2200	3200	3200
Condensor airflow	m^3/h	2250	2050	3450	3350	3350	5100	5100	5580	5450
Sound Power Level	dB(A)	68	68	69	69	70	70	73	71	71
Sound Pressure (10m free field)	dB(A)	41	41	41	41	42	42	45	43	43
Indoor unit										
Height	mm	350	350	350	350	350	350	350	400	400
Width	mm	590	590	990	990	990	990	990	1090	1090
Depth	mm	1040	1040	1040	1040	1040	1040	1040	1040	1040
Outdoor unit										
Height	mm	580	580	630	630	630	630	630	1268	1268
Width	mm	600	600	990	990	990	990	990	1120	1120
Depth	mm	350	350	360	360	360	360	360	578	578

(1) Indoor conditions 27°C/ 40% relative humidity Outdoor condition: 35 °C

(2) rotary compressor on model THS0025, 0035, 0045

Standard options:

- Freecooling (direct)
- 48 Volt emergency Freecooling
- Electrical heater
- X-tra potential free contacts for alarm
- GSM kit

INNOV@™ • 6 ➔ 120 kW

Close Control Units

INNOV@ ™

Introduction to the range

The new series of **INNOV@™** H Close Control Air Conditioning units are designed to guarantee and respect all environment protection parameters; they represent the perfect answer to all technical requirements of **different technological plant concepts (computer rooms, datacenters, control rooms, EDP rooms, textile industry, metrological rooms, etc ...).**
The exclusive design with rounded edges, innovative colour and the excellent performances of the **INNOV@™** series have become the new high quality standard in the close control air conditioning sector.

Highest energy efficiency, smallest dimensions and lowest noise levels: these were LENNOX's targets when developing it's new **INNOV@™** series, units designed in order to operate 24 hours a day, 365 days a year.

Energy performance

- The reduction of energy consumption in comparison with traditional technologies reaches values up to 45%.

Sustainable performance

- Only internationallly recognised quality components and latest technology devices are used in the **INNOV@™** series in order to guarantee top efficiency and reliability. Technical features such as electronic expansion valves, radial fans with reverse blades and electronically commutated (EC) DC motors offers various opportunities in energy saving.

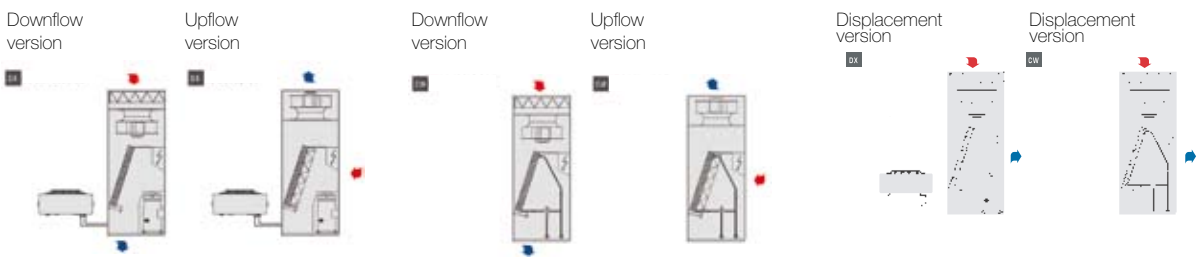
Easy installation, operation and maintenance

- All main components are reachable from the front of the unit in order to reduce costs for installation and maintenance: electrical panel, compressor, fans, humidifier, electrical heaters, expansion valve and liquid flow filter can be reached by just opening the front panel. This guarantees fast and safe intervention.

Control

- The microprocessor control, available in Basic or Advanced Grpahic version, manages all functions of the **INNOV@™** series. This control offers the opportunity to connect up to 8 units together creating a local network (LAN) and allowing, among different options, to balance operation times in an automatic stand by and rotation function. The microprocessor controls are available with a LCD display (Basic version) or with a graphic display (Advanced version) and are compatible with the most wide spread communication protocols. LENNOX Software Development Team (LSDT) moreover, is able to develop control strategies according to customers special requirements.

Distribution configurations



General Data

INNOV@™ DX AIRCOOLED UPFLOW/DOWNFLOW/DISPLACEMENT		0060	0080	0100	0110	0130	0160	0190	0205	0201	0251	0281	0311
Total cooling capacity (1)	kW	5,9	7,7	9,3	10,6	12,7	15,8	18,4	20,5	21,2	23,2	27,7	31,6
Sensible Cooling capacity	kW	5,9	7,4	9,3	10,6	12,5	15,6	17,3	18,9	21,2	23,2	24,6	26,2
SHR		1,00	0,96	1,00	1,00	0,98	0,99	0,94	0,92	1	1	0,89	0,83
Number of compressors	scroll	1	1	1	1	1	1	1	1	1	1	1	1
Air Flow	m^3/h	1785	2150	3530	3530	3700	5100	5100	5100	7280	7280	8250	8250
Fan Type (2)		EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC
Number of fan		1	1	1	1	1	1	1	1	1	1	1	2
Height	mm	1875	1875	1875	1875	1875	1875	1875	1875	1998	1998	1998	1998
Length	mm	600	600	900	900	900	900	900	900	1000	1000	1270	1270
Depth	mm	600	600	600	600	600	600	600	600	795	795	795	795

INNOV@™ DX AIRCOOLED UPFLOW/DOWNFLOW/DISPLACEMENT		0301	0401	0272	0302	0362	0422	0452	0532	0592	0602	0692	0762
Total cooling capacity (1)	kW	31,5	41,2	26,9	31,9	35,9	41,9	44,3	53,9	59,1	61,4	68,7	76,2
Sensible Cooling capacity	kW	31,2	40,0	26,9	31,6	35,2	40,6	43,9	45,3	47,3	59,2	65,6	70,5
SHR		0,99	0,97	1	0,99	0,98	0,97	0,99	0,84	0,80	0,96	0,95	0,93
Number of compressors	scroll	1	1	2	2	2	2	2	2	2	2	2	2
Air Flow	m^3/h	12950	12950	12950	12950	12950	12950	12950	14500	14500	19415	19415	19415
Fan Type (2)		EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC
Number of fan		2	2	2	2	2	2	2	3	3	3	3	3
Height	mm	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998
Length	mm	1750	1750	1750	1750	1750	1750	1750	2000	2000	2500	2500	2500
Depth	mm	795	795	795	795	795	795	795	795	795	795	795	795

INNOV@™ DX WATERCOOLED UPFLOW/DOWNFLOW/DISPLACEMENT		0060	0080	0100	0110	0130	00160	0190	0205	0201	0251	0281	0311
Total cooling capacity (1)	kW	5,3	7,0	8,9	10,0	11,7	15,5	17,8	19,7	20,0	21,1	27,7	31,6
Sensible Cooling capacity	kW	5,2	6,7	8,9	10,0	10,8	15,5	16,6	17,5	20,0	21,1	24,6	26,2
SHR		0,98	0,95	1	1	0,92	1	0,93	0,89	1	1	0,89	0,83
Number of compressors	scroll	1	1	1	1	1	1	1	1	1	1	1	1
Air Flow	m^3/h	1785	2150	3530	3530	3700	5100	5100	5100	7280	7280	8250	8250
Fan Type (2)		EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC
Number of fan		1	1	1	1	1	1	1	1	1	1	1	2
Height	mm	1875	1875	1875	1875	1875	1875	1875	1875	1998	1998	1998	1998
Length	mm	600	600	900	900	900	900	900	900	1000	1000	1270	1270
Depth	mm	600	600	600	600	600	600	600	600	795	795	795	795

(1) Indoor conditions 24°C/ 50% relative humidity / Outdoor condition: 35 °C
Matching drycoolers available
FREECOOLING optional (direct / indirect)

(2) Electronically Commutated fan
Centrifugal fans are an option for the models 0060 - 0205
Dualfluid optional

General data

INNOV@™ DX WATERCOOLED UPFLOW/DOWNFLOW/DISPLACEMENT		0301	0401	0272	0302	0362	0422	0452	0532	0592	0602	0692	0762
Total cooling capacity (1)	kW	29,4	39,2	23,5	28,9	34,0	39,9	42,1	53,9	59,1	58,9	68,6	78,3
Sensible Cooling capacity	kW	29,2	38,8	23,5	28,6	34,0	39,1	42,1	45,3	47,3	58,9	66,9	73,7
SHR		0,99	0,99	1	0,99	1	0,98	1	0,84	0,80	1	0,97	0,94
Number of compressors	scroll	1	1	2	2	2	2	2	2	2	2	2	2
Air Flow	m^3/h	12950	12950	12950	12950	12950	12950	12950	14500	14500	19415	19415	19415
Fan Type (2)		EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC
Number of fan		2	2	2	2	2	2	2	3	3	3	3	3
Height	mm	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998
Length	mm	1750	1750	1750	1750	1750	1750	1750	2000	2000	2500	2500	2500
Depth	mm	795	795	795	795	795	795	795	795	795	795	795	795

(1) Indoor conditions 24°C/ 50% relative humidity / Outdoor condition: 35 °C
Matching drycoolers available
FREECOOLING optional (direct / indirect)

(2) Electronically Commutated fan
Centrifugal fans are an option for the models 0060 - 0205
Dual fluid optional

INNOV@™ CHILLED WATER UPFLOW/DOWNFLOW/DISPLACEMENT		0080	0110	0140	0160	0200	0230	0300	0380
Total cooling capacity (1)	kW	7,7	10,6	13,3	15,8	19,7	23,4	26,8	40,5
Sensible Cooling capacity	kW	6,8	8,9	13,0	13,2	18,5	19,3	23,3	32,7
SHR		0,88	0,84	0,98	0,83	0,94	0,83	0,87	0,81
Air Flow	m^3/h	2300	2400	3800	3800	5100	5100	7450	7450
Fan Type (2)		EC	EC	EC	EC	EC	EC	EC	EC
Number of fan		1	1	1	1	1	1	1	1
Height	mm	1875	1875	1875	1875	1875	1875	1998	1998
Length	mm	600	600	900	900	900	900	1000	1000
Depth	mm	600	600	600	600	600	600	795	795

INNOV@™ CHILLED WATER UPFLOW/DOWNFLOW/DISPLACEMENT		0400	0500	0650	0750	0900	1000	1200
Total cooling capacity (1)	kW	43,5	57,3	69,1	83,1	88,7	107,6	133,4
Sensible Cooling capacity	kW	36,6	47,7	56,8	66,2	74,1	88,0	102,8
SHR		0,84	0,83	0,82	0,80	0,84	0,82	0,77
Air Flow	m^3/h	14550	14550	14550	14550	21400	21400	21400
Fan Type (2)		EC	EC	EC	EC	EC	EC	EC
Number of fan		1	2	2	2	3	3	3
Height	mm	1998	1998	1998	1998	1998	1998	1998
Length	mm	1750	1750	1750	1750	2500	2500	2500
Depth	mm	795	795	795	795	795	795	795

(1) Indoor conditions 24°C/ 50% relative humidity
Water in - out: 7 - 12 °C
FREECOOLING optional (direct / indirect)

(2) Electronically Commutated fan
Centrifugal fans are an option for the models 0080 - 0230

Accessories

Security & extended lifecycle

- Dual fluid
- Potential free alarms contacts
- Water detection kit

Service

- Full frontal access
- Flash memory

Control

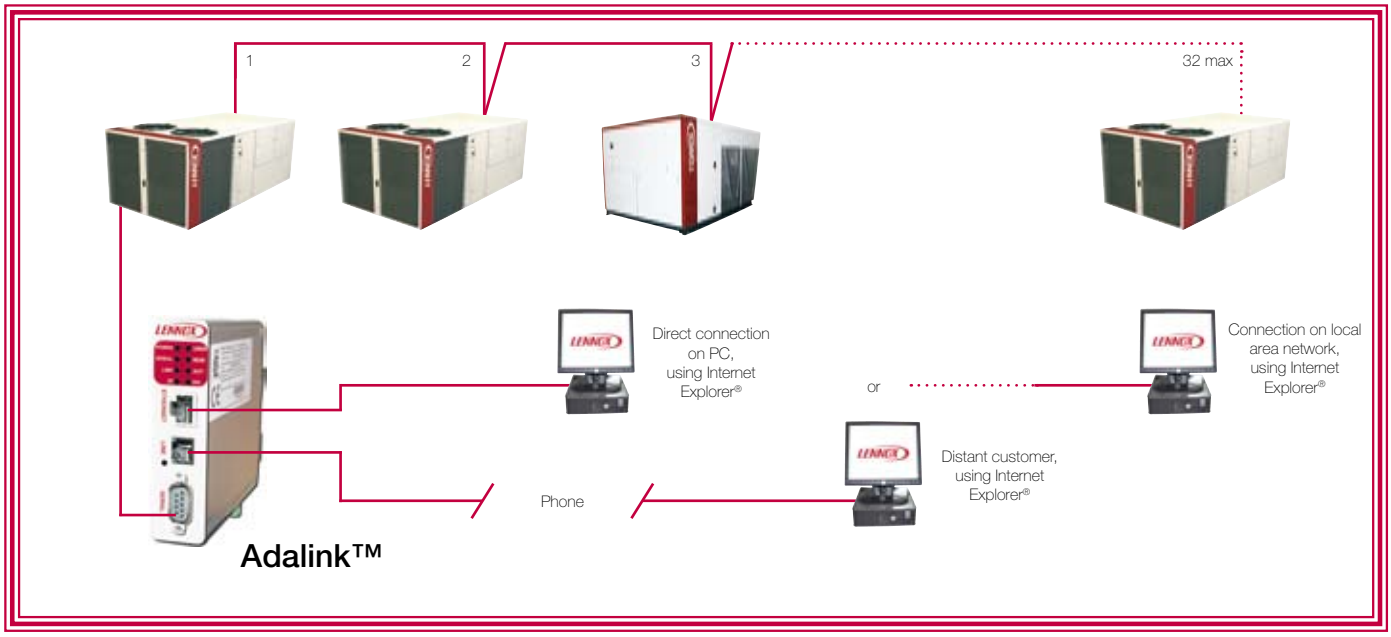
- Microprocessor
- Electronic condenser fans speed control
- Interconnectivity (ModBus, TCP/IP, Bacnet ...)
- Touch screen graphic display

Systems

Providing indoor climate comfort

Adalink™

ADALINK™ is the LENNOX solution for HVAC installation monitoring. It can control up to 32 units on the same site. Real gateway to the unit, **ADALINK™** can be used locally, via LAN network or directly plugged It can also be used remotely via an internal modem. **ADALINK™** can be connect to different units of the Lennox range, chillers and rooftop; **ECOLEAN™, NEOSYS™, BALTIC™ AND FLEXY ™II.**



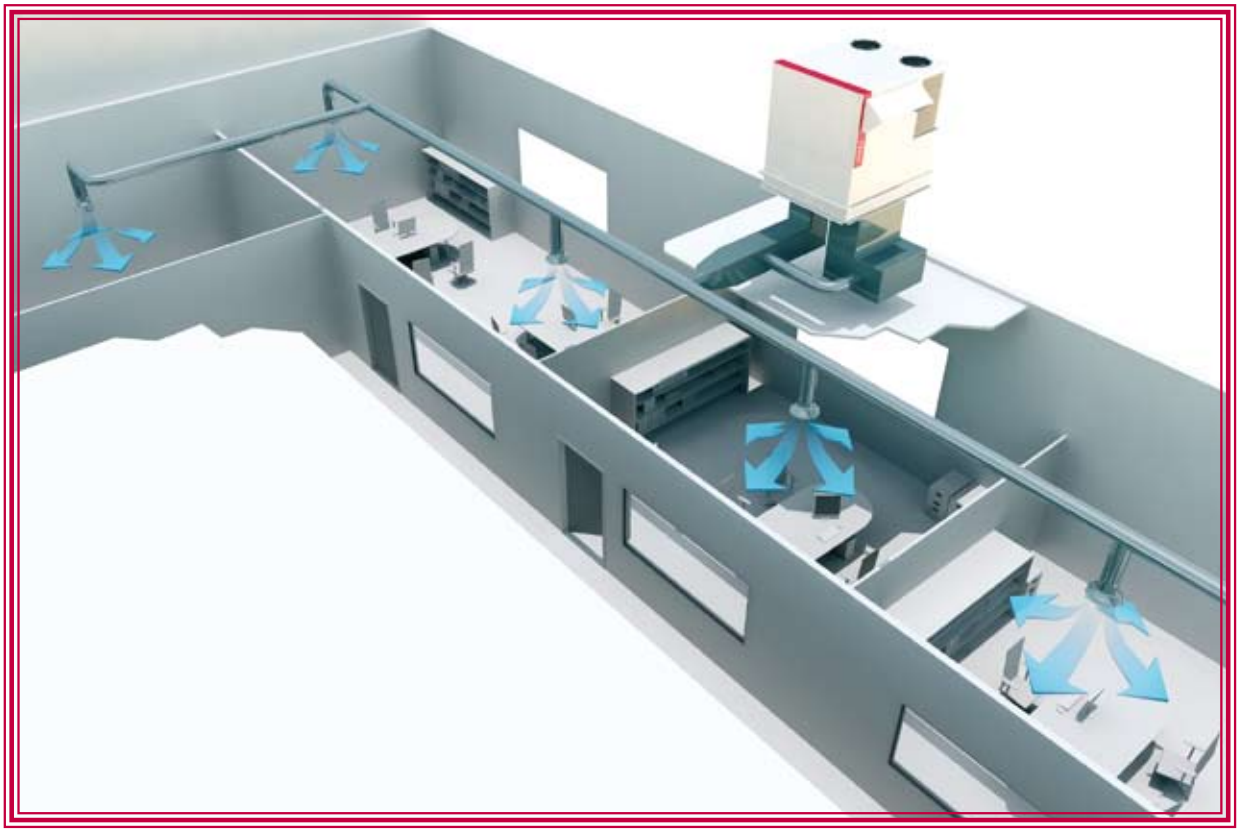
ADALINK™ can show the whole site map showing status of the different units, zoom on each unit and allow the user to graphically change set point, access alarm list, look at trend curves It is the ideal tools for maintenance specialist with an expert mode giving access to all the parameters and set point of the unit
Finally, yearly scheduling is possible with a very smart and user-friendly drag and drop system.

LennoxVision™

LENNOX presents **LennoxVision™**, a new solution for supervision and telemaintenance.
LennoxVision™ is the LENNOX supervision system, it can be connected to all the Lennox units and external components up to 750. Real BMS system you gives you access to the variables of all the units and carries out monitoring, scheduling and energy management. The **LennoxVison™** software gives you access to different pages in order to fully manage the different units on the site; unit page, service, alarm, curves and scheduling pages. The system includes remote connection via modem (options), communication with other BMS, management of alert messages by SMS or Email and lighting management.
LennoxVison™ can be used as a local system with mouse, keyboard and monitor, or as a monitoring system with access from a remote workstation via modem or network. **LennoxVision™** includes a complete pre-configured version of software running on dedicated hardware, and features all the communication ports required to best exploit its Web Server and installation supervision functions

Zonelink™

ZoneLink™ configures constant volume single zone HVAC equipment and a series of dampers to maintain the desired temperature for up to 10 separate zones per rooftop unit (RTU). Each zone is capable of having an adjustable set point, a programmable time-of-day schedule for each day of the week, and an independent unoccupied override input. The system meets the space temperature set points by first reading the space temperature deviation from set point for each zone, and then energizing the heating or cooling in the HVAC unit and controlling the position of a supply damper ducted to each zone. Individual **ZoneLink™** dampers open and close based on the zone temperature compared with the set point and the temperature of the RTU discharge air (heating or cooling).
ZoneLink™ controls the static pressures in the supply duct by actuating a bypass damper that channels air from the supply duct directly into the return air duct or return air plenum. When static pressure increases above the adjustable set point (due to the closing of individual zone dampers), the bypass damper opens to re-route the supply air and decrease the static pressure.
ZoneLink™ can be used in a variety of buildings. The most common use of the system is for buildings where a constant volume HVAC unit is applied to maintain temperature in various areas, each with different load conditions.
ZoneLink™ monitors zone space temperature deviation from set point for zones 1 to 10 and, depending on the total demand from the zones, energizes heating or cooling. Individual dampers modulate open or closed to allow more or less of the conditioned air into the space. For example, if a particular zone requires heating and the unit is in the cooling mode, the zone damper modulates closed (or to its minimum position) depending on the space conditions or how the system is configured. When the minimum time in mode expires, the unit changes over to heating and satisfies any and all zones needing heat. **ZoneLink™** sets minimum on, off and interstage time delays to ensure equipment protection.



Wireless

Following customer request and last technologies development, LENNOX is able to provide you a wireless customer display DWC 50 for your Roof Top. A repeater connected to the main board of the CLIMATIC 50 with a RS 485 connection, communicate through a ZIGBEE protocol to the wireless customer display located in the ambient. This solution is particularly suitable for light commercial building with one or two units and where the display can be installed in the ambient field.

The DWC 50 display is equipped with a battery (5 yrs consumption) and an embedded sensor. This wireless display can be wall-mounted, desk-top or hand-held. In addition if you want a more accurate ambient temperature measure in a big volume, additional wireless sensor are available and in this case the display will communicate the average temperature of the sensors

Hydrolink™

HYDROLINK™ is a system consisting of a chiller or heat pump, fan coil units and complete controls including the management system. All the elements were developed to work together. This solution avoids the risks of discrepancy between the various elements of the loop.
It ensures a perfectly configured system which requires only the connection of water and electrical connections. **HYDROLINK™** solution from LENNOX constitutes an ecological alternative to systems using direct expansion . The use of water to transfer energy from refrigeration or heating reduces the costs of installation and maintenance compared to direct expansion systems with a refrigeration circuit. Implementing of the LENNOX system results in an economic installation. Additional options, in particular the user interface of the fan coils complete the system and make it the ideal solution for small offices or modular buildings. **HYDROLINK™** offers total flexibility in combining fan coil units in order to meet the requirements of your application.
The **HYDROLINK™** centralized management the heat pump change overs to be controlled as requested by the fan coil units. With the graphic interface, the user can read alarms and setting points and can also choose between different algorithms for the chiller control in order to give priority to either comfort or energy saving The **HYDROLINK™** system can be connected to various user interfaces: wall mounted or built in.
Each zone or terminal can be managed individually. For an optimisation of the energy savings, the range of water for the chiller can adapted in accordance with the building's thermal load.

General data
Eurovent conditions

Providing indoor climate comfort

General data - Eurovent conditions

All data is at Eurovent conditions.
http://www.eurovent-certification.com/

Comfort™ + - Split cassette

Program: AC1-A-S-R

COMFORT™ +	CXHK	018	024	036	048
Outdoor unit	KCHK	018	024	036	048
Indoor unit	LCXO	024	024	048	048
Cooling mode					
Nominal cooling capacity	kW	5,50	6,50	9,60	11,30
Power input	kW	2,00	2,50	3,79	4,40
EER		2,75	2,60	2,53	2,57
Heating mode					
Nominal heating capacity	kW	5,30	6,80	9,00	11,10
Power input	kW	1,87	2,56	3,17	4,10
COP		2,83	2,66	2,84	2,71
Acoustic					
Sound power level for outdoor unit	dB(A)	68	68	69	69
Sound power level for indoor unit	dB(A)	51	51	64	64

Ductair™ + - Ductable split for false ceiling installation

Program: AC1-A-S-R

DUCTAIR™ +	NCHK	018	024	030	036	048
Outdoor unit	KCHK	018	024	030	036	048
Indoor unit	LNXO	018	024	030	036	048
Cooling mode						
Nominal cooling capacity	kW	5,1	6,6	7,7	9	11
Power input	kW	2,02	2,6	3,3	3,86	4,7
EER		2,52	2,54	2,33	2,33	2,34
Heating mode						
Nominal heating capacity	kW	5,4	6,85	8,4	9,2	11,4
Power input	kW	2,06	2,54	3,23	3,5	4,21
COP		2,62	2,7	2,6	2,63	2,71
Acoustic						
Sound power level for outdoor unit	dBA	68	68	69	69	69
Sound power level for indoor unit	dBA	64	66	66	68	66

Program: AC2-A-S-R

DUCTAIR™ +	NCHK	060	070	080
Outdoor unit	KCHK	060	070	080
Indoor unit	LNXO	060	070	080
Cooling mode				
Nominal cooling capacity	kW	13,5	16,1	18,3
Power input	kW	5,79	6,71	7,85
EER		2,33	2,4	2,33
Heating mode				
Nominal heating capacity	kW	14,4	16,5	19
Power input	kW	5,65	6,02	7,31
COP		2,55	2,74	2,6
Acoustic				
Sound power level for outdoor unit	dBA	73	73	80
Sound power level for indoor unit	dBA	72	74	77

Flatair™ - Horizontal convertible packaged air conditioner

Program: AC1-A-P-C

FLATAIR™	FLCK	10	12
Cooling mode			
Nominal cooling capacity	kW	9,8	11,8
Power input	kW	3,68	4,57
EER		2,66	2,58
Acoustic			
Sound power level for outdoor unit	dBA	69	69
Sound power level for indoor unit	dBA	65	65

Program: AC2-A-P-C

FLATAIR™	FLCK	16	22	24	28	30
Cooling mode						
Nominal cooling capacity	kW	15,3	19,5	22	26,3	28,1
Power input	kW	6,4	8,09	9,02	10,4	12,2
EER		2,39	2,41	2,44	2,53	2,3
Acoustic						
Sound power level for outdoor unit	dBA	73	80	81	83	80
Sound power level for indoor unit	dBA	69	80	83	84	81

Program: AC1-A-P-R

FLATAIR™	FLHK	10	12
Cooling mode			
Nominal cooling capacity	kW	9,8	11,8
Power input	kW	3,68	4,57
EER		2,66	2,58
Heating mode			
Nominal heating capacity	kW	10	12
Power input	kW	3,16	4,11
COP		3,16	2,92
Acoustic			
Sound power level for outdoor unit	dBA	69	69
Sound power level for indoor unit	dBA	65	65

Program: AC2-A-P-R

FLATAIR™	FLHK	16	22	24	28	30
Cooling mode						
Nominal cooling capacity	kW	14,70	19,20	21,00	26,00	27,00
Power input	kW	6,11	7,92	8,80	10,36	11,78
EER		2,41	2,42	2,39	2,51	2,29
Heating mode						
Nominal heating capacity	kW	15,60	20,00	22,80	27,00	29,80
Power input	kW	4,94	6,60	7,80	8,43	9,43
COP		3,16	3,03	2,92	3,20	3,16
Acoustic						
Sound power level for outdoor unit	dB(A)	73	80	81	83	80
Sound power level for indoor unit	dB(A)	69	80	83	84	81

General data - Eurovent conditions

All data is at Eurovent conditions.
http://www.eurovent-certification.com/

Compactair™ - Vertical convertible packaged air conditioner

Program: AC2-A-P-C

COMPACTAIR™	LVCK	22E	24E	28E	32E	38E	44D	48D
Cooling mode								
Nominal cooling capacity	kW	19,5	19,8	26,5	28,7	36,5	39	40,2
Power input	kW	8,52	8,53	11,5	13	16	17	17,3
EER		2,29	2,32	2,3	2,21	2,28	2,29	2,32
Acoustic								
Sound power level for outdoor unit	dBA	82	82	82	84	85	85	85
Sound power level for indoor unit	dBA	80	82	82	85	86	83	84

Program: AC3-A-P-C

COMPACTAIR™	LVCK	56D	64D	76D
Cooling mode				
Nominal cooling capacity	kW	53,00	57,40	73,00
Power input	kW	23,00	26,00	32,00
EER		2,30	2,21	2,28
Acoustic				
Sound power level for outdoor unit	dB(A)	85	87	88
Sound power level for indoor unit	dB(A)	85	88	89

Program: AC2-A-P-R

COMPACTAIR™	LVHK	22E	24E	28E	32E	38E	44D	48D
Cooling mode								
Nominal cooling capacity	kW	19,50	22,00	26,50	28,70	36,50	39,00	44,00
Power input	kW	8,52	9,50	11,50	13,00	16,00	17,00	19,00
EER		2,29	2,32	2,30	2,21	2,28	2,29	2,32
Heating mode								
Nominal heating capacity	kW	20,20	22,50	27,00	30,30	36,90	40,40	45,00
Power input	kW	7,70	8,60	10,00	11,50	13,60	15,40	17,20
COP		2,62	2,62	2,70	2,63	2,71	2,62	2,62
Acoustic								
Sound power level for outdoor unit	dB(A)	82	82	82	84	85	85	85
Sound power level for indoor unit	dB(A)	80	82	82	85	86	83	84

Program: AC3-A-P-R

COMPACTAIR™	LVHK	56D	64D	76D
Cooling mode				
Nominal cooling capacity	kW	53,00	57,40	73,00
Power input	kW	23,00	26,00	32,00
EER		2,30	2,21	2,28
Heating mode				
Nominal heating capacity	kW	54,00	60,60	73,80
Power input	kW	20,00	23,00	27,20
COP		2,70	2,63	2,71
Acoustic				
Sound power level for outdoor unit	dB(A)	85	87	88
Sound power level for indoor unit	dB(A)	85	88	89

Aircoolair™ - Large ductable split / dual split units

Program: AC2-A-S-C

AIRCOOLAIR™	ANCM/HM	22E	26E	32E	38E	43E
Outdoor unit	KNCM/HM	22E	26E	32E	38E	43E
Indoor unit	LECM/HM	22E	26E	32E	38E	43E
Cooling mode						
Nominal cooling capacity	kW	19,5	23,5	27	35,5	40,5
Power input	kW	6,72	8,45	9,82	12,4	14,7
EER		2,9	2,78	2,75	2,86	2,75
Acoustic						
Sound power level for outdoor unit	dB(A)	76	78	81	80	81
Sound power level for indoor unit	dB(A)	73	78	80	80	83

Program: AC3-A-S-C

AIRCOOLAIR™	ANCM/HM	52D	64D	76D	86D	112D
Outdoor unit	KNCM/HM	52D	64D	76D	86D	112D
Indoor unit	LECM/HM	52D	64D	76D	86D	112D
Cooling mode						
Nominal cooling capacity	kW	46,5	55,5	69,5	82	100
Power input	kW	17,0	19,8	24,8	29,8	35,7
EER		2,73	2,8	2,80	2,75	2,80
Acoustic						
Sound power level for outdoor unit	dB(A)	81	84	83	84	87
Sound power level for indoor unit	dB(A)	86	80	85	87	85

Program: AC2-A-S-R

AIRCOOLAIR™	ANCM/HM	22E	26E	32E	38E	43E
Outdoor unit	KNCM/HM	22E	26E	32E	38E	43E
Indoor unit	LECM/HM	22E	26E	32E	38E	43E
Cooling mode						
Nominal cooling capacity	kW	19,5	23,5	27	35,5	40,5
Power input	kW	6,72	8,45	9,82	12,4	14,7
EER		2,9	2,78	2,75	2,86	2,75
Heating mode						
Nominal heating capacity	kW	19,5	25	28,5	36	40
Power input	kW	6,50	8,33	9,66	11,9	13,3
COP		3,00	3,00	2,95	3,03	3,03
Acoustic						
Sound power level for outdoor unit	dB(A)	76	78	81	80	81
Sound power level for indoor unit	dB(A)	73	78	80	80	83

General data - Eurovent conditions

All data is at Eurovent conditions.
http://www.eurovent-certification.com/

Aircoolair™ - Ducted unit

Program: AC3-A-S-R

AIRCOOLAIR™	ANCM/HM	52D	64D	76D	86D	112D
Outdoor unit	KNCM/HM	52D	64D	76D	86D	112D
Indoor unit	LECM/HM	52D	64D	76D	86D	112D
Cooling mode						
Nominal cooling capacity	kW	46,5	55,5	69,5	82	100
Power input	kW	17,0	19,8	24,8	29,8	35,7
EER		2,73	2,8	2,80	2,75	2,80
Heating mode						
Nominal heating capacity	kW	49,5	56,5	72,5	80	108
Power input	kW	17,1	18,8	24,2	26,6	34,5
COP		3	3	3	3,01	3,13
Acoustic						
Sound power level for outdoor unit	dB(A)	81	84	83	84	87
Sound powere level for indoor unit	dB(A)	86	80	85	87	85

Baltic™ - Rooftop unit

Program: AC2-A-P-C

BALTIC™	BAC/BAG	20S	30S	35S	45S
Cooling mode					
Net cooling capacity	kW	21,2	26	34,5	43,4
Power input	kW	7,2	9,6	12,9	14,8
EER		2,95	2,71	2,68	2,94
Acoustic					
Outside sound power	dBA	86	87	84	85
Indoor blower outlet sound power	dBA	78	83	82	83

Program: AC3-A-P-C

BALTIC™	BAC/BAG	55S	65D	75D
Cooling mode				
Net cooling capacity	kW	51	63,6	72,5
Power input	kW	18,5	21,9	27,4
EER		2,76	2,90	2,64
Acoustic				
Outside sound power	dBA	86	85	86
Indoor blower outlet sound power	dBA	84	82	85

Baltic™ - Rooftop unit

Program: AC2-A-P-R

BALTIC™	BAH/BAM	20S	30S	35S	45S
Cooling mode					
Net cooling capacity	kW	20,9	24,8	34,2	43
Power input	kW	7,2	9,2	12,9	14,8
EER		2,90	2,69	2,65	2,91
Heating mode					
Net heating capacity	kW	20,5	24,9	35,6	43,3
Power input	kW	6,79	8,45	11,43	13,50
COP		3,02	2,95	3,12	3,21
Acoustic					
Outside sound power	dBA	86	87	85	85
Indoor blower outlet sound power	dBA	81	86	85	85

Program: AC3-A-P-R

BALTIC™	BAH/BAM	55S	65D	75D
Cooling mode				
Net cooling capacity	kW	50,1	62,8	71,6
Power input	kW	18,5	21,9	27,4
EER		2,71	2,87	2,61
Heating mode				
Net heating capacity	kW	51,8	65,9	77,2
Power input	kW	16,76	19,94	23,77
COP		3,09	3,30	3,25
Acoustic				
Outside sound power	dBA	86	86	86
Indoor blower outlet sound power	dBA	87	85	89

Flexy™ - Rooftop unit

Program: AC3-A-P-C

FLEXY™	FCM-FGM	85
Cooling mode		
Net cooling capacity	kW	82,8
Absorbed power	kW	29
EER		2,86
Acoustic		
Outside sound power	dB(A)	87
Indoor blower sound power	dB(A)	85

General data - Eurovent conditions

All data is at Eurovent conditions.
http://www.eurovent-certification.com/

Flexy™ - Rooftop unit

Program: AC3-A-P-R

FLEXY™		FHM-FDM	85
Cooling mode			
Net cooling capacity		kW	82
Absorbed power		kW	29,6
EER			2,77
Heating mode			
Net heating capacity		kW	82,9
Absorbed pwer		kW	26,3
COP			3,16
Acoustic			
Outside sound power		dB(A)	87
Indoor blower sound power		dB(A)	85

Ecolean™ - Air cooled chiller/heat pump

Program: LCP-A-P-C-AC

ECOLEAN™	EAC	0091SK	0111SK	0151SK	0191SK	0211SK	0251SM	0291SM	0351SM	0431SM
Cooling mode										
Cooling capacity	kW	8,84	11,2	13,4	17,4	19,2	22,1	25,9	32	37,6
Absorbed power	kW	3,09	3,78	4,93	6,35	7,06	7,62	9,09	11,2	13,4
EER		2,86	2,96	2,72	2,74	2,72	2,9	2,85	2,86	2,81
CLASS EER		C	B	C	C	C	B	C	C	C
Pressure drop										
Pressure drop without water filter	kPa	25	39	29	47	41	51	54	30	34
Acoustic										
Sound power level	dBA	73	75	76	76	79	78	81	80	81

ECOLEAN™	EAC	0472SM	0552SM	0672SM	0812SM	1003SM	1103SM	1203SM	1303SM	1403SM	1604SM	1804SM
Cooling mode												
Cooling capacity	kW	44,1	50,7	63,4	75,4	88,2	102	112	126	139	149	174
Absorbed power	kW	15,2	18,2	22,4	26,7	31,2	35,2	40,1	44,1	48,4	54	60
EER		2,9	2,79	2,83	2,82	2,83	2,9	2,79	2,86	2,87	2,76	2,9
CLASS EER		B	C	C	C	C	B	C	C	C	C	B
Pressure drop												
Pressure drop without water filter	kPa	32	34	40	47	32	38	43	48	53	44	52
Acoustic												
Sound power level	dBA	81	84	83	84	85	87	88	90	90	89	89

Ecolean™ - Air cooled chiller/heat pump

Program: LCP-A-P-R-CHF

ECOLEAN™	EAR	0091SK	0111SK	0151SK	0191SK	0211SK	0251SM	0291SM	0351SM	0431SM	0472SM
Cooling mode											
Cooling capacity	kW	12,5	15,8	18,8	24,6	27,1	29,7	34,8	43,4	50	58,9
Absorbed power	kW	3,48	4,27	5,55	7,81	7,97	8,71	10,2	12,7	15,2	17,3
EER		3,59	3,7	3,39	3,15	3,4	3,41	3,4	3,41	3,28	3,41
CLASS EER		C	B	D	F	D	D	D	D	E	D
Pressure drop											
Water pressure drop	kPa	45	69	55	85	72	91	96	53	57	54
Heating mode											
Heating capacity	kW	7,11	9,1	10,9	14,3	16,2	25	28,6	35,8	39,7	49,9
Absorbed power	kW	2,65	3,51	4,18	5,4	6,09	6,7	7,75	9,6	11,1	13,5
COP		2,68	2,59	2,61	2,65	2,66	3,73	3,69	3,73	3,57	3,7
CLASS COP		G	G	G	G	G	D	D	D	E	D
Pressure drop											
Water pressure drop	kPa	25,7	40,3	29,2	51,3	48,3	59	63	33	36	38
Acoustic											
Sound power level	dBA	73	75	76	76	79	78	81	80	81	81

Program: LCP-A-P-R-AC

ECOLEAN™	EAR	0091SK	0111SK	0151SK	0191SK	0211SK	0251SM	0291SM	0351SM	0431SM
Cooling mode										
Cooling capacity	kW	8,84	11,2	13,4	17,4	19,2	22,1	25,9	32	37,6
Absorbed power	kW	3,09	3,78	4,93	6,35	7,06	7,62	9,09	11,2	13,4
EER		2,86	2,96	2,72	2,74	2,72	2,9	2,85	2,86	2,81
CLASS EER		C	B	C	C	C	B	C	C	C
Pressure drop										
Water pressure drop	kPa	25	39	29	47	41	51	54	30	34
Heating mode										
Heating capacity	kW	8,96	11	13,1	17,4	19,7	23,6	27,6	33,6	37,8
Absorbed power	kW	3,37	4,45	5,28	6,82	7,7	7,87	9,2	11,2	13
COP		2,66	2,47	2,48	2,55	2,56	3	3	3	2,91
CLASS COP		D	E	E	E	E	B	B	B	C
Pressure drop										
Water pressure drop	kPa	26	39	29	48	43	54	58	31	34
Acoustic										
Sound power level	dBA	73	75	76	76	79	78	81	80	81

General data - Eurovent conditions

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Ecolean™ - Air cooled chiller/heat pump

Program: LCP-A-P-R-AC

ECOLEAN™	EAR	0472SM	0552SM	0672SM	0812SM	1003SM	1103SM	1203SM	1303SM	1403SM	1604SM	1804SM
Cooling mode												
Cooling capacity	kW	44,1	50,7	63,4	75,4	88,2	102	112	126	139	149	174
Absorbed power	kW	15,2	18,2	22,4	26,7	31,2	35,2	40,1	44,1	48,4	54	60
EER		2,9	2,79	2,83	2,82	2,83	2,9	2,79	2,86	2,87	2,76	2,9
CLASS EER		B	C	C	C	C	B	C	C	C	C	B
Pressure drop												
Water pressure drop	kPa	32	34	40	47	32	38	43	48	53	44	52
Heating mode												
Heating capacity	kW	47,8	54,7	68	75,7	95	108	118	130	143	159	180
Absorbed power	kW	15,9	18,6	22,7	25,9	31,2	36	39,3	44,5	48,2	53	61
COP		3	2,94	3	2,92	3,05	3	3	2,92	2,97	3	2,95
CLASS COP		B	C	B	C	B	B	B	C	C	B	C
Pressure drop												
Water pressure drop	kPa	35	36	43	47	34	40	46	50	54	46	54
Acoustic												
Sound power level	dBA	81	84	83	84	85	87	88	90	90	89	89

Ecologic™ - Air cooled chiller/heat pump

Program: LCP-A-P-C-AC

ECOLOGIC™	WA	200D-STD	230D-STD	270D-STD	300D-STD	370D-STD
Cooling mode						
Cooling Capacity	kW	185	221	267	283	351
Power input	kW	81,5	97,8	122	137	161
EER		2,27	2,26	2,18	2,06	2,18
CLASS EER		F	F	F	G	F
ESEER		3,08	3,35	3,29	3,3	3,17
Pressure drop						
Pressure drop	kPa	41,6	58,4	47,8	54	51,3
Acoustic						
Global sound power level	dBA	96	97	98	99	99

Neosys™ - Air cooled chiller/heat pump

Program: LCP-A-P-R-AC

Program: LCP-A-P-C-AC

NEOSYS™	NAC	200	230	270	300	340	380	420	480
Cooling mode									
Cooling capacity	kW	202	229	266	299	337	377	420	460
Power input	kW	69,7	83,9	103,9	104,9	122	146,6	149,3	170,1
EER		2,9	2,72	2,56	2,85	2,76	2,57	2,82	2,71
ESEER		4,18	3,97	3,93	4,11	4,09	3,92	4,48	3,95
Pressure drop									
Pressure drop	kPa	28,6	36,6	37,5	47,2	45,3	38,6	39,2	46,9
Acoustic									
Global sound power level	dBA	89	89	90	91	91	91	93	93

NEOSYS™	NAH	200	230	270	300
Cooling mode					
Cooling capacity	kW	191	215	271	295
Power input	kW	69,5	84,8	96,9	111,5
EER		2,75	2,54	2,79	2,65
ESEER		4	3,76	3,99	3,94
Pressure drop					
Pressure drop	kPa	25,7	32,5	38,8	46,2
Heating mode					
Heating capacity	kW	219	252	313	346
Power input	kW	68,1	80,4	97,7	110,7
COP		3,21	3,13	3,2	3,12
Acoustic					
Global sound power level	dBA	89	89	91	91

Hydrolean™ - Water cooled chiller

Program: LCP-W-P-C-AC

HYDROLEAN™	SWC	020ESK	025ESK	035ESK	040ESK	050ESK	065ESK	080ESK	090ESK	100ESK	120DSK	135DSK	165DSK
Cooling mode													
Cooling capacity	kW	18,9	24,2	34,6	42,2	49,3	69,6	75,8	86	103	111	140	165
Power input	kW	4,57	6,45	9,20	11	12,9	18,6	20,7	22,1	28,1	29,8	36,8	44,8
EER		4,14	3,75	3,76	3,85	3,81	3,74	3,67	3,90	3,66	3,72	3,80	3,68
CLASS EER		D	E	E	D	E	E	E	D	E	E	E	E
ESEER		4,76	4,34	4,32	4,43	5,31	5,14	5,16	5,24	5,28	5,13	5,12	4,97
Pressure drop													
Evaporator pressure drop	kPa	30	49	45	44	33	36	43	32	45	41	37	50
Condenser pressure drop	kPa	46	77	71	69	51	57	67	50	71	65	57	79

General data - Eurovent conditions

All data is at Eurovent conditions.
http://www.eurovent-certification.com/

Hydrolean™ - Water cooled chiller

Program: LCP-W-P-R-AC

HYDROLEAN™	SWH	020ESK	025ESK	035ESK	040ESK	050ESK	065ESK	080ESK	090ESK	100ESK	120DSK	135DSK	165DSK
Cooling mode													
Cooling capacity	kW	17,5	22,6	32,2	39,3	45,9	64,9	70,7	80,1	95,7	103	130	154
Power input	kW	4,57	6,49	9,25	11	13	18,7	20,8	22,2	28,2	29,9	36,8	45,2
EER		3,83	3,48	3,48	3,56	3,53	3,47	3,4	3,61	3,4	3,45	3,53	3,41
CLASS EER		E	E	E	E	E	E	F	E	F	E	E	F
Pressure drop													
Evaporator pressure drop	kPa	26	42	40	38	29	32	37	28	39	36	32	44
Condenser pressure drop	kPa	41	69	64	62	46	51	61	45	64	59	52	71
Heating mode													
Heating capacity	kW	19,4	26	37	45,2	52,4	74,4	81,9	91	110	119	147	177
Power input	kW	5,9	8,1	11,6	14	16,3	23,4	26,1	28,1	35,1	37,7	46,2	56,7
COP		3,29	3,21	3,19	3,23	3,21	3,18	3,14	3,24	3,13	3,16	3,18	3,12
CLASS COP		E	F	F	F	F	F	F	F	F	F	F	F
Pressure drop													
Condenser pressure drop	kPa	32	56	52	50	37	41	49	36	51	47	41	57

Program: LCP-W-P-R-CHF

HYDROLEAN™	SWH	020ESK	025ESK	035ESK	040ESK	050ESK	065ESK	080ESK	090ESK	100ESK	120DSK	135DSK	165DSK
Cooling mode													
Cooling capacity	kW	25,7	32,4	46	56,3	65,7	92,3	101	115	137	73,8	187	219
Power input	kW	4,9	6,81	9,7	11,5	13,8	19,6	21,8	23,4	29,7	15,4	39	47,1
EER		5,24	4,76	4,74	4,9	4,76	4,71	4,63	4,91	4,61	4,79	4,79	4,65
CLASS EER		A	C	C	B	C	C	D	B	D	C	C	D
ESEER		4,05	4,05	4,02	4,11	4,94	4,79	4,81	4,88	4,91	4,76	4,76	4,64
Pressure drop													
Evaporator pressure drop	kPa	55	86	79	77	55	60	71	54	76	71	64	89
Condenser pressure drop	kPa	76	123	113	110	81	89	105	78	112	102	90	123
Heating mode													
Heating capacity	kW	20,3	26,9	38,4	46,7	54,1	77	84,5	94,2	114	123	154	184
Power input	kW	4,5	6,4	9,21	11	12,9	18,5	20,6	22	27,7	29,9	36,8	44,9
COP		4,51	4,2	4,17	4,25	4,19	4,16	4,1	4,28	4,11	4,12	4,19	4,1
CLASS COP		A	C	C	B	C	C	C	B	C	C	C	C
Pressure drop													
Condenser pressure drop	kPa	38	66	60	56	41	45	54	38	56	52	46	65

HC - Centrifugal fan coil unit

Program: FC-2-H

COMFAIR™	Speed	HC	10	20	30	40	50	60	70	80	90
Sensible cooling capacity	Min	kW	0,51	0,81	1,2	1,31	1,5	2,12	2,3	3,13	3,29
	Med		0,65	0,9	1,57	1,71	1,93	2,68	2,67	3,62	4,11
	Max		0,74	1,02	1,76	2,17	2,18	3,08	3,15	3,96	4,82
Total cooling capacity	Min	kW	0,67	1,08	1,45	1,53	2,2	2,72	3,25	4,48	4,83
	Med		0,79	1,17	1,94	2,03	2,79	3,41	3,71	5,17	5,96
	Max		0,86	1,28	2,17	2,53	3,11	3,85	4,33	5,59	6,9
Heating capacity	Min	kW	0,85	1,47	1,87	2,11	2,57	3,12	3,79	5,36	5,62
	Med		1,1	1,65	2,33	2,64	3,27	3,94	4,37	6,18	6,98
	Max		1,25	1,87	2,59	3,28	3,66	4,48	5,14	6,69	8,13
Water pressure drop - Cooling	Min	kW	0,6	1,4	2,7	3,2	8,1	12,9	21,2	17,9	9,4
	Med		0,8	1,7	5,0	5,6	13	20,2	27,7	23,9	14,3
	Max		0,9	2	6,3	8,8	16,1	25,9	37,6	27,9	19,1
Water pressure drop - Heating	Min	kW	0,4	1	2,2	2,7	6,9	11	19,6	15,2	8,7
	Med		0,6	1,2	3,9	4,8	11,1	17,2	25,6	20,3	13,2
	Max		0,7	1,4	4,9	7,5	13,7	22	34,7	23,7	17,6
Fan absorbed power	Min	kW	0,02	0,02	0,02	0,02	0,03	0,04	0,05	0,13	0,13
	Med		0,02	0,03	0,03	0,03	0,05	0,06	0,06	0,15	0,15
	Max		0,03	0,03	0,04	0,05	0,06	0,08	0,07	0,16	0,18
Sound power level	Min	dBA	33	37	34	33	37	38	42	51	51
	Med		41	41	41	40	43	47	46	56	58
	Max		46	45	44	47	47	52	52	58	64

Program: FC-4-H

COMFAIR™	Speed	HC	10	20	30	40	50	60	70	80	90
Sensible cooling capacity	Min	kW	0,5	0,89	1,15	1,16	1,72	2	2,44	3,26	3,57
	Med		0,63	0,99	1,51	1,52	2,2	2,54	2,83	3,76	4,47
	Max		0,71	1,12	1,69	1,93	2,49	2,91	3,34	4,11	5,26
Total cooling capacity	Min	kW	0,65	1,04	1,38	1,44	2,1	2,61	3,35	4,28	4,58
	Med		0,77	1,13	1,85	1,9	2,66	3,26	3,83	4,95	5,66
	Max		0,84	1,23	2,08	2,38	2,96	3,69	4,47	5,35	6,57
Heating capacity	Min	kW	0,86	1,49	1,97	1,86	2,45	3,15	3,71	5,24	5,3
	Med		1,11	1,67	2,45	2,33	3,12	3,75	4,29	5,84	6,58
	Max		1,26	1,89	2,73	2,89	3,49	4,14	5,04	6,21	7,67
Water pressure drop - Cooling	Min	kW	0,39	1,4	2,5	3	5,72	10,2	28	7,5	18,4
	Med		0,52	1,7	4,5	5,2	8,82	15,7	36,5	10	28,1
	Max		0,61	2	5,7	8,2	10,7	20	49,8	11,6	37,8
Water pressure drop - Heating	Min	kW	1,06	3,6	7,4	6,6	13,9	20,5	32,8	70,7	84,5
	Med		1,67	4,1	11,5	10,7	22,1	29	44,3	87,3	130
	Max		2,1	5,7	13,9	16,4	27,9	35,1	61,5	99,1	177
Fan absorbed power	Min	kW	0,02	0,02	0,02	0,02	0,03	0,04	0,05	0,13	0,13
	Med		0,02	0,03	0,03	0,03	0,05	0,06	0,06	0,15	0,15
	Max		0,03	0,03	0,04	0,05	0,06	0,08	0,07	0,16	0,18
Sound power level	Min	dBA	34	39	34	35	35	41	43	51	51
	Med		40	43	40	41	42	48	47	57	59
	Max		45	47	44	47	46	53	53	59	65

General data - Eurovent conditions

All data is at Eurovent conditions.
http://www.eurovent-certification.com/

HH - High pressure modular fan coil unit

Program: FC-2-H

COMFAIR™	Speed	HH	10	20	30	40	50
Sensible cooling capacity	Min	kW	2,46	4,02	5,63	6,11	7,23
	Med		2,74	5,02	6,93	7,88	9,44
	Max		2,87	5,64	7,36	8,63	11
Total cooling capacity	Min	kW	3,16	5,16	7,21	7,79	8,91
	Med		3,47	6,35	8,66	9,81	11,3
	Max		3,64	7,05	9,2	10,6	13,1
Heating capacity	Min	kW	4,3	6,13	8,66	9,23	11,2
	Med		4,75	7,62	10,5	11,8	14,5
	Max		4,98	8,51	11,2	12,8	16,9
Water pressure drop - Cooling	Min	kw	18,1	19,3	20,8	17,2	16,6
	Med		21,9	29,2	30	27,3	26,9
	Max		24	35,9	33,8	31,9	35,9
Water pressure drop - Heating	Min	kW	16,7	17	17,7	15,1	15,4
	Med		20,2	25,7	25,6	23,9	24,9
	Max		22,2	31,7	28,9	27,9	33,2
Fan absorbed power	Min	kW	0,11	0,15	0,3	0,31	0,28
	Med		0,12	0,19	0,32	0,34	0,41
	Max		0,16	0,24	0,32	0,34	0,58
Sound power level	Min	dBA	63	53	61	58	62
	Med		67	62	68	65	69
	Max		68	66	70	69	75

Program: FC-4-H

COMFAIR™	Speed	HH	10	20	30	40	50
Sensible cooling capacity	Min	kW	2,66	4,02	5,4	5,76	6,89
	Med		2,93	5	6,66	7,44	9,02
	Max		3,1	5,63	7,07	8,04	10,6
Total cooling capacity	Min	kW	3,13	5,12	6,51	7,03	8,31
	Med		3,44	6,3	7,82	8,86	10,6
	Max		3,6	7	8,3	9,57	12,3
Heating capacity	Min	kW	3,61	5,04	7,5	8,23	9,3
	Med		3,98	6,27	8,73	9,93	12
	Max		4,18	7	9,17	10,6	14
Water pressure drop - Cooling	Min	kW	12	14,4	17,7	16,2	14,2
	Med		14,5	21,8	25,2	25,5	23
	Max		15,9	26,8	28	29,2	30,8
Water pressure drop - Heating	Min	kW	20	11,9	25,3	13,3	15
	Med		24,3	18,4	33,8	19,3	24,9
	Max		26,8	22,9	37	21,7	33,8
Fan absorbed power	Min	kW	0,11	0,14	0,3	0,31	0,28
	Med		0,12	0,17	0,32	0,34	0,41
	Max		0,16	0,22	0,32	0,34	0,58
Sound power level	Min	dBA	63	55	61	59	61
	Med		67	62	68	66	68
	Max		69	66	70	70	73

HD - High wall fan coil unit

Program: FC-2-H

COMFAIR™	Speed	HD	1	2	3
Sensible cooling capacity	Min	kW	1,2	1,55	2,89
	Med		1,45	1,7	3,32
	Max		1,7	1,99	3,44
Total cooling capacity	Min	kW	1,45	1,87	3,71
	Med		1,73	2	4,2
	Max		2,04	2,46	4,42
Heating capacity	Min	kW	1,81	2,21	4,51
	Med		2,22	2,42	5,24
	Max		2,59	3,32	5,64
Water pressure drop - Cooling	Min	kw	9,1	16	48,1
	Med		13	18	61,4
	Max		18	20	68,1
Water pressure drop - Heating	Min	kW	8,4	14	42,2
	Med		12	16	54
	Max		16,7	17	59,8
Fan absorbed power	Min	kW	0,02	0,02	0,05
	Med		0,03	0,03	0,05
	Max		0,03	0,03	0,06
Sound power level	Min	dBA	49	46	50
	Med		54	50	57
	Max		56	54	61

CWC - Chilled water cassette

Program: FC-2-H

COMFAIR™	Speed	CWC	020-2P	030-2P	040-2P	050-2P	070-2P	090-2P
Nominal air flow	Min	m^3/h	445	400	553	650	987	1126
	Med		550	517	670	791	1164	1323
	Max		650	598	779	920	1342	1569
Sensible cooling capacity	Min	kW	1,15	2	2,55	3,02	4,61	5,04
	Med		1,32	2,44	2,87	3,53	5,18	5,71
	Max		1,48	2,73	3,19	3,96	5,76	6,49
Total cooling capacity	Min	kW	1,48	2,58	3,27	4,19	5,92	6,94
	Med		1,69	3,09	3,68	4,82	6,66	7,77
	Max		1,87	3,41	4,09	5,33	7,4	8,71
Heating capacity	Min	kW	2,01	2,98	3,55	4,64	6,4	7,6
	Med		2,33	3,62	3,92	5,41	7,06	8,62
	Max		2,6	4,05	4,61	6,09	8,31	9,79
Pressure drop cooling circuit	Min	kPa	9,3	13,3	25,8	24,2	18	18,9
	Med		11,8	18,4	32,3	31	21,6	23,2
	Max		14,2	22	37,9	37,2	26,2	28,7
Pressure drop heating circuit	Min	kPa	11,2	13,2	23,4	28,9	15,6	16,4
	Med		14,2	18,2	31,1	37	19,8	20,1
	Max		17	21,8	37,7	44,4	24,9	24,8
Fan absorbed power	Min	kW	0,034	0,034	0,054	0,07	0,106	0,13
	Med		0,042	0,042	0,059	0,07	0,115	0,14
	Max		0,048	0,048	0,066	0,08	0,129	0,16
Sound power level dBA	Min	dBA	44	40	47	53	51	56
	Med		50	46	52	56	56	60
	Max		52	50	55	62	60	65

General data - Eurovent conditions

All data is at Eurovent conditions.
http://www.eurovent-certification.com/

CWC - Chilled water cassette

Program: FC-4-H

COMFAIR™	Speed	CWC	020-4P	030-4P	040-4P	050-4P	070-4P	090-4P
Nominal air flow	Min	m³/h	405	400	553	650	987	1126
	Med		510	517	590	791	1164	1323
	Max		601	598	779	920	1342	1569
Sensible cooling capacity	Min	kW	1,42	1,8	2,25	2,68	4	5
	Med		1,59	2,02	2,59	3,10	4,52	5,61
	Max		1,77	2,25	2,88	3,45	5,01	6,24
Total cooling capacity	Min	kW	1,62	2,18	2,64	3,4	4,98	6,31
	Med		1,83	2,46	2,99	3,87	5,55	7,11
	Max		2,03	2,73	3,27	4,25	6,06	7,89
Heating capacity	Min	kW	1,17	1,74	2,69	3,53	5,67	5,89
	Med		1,28	1,92	2,99	4,01	6,24	6,5
	Max		1,51	2,26	3,25	4,41	6,75	7,65
Pressure drop cooling circuit	Min	kPa	8,6	22	18,3	24,5	12,9	18
	Med		11	25	22,8	30,8	15,7	21,9
	Max		13,5	33	27	36,5	18,4	25
Pressure drop heating circuit	Min	kPa	1,8	5,7	24,9	25,4	19,8	16,3
	Med		1,9	7,3	30,2	32	23,4	17,2
	Max		2,6	9,4	34,9	38	27	25,6
Fan absorbed power	Min	kW	0,037	0,036	0,054	0,066	0,108	0,132
	Med		0,045	0,045	0,059	0,071	0,118	0,142
	Max		0,052	0,051	0,066	0,082	0,132	0,164
Sound power level dBA	Min	dBA	41	40	47	53	52	56
	Med		47	46	52	56	56	60
	Max		51	50	56	62	60	64

QUANTUM™ M - High static uncased fan coil unit

Program: FCP-2-C

QUANTUM™ M	Speed	QMLC	10A3-	10A4-	10A5-	20A3-	20A4-	20A5-	30A3-	30A4-	30A5-
Airflow	2	m³/h	300			450			510		
	3		400			620			680		
	4		480			780			845		
Sensible cooling capacity / Available static pressure	2	kW	1,34/30	1,53/30	1,76/30	2,05/30	2,31/30	2,65/30	2,48/30	2,76/30	3,10/30
	3		1,66/50	1,93/50	2,30/50	2,62/50	3,00/50	3,50/50	3,11/50	3,50/50	4,00/50
	4		1,90/75	2,20/75	2,70/75	3,09/75	3,60/75	4,25/75	3,66/75	4,20/75	4,85/75
Total cooling capacity	2	kW	1,9	2,3	2,7	2,96	3,4	4,1	3,6	4,1	4,8
	3		2,3	2,8	3,4	3,6	4,3	5,3	4,52	5,2	6,19
	4		2,6	3,2	4	4,28	5,1	6,4	5,2	6,1	7,42
Water pressure drop	2	kPa	10,2	15,8	30,5	10,8	17	25,2	19,4	29,7	45
	3		13,2	24,7	47,2	16,1	26,2	40,9	28,4	44,6	70,9
	4		18	33,6	61,7	21,2	35	57	37,3	59,8	98,6
Fan absorbed power	2	kW	0,12			0,23			0,24		
	3		0,14			0,29			0,27		
	4		0,17			0,3			0,32		
Sound power level for indoor unit	2	dB(A)	49			51			48		
	3		49			55			53		
	4		55			58			55		
Sound power level for outdoor unit	2	dB(A)	49			55			51		
	3		55			60			57		
	4		62			62			58		

QUANTUM™ M - High static uncased fan coil unit

Program: FCP-2-H

QUANTUM™ M	Speed	QMLC	10A3-	10A4-	10A5-	20A3-	20A4-	20A5-	30A3-	30A4-	30A5-
Airflow	2	m³/h	300			450			510		
	3		400			620			680		
	4		480			780			845		
Sensible cooling capacity / Available static pressure	2	kW	1,34/30	1,53/30	1,76/30	2,05/30	2,31/30	2,65/30	2,48/30	2,76/30	3,10/30
	3		1,66/50	1,93/50	2,30/50	2,62/50	3,00/50	3,50/50	3,11/50	3,50/50	4,00/50
	4		1,90/75	2,20/75	2,70/75	3,09/75	3,60/75	4,25/75	3,66/75	4,20/75	4,85/75
Total cooling capacity	2	kW	1,9	2,3	2,7	2,96	3,4	4,1	3,6	4,1	4,8
	3		2,3	2,8	3,4	3,6	4,3	5,3	4,52	5,2	6,19
	4		2,6	3,2	4	4,28	5,1	6,4	5,2	6,1	7,42
Water pressure drop - Cooling	2	kPa	10,2	15,8	30,5	10,8	17	25,2	19,4	29,7	45
	3		13,2	24,7	47,2	16,1	26,2	40,9	28,4	44,6	70,9
	4		18	33,6	61,7	21,2	35	57	37,3	59,8	98,6
Heating capacity	2	kW	2,33	2,6	2,89	3,54	3,92	4,34	4,19	4,59	4,99
	3		2,91	3,31	3,77	4,56	5,13	5,84	5,3	5,88	6,54
	4		3,34	3,94	4,45	5,43	6,18	7,17	6,29	7,05	7,99
Water pressure drop - Heating	2	kPa	12,5	19,6	29,1	13	18,7	26,1	21,4	30,4	41,4
	3		18,8	30,4	47	20,7	30,5	44,8	32,9	47,7	67,6
	4		24,1	39,7	63,4	28,4	42,9	65,2	44,9	66,5	97,3
Voltage	-	V / Ph / Hz	230/1/50								
Fan absorbed power	2	kW	0,12			0,23			0,24		
	3		0,14			0,29			0,27		
	4		0,17			0,3			0,32		
Sound power level for indoor unit	2	dB(A)	49			51			48		
	3		49			55			53		
	4		55			58			55		
Sound power level for outdoor unit	2	dB(A)	49			55			51		
	3		55			60			57		
	4		62			62			58		

QUANTUM™ M - High static uncased fan coil unit

Program: FCP-4-H

QUANTUM™ M	Speed	QMLC	10A31	10A41	10A51	20A31	20A41	20A51	30A31	30A41	30A51
Airflow	2	m³/h	300			450			510		
	3		400			620			680		
	4		480			780			845		
Sensible cooling capacity / Available static pressure	2	kW	1,34/30	1,53/30	1,76/30	2,05/30	2,31/30	2,65/30	2,48/30	2,76/30	3,10/30
	3		1,66/50	1,93/50	2,30/50	2,62/50	3,00/50	3,50/50	3,11/50	3,50/50	4,00/50
	4		1,90/75	2,20/75	2,70/75	3,09/75	3,60/75	4,25/75	3,66/75	4,20/75	4,85/75
Total cooling capacity	2	kW	1,9	2,3	2,7	2,96	3,4	4,1	3,6	4,1	4,8
	3		2,3	2,8	3,4	3,6	4,3	5,3	4,52	5,2	6,19
	4		2,6	3,2	4	4,28	5,1	6,4	5,2	6,1	7,42
Heating capacity	2	kW	1,38		1,7	1,77		2,69	2,69		2,92
	3		1,65		2,05	2,08		3,32	3,24		3,5
	4		1,84		2,28	2,36		3,8	3,71		3,93
Water pressure drop - Cooling	2	kPa	10,2	15,8	30,5	10,8	17	25,2	19,4	29,7	45
	3		13,2	24,7	47,2	16,1	26,2	40,9	28,4	44,6	70,9
	4		18	33,6	61,7	21,2	35	57	37,3	59,8	98,6
Water pressure drop - Heating	2	kPa	2,43		3,55	3,83		10,7	13,2		12,4
	3		3,37		4,97	5,14		15,6	18,4		17,3
	4		4,09		6,06	6,43		20	23,6		21,1
Fan absorbed power	2	kW	0,12			0,23			0,24		
	3		0,14			0,29			0,27		
	4		0,17			0,3			0,32		
Sound power level for indoor unit	2	dB(A)	49			51			48		
	3		49			55			53		
	4		55			58			55		
Sound power level for outdoor unit	2	dB(A)	49			55			51		
	3		55			60			57		
	4		62			62			58		

General information

Providing indoor climate comfort

Acoustic data

Power level and pressure level

Noise is generated by a moving body: thus we can use a concept of mechanical pressure expressed in watts. The noise is compared to a reference value of 10-12 watts, using the following formula:

Lw = 10 x Log (W emitted / W reference)

We can therefore speak of the **pressure level**.

The noise striking the ear or a measuring instrument is a vibration of the air, in other words a pressure variation, expressed in Pa. This can also be described by comparing it to a reference value of 2.10^{-5} Pa by means of the following formula:

Lp = 20 x Log (P emitted / P reference)

NOTE : In these two equations, we have ratios of numbers expressed in the same units, i.e. dimensionless numbers. In this particular case, the result is expressed in decibels (dB).

The spectrum

31,5	63	125	250	500	1000	2000	4000	8000	16000
	1ère	2e	3e	4e	5e	6e	7e	8e	
SEVERE				MEDIUM			ACUTE		

In practice, a noise always consists of a multiplicity of noises emitted at different frequencies. On average, the human ear perceives frequencies from 20 to 16000 Hz with greater or lesser acuity. It is useful to describe noise in terms of a frequency bands. The frequency range of the human ear is therefore divided into 10 bands of octaves (a frequency octave extends from one frequency, f, to 2f.
Example: from 320 to 640 Hz). These octave bands are named according to their average frequency.

Weighting

To give more importance to the auditory disturbance than to the physical measurement, weightings have been determined by experimental methods. These values are classed according to the three following filters:

Frequencies	63	125	250	500	1000	2000	4000	8000
Filter A: Values below 55 dB"	26,2	-16,1	-8,6	-3,2	0	1,2	1	-1,1
Filter B: Values from 55 dB to 85 dB"	-9,3	-4,2	-1,3	-0,3	0	-0,1	-0,7	-2,9
Filter C: Values above 85 dB"	-0,8	-0,2	0	0	0	-0,2	-0,8	-3

NOTE : Filter A is the most commonly used filter. Note that dB and dBlin are sound levels without weighting, and dBA, dBB and dBC are weighted sound levels.

A chart called the ISO disturbance index, or noise rating (NR), is also used. The ISO or NR level is defined as the nominal value of the curve at 1000 Hz (there is also an NC index, a chart similar to the NR one but with the nominal value at 1500 Hz).

IMPORTANT : All logarithms shown in this document are common (base 10) logarithms.

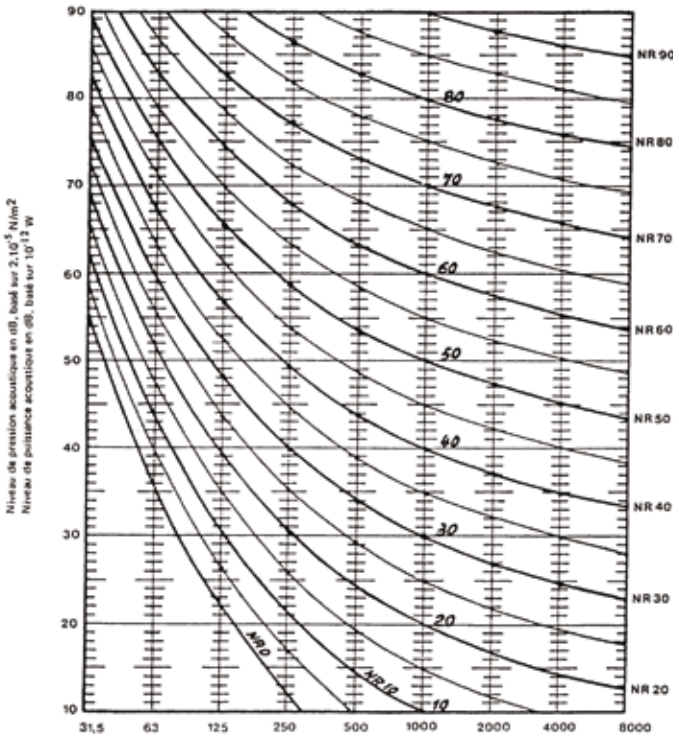


Fig. 3 Indice d'évaluation ISO du niveau de gêne

Free air or free field noise diffusion

In the theoretical case of a source emitting in all directions in space without obstacles, the pressure waves are propagated in concentric spheres like circles made by throwing a pebble into water. When a wave reaches you, its energy is distributed over the surface of a sphere whose radius is the distance between you and the source. Thus we can derive the following equation:

$$Lp = Lw + 10 \times \text{Log } Q / (4 \times \pi \times r^2)$$

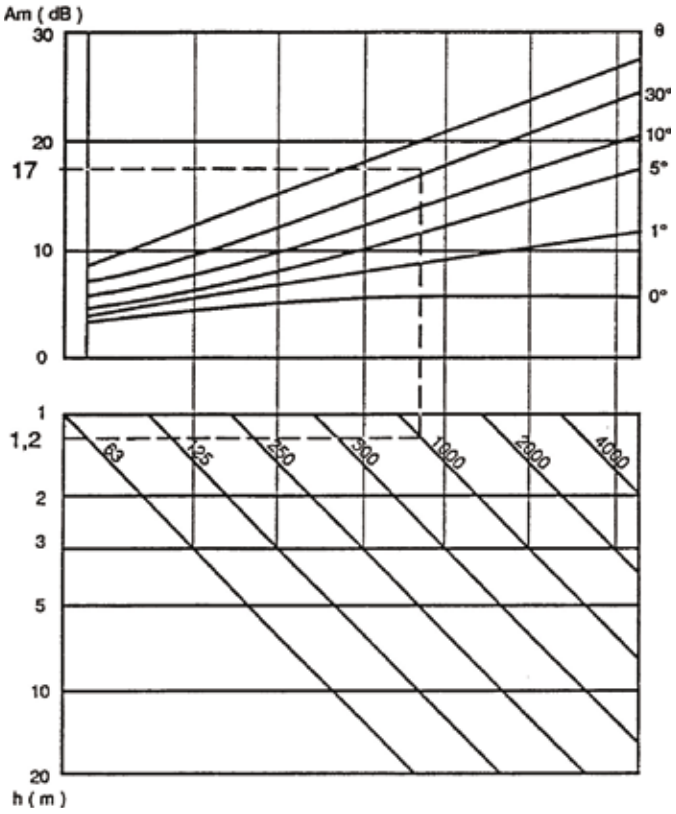
The term **Q** is called the directivity factor.
Its value is:
1 when the source is in space, emitting in a complete sphere
2 for a source on the ground, i.e. emitting in a hemisphere
4 if the source is on a wall, emitting in a quarter of a sphere
8 for a source located in a corner of a wall, emitting in an eighth of a sphere

Free air or noise diffusion with an obstacle

We can use the general diffusion equation shown above:

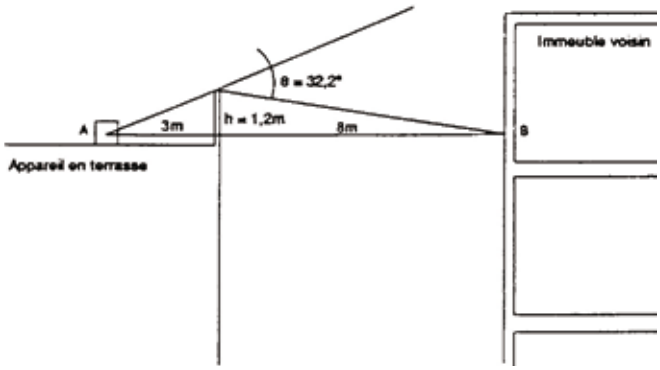
$$Lp = Lw + 10 \times \text{Log } Q / (4 \times \pi \times r^2) - Am$$

with the addition of the term Am, which is the attenuation created by the obstacle.



Examples :

A unit installed in a raised position with a power level of 77 dB at 1000 Hz :



1. Perceived pressure level in B if there were no obstacles:

Lp = 77 - 8 - 20 Log (3 + 8) = **48 dB**

2. Perceived pressure level in B, allowing for the obstacle: Am according to the chart = 17

Lp = 77 - 8 - 20 Log (3 + 8) -17 = **31 dB**

Diffusion of noise in an enclosed space

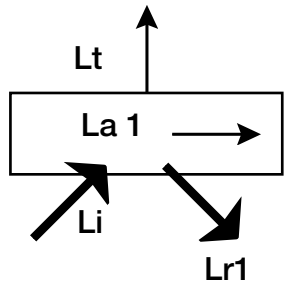
When a noise is emitted in a room, we perceive a pressure wave which comes to us directly from the source as in the free field case, but we also perceive waves reflected by the walls of the room.

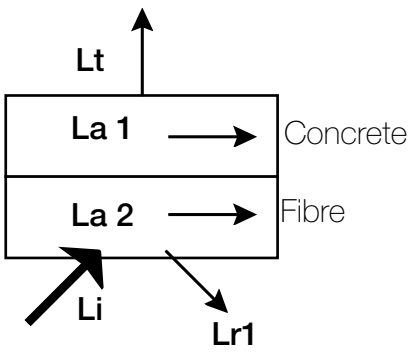
Wave reflection

When a wave strikes a wall (Ii), then, in simplified terms, part of the energy is transmitted through the wall (It), another part of the energy is absorbed by the wall, and the final part is reflected into the room.

In the example shown opposite, we see that, for a given incident wave Ii, the transmitted It varies very little according to whether the wall is lined or not. The energy transmitted is a function of the mass of the wall; since the absorbent lining (glass wool for example) has a low density with respect to concrete, It is affected only slightly.

Conversely, we note that the absorbed energy is much greater in the fibre. In this case, the energy is expended on moving the air molecules trapped in the material.





Absorption capacity of a surface

Examples of absorption coefficients:

Frequency	125	250	500	1000	2000	4000
Concrete wall	0,01	0,01	0,01	0,01	0,02	0,02
Mineral wool, 25 mm	0,09	0,23	0,56	0,72	0,75	0,77

If the incident wave has a value of 1 and the material absorbs α, the reflected wave is 1 - α.

α is the absorption coefficient of the material. It is a dimensionless number in the range from 0 to 1, defined by the frequency.

The absorption capacity of a surface is :

$$A = S \cdot \alpha$$

S in m^2

A in m^2 Sabine

For a room:

$$A = \Sigma Si \cdot \alpha i$$

Constant r of a room

$$\alpha_m = \Sigma Si \cdot \alpha i / \Sigma Si = A / S$$

$$R = S \cdot \alpha_m / (1 - \alpha_m)$$

Reverberation time of a room

When noise emission is stopped abruptly in a room, the sound takes a certain time to decay. The time taken by the sound to decrease by 60 dB is called the reverberation time of the room.

Some examples of reverberation time in seconds::

Concert hall : 1 to 2
Meeting room : 0.5 to 1.5
Hotel room : 1
Church : 2 to 7
Swimming pool : 1.5 to 4

The following formula, for guidance only, relates the reverberation time to the room characteristic:

$$T = 0,16 \cdot V / A$$

Having examined the diffusion of a noise in a free field and the reverberation in a room, we obtain the following general formula:

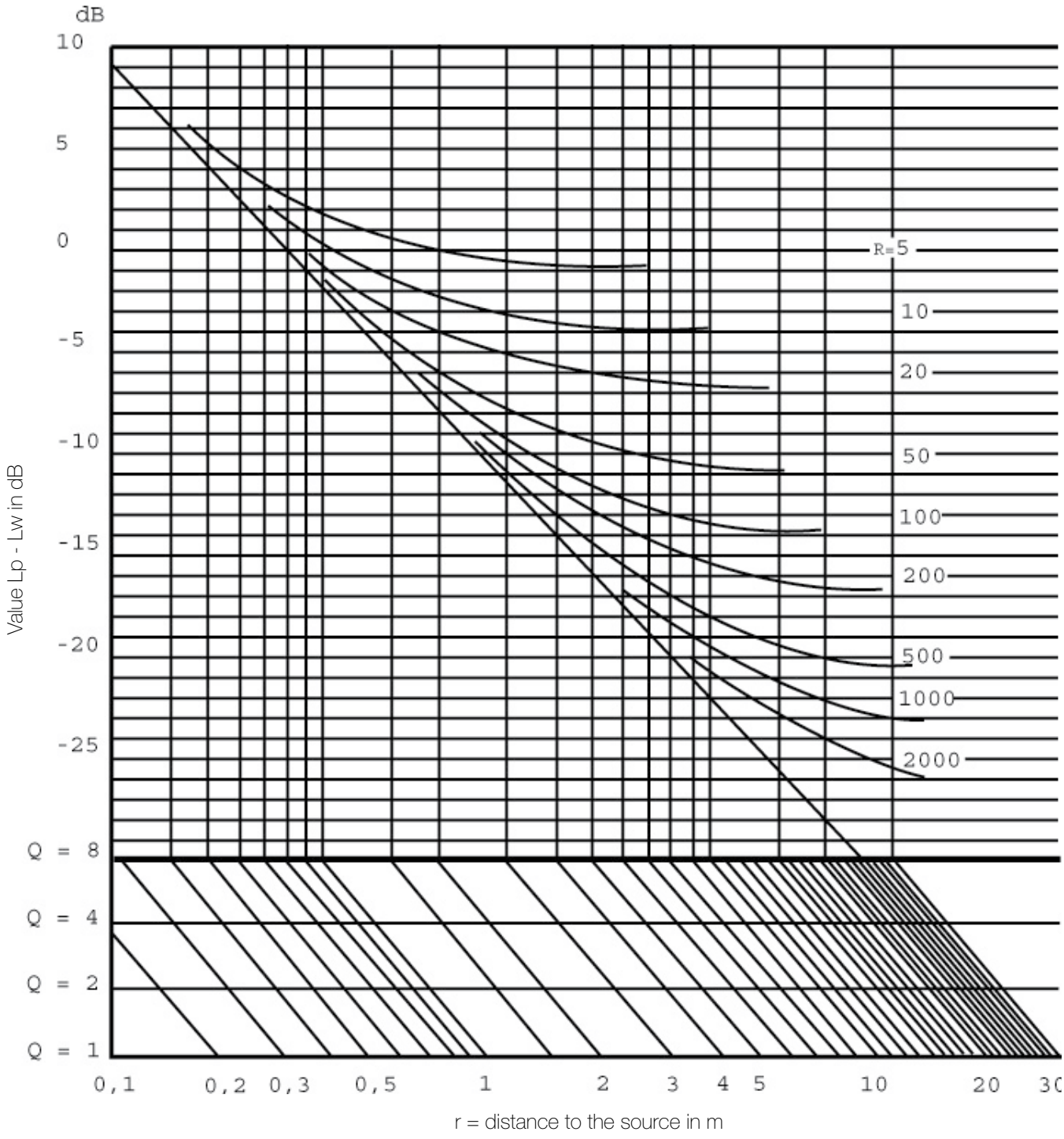
$$Lp = Lw + 10 \text{ Log } (Q / (4 \times \pi \times r^2) + 4 / R)$$

NOTA:

$Q / 4 \pi r^2$ represents the direct field
$4 / R$ represents the reflected field

Graphic expression of the equation

$Lp = Lw + 10 \text{ Log } (Q / (4 \times \pi \times r^2) + 4 / R)$



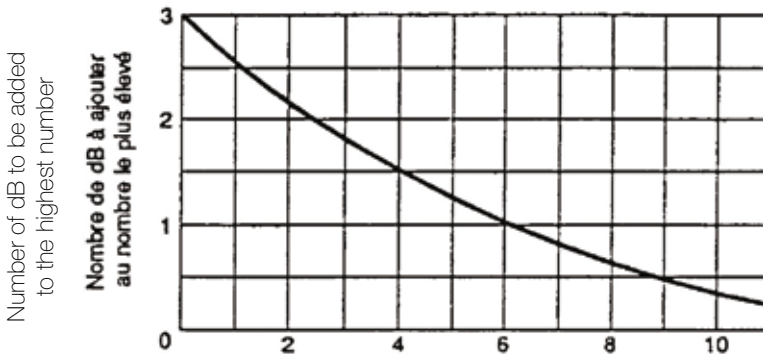
The attenuation decreases with distance in the direct field, but is constant in the reflected field.

Overall level - combination of a number of noises

Since decibels are not added in an arithmetical way, the following formula is used to find the overall level of a number of simultaneous noises :

$Lp = 10 \times \text{Log} \sum 10^{(Lpi / 10)}$

In practice, the following curve is used:

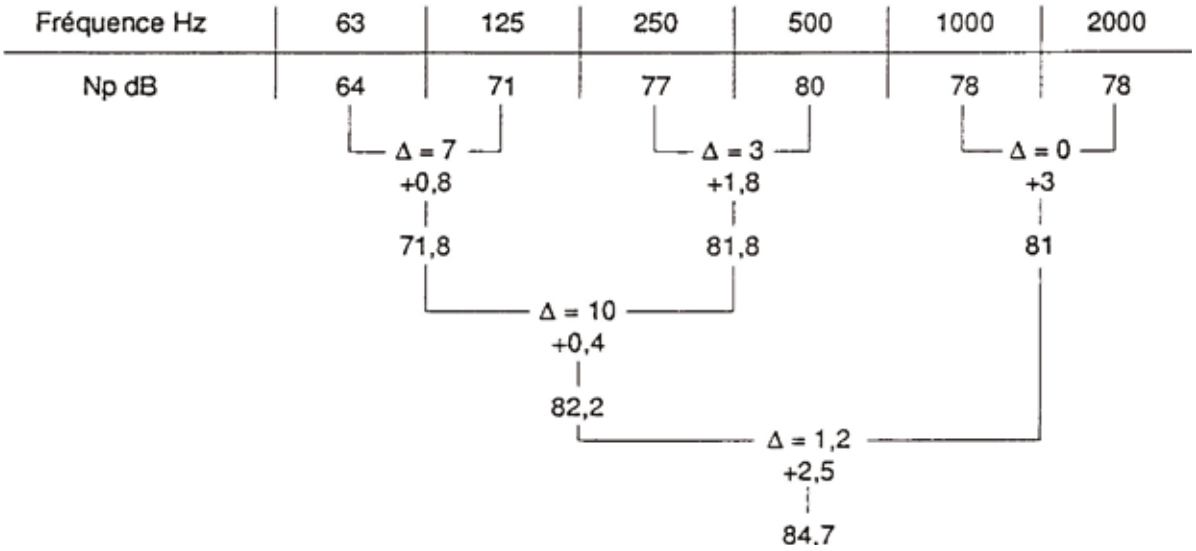


Difference between the 2 sound levels to be composed

In the case of a number of noise sources having the same value:

Lp = Lpi + 10 x Log (number of sources)

Example :



I.e. an overall power level of 85 dB.

Air filtration

Efficiency of air filters: standards

The efficiency of filters is currently evaluated by methods based on very different principles. In the ASHRAE method, the «gravimetric» section relates to the volume of synthetic particles retained by the filter, while the «opacimetric» section relates to the projected surface of the natural particles retained. Most of the ASHRAE 52/76 method has been incorporated in the standard NF EN779 (X 44-012) which also includes the essentials of Eurovent recommendation 4/5. This standard classifies filters on the basis of 0.3 µm particles The NF X 44-013 (ClNa-flame photometry) and NF X 44-011 (fluorescence) standards should also be mentioned. The NF EN 1822 (X 44-014) is based on a measurement of the «most penetrating particle size» (MPPS).

The main standards currently used in Europe are produced by:

- AFNOR (France)
- ASHRAE (USA) (American Society of Heating Refrigerating and Air conditioning Engineers)
- EUROVENT (European Committee of Air Handling and Refrigerating Equipment Manufacturers)
- CEN (European Committee for Standardization)
- Mil. Standard (American military standards)

Cen european standards

In the European Union, air filters are divided «for administrative purposes» into 17 efficiency classes, as follows:

Air filters used in general ventilation NF EN 779 (X 44-012): Table 1

The test procedure for air filters used in general ventilation is based on the procedure established twenty years ago by ASHRAE (ASHRAE 52/76), later adopted as a Eurovent Recommendation (Eurovent 4/5), and on AFNOR NF EN 779 (X 44-012), differing only in certain details.

The filters are subjected to two types of test:

Gravimetric test : Standardized dust is injected upstream of the filter; the proportion by weight retained by the filter is then determined by weighing.
The operation is conducted on a new filter, and then at different stages of clogging, using an accelerated clogging procedure. The accepted filter efficiency (Am) is the weighted mean efficiency calculated from the values found at different stages of clogging up to a final pressure drop of 250 Pa.

Notes:

1. The filter does not operate in normal conditions (accelerated clogging, concentrations by weight 700 times greater than atmospheric concentrations, test dust composition not representing the aerosol present in the atmosphere).

2. It is not possible to translate this weight-based (gravimetric) efficiency, measured with a synthetic dust, into spectral efficiency (Eurovent 4/9).

3. The displayed efficiency value (Am) is greater than the initial efficiency found with a new filter.

Opacimetric test : Atmospheric air is used as the aerosol. The dust levels upstream and downstream of the filters is found by the dust spot method by sucking the air through a pad of very high efficiency white filter paper The degrees of darkening upstream and downstream are compared by the opacimetric method and from this the «atmospheric dust spot efficiency» (opacimetric efficiency) of the filter is determined.

The operation is conducted on a new filter, and then at different stages of clogging, using an accelerated clogging procedure.

The accepted filter efficiency (Em) is the weighted mean efficiency calculated from the values found at different stages of clogging up to a final pressure drop of 450 Pa.

Notes :

1. The filter does not operate in normal conditions (accelerated clogging)

2. This opacimetric efficiency cannot be translated into spectral efficiency (Eurovent 4/9).

3. The displayed efficiency value (Em) is a mean value weighted for clogging, and is therefore greater than the initial efficiency found with a new filter.

Table 1 : Efficiency classification of air filters used in general ventilation according to the measurement method described in Eurovent recommendation 4/5. To permit accurate comparison and choice, the test characteristics (air flow in m3/hr, final pressure drop in Pa) must always be shown with the class of a filter.

LIMITS OF FILTER CLASSES			
Filter class	**Gravimetric efficiency mean Am (%)**	**Opacimetric efficiency mean Em (%)**	**Corresponding to NF EN779 (X 44-012)**
EU1	Am < 65	/	(G1)
EU2	65 < or = Am < 80	/	(G2)
EU3	80 < or = Am < 90	/	(G3)
EU4	90 < or = Am	/	(G4)
EU5	/	40 < or = Em < 60	(F5)
EU6	/	60 < or = Em 80	(F6)
EU7	/	80 < or = Em < 90	(F7)
EU8	/	90 < or = Em < 95	(F8)
EU9	/	95 < or = Em	(F9)

Very high efficiency air filters NF EN 1822 (X 44-014): Table 2

This standard has two essential features:

- The emphasis is placed on the determination of efficiency ratings in the least favourable conditions: in the new filter and for the most penetrating particle size (between 0.1 and 0.2 µm), known as the MPPS.

- The maximum local "leakage" (maximum local penetration) is quantified for filter classes equal to or above H13.
  For classes H13 and H14, the integrity of the filter can be checked by a leakage test of the "smoke test" type.

It should be noted that the references HEPA and ULPA shown here do not correspond to the American definitions used previously.
These classifications are related to standardized test methods and procedures, designed to quantify the purifying capacity of filters to a certain extent.
All these test methods are based on a very simple procedure: the filters to be tested are placed in an airstream set to their operating flow rate (nominal flow); a specified test aerosol is injected upstream; individual counts are carried out upstream and downstream; the quantity retained by the filters is deduced from the results.

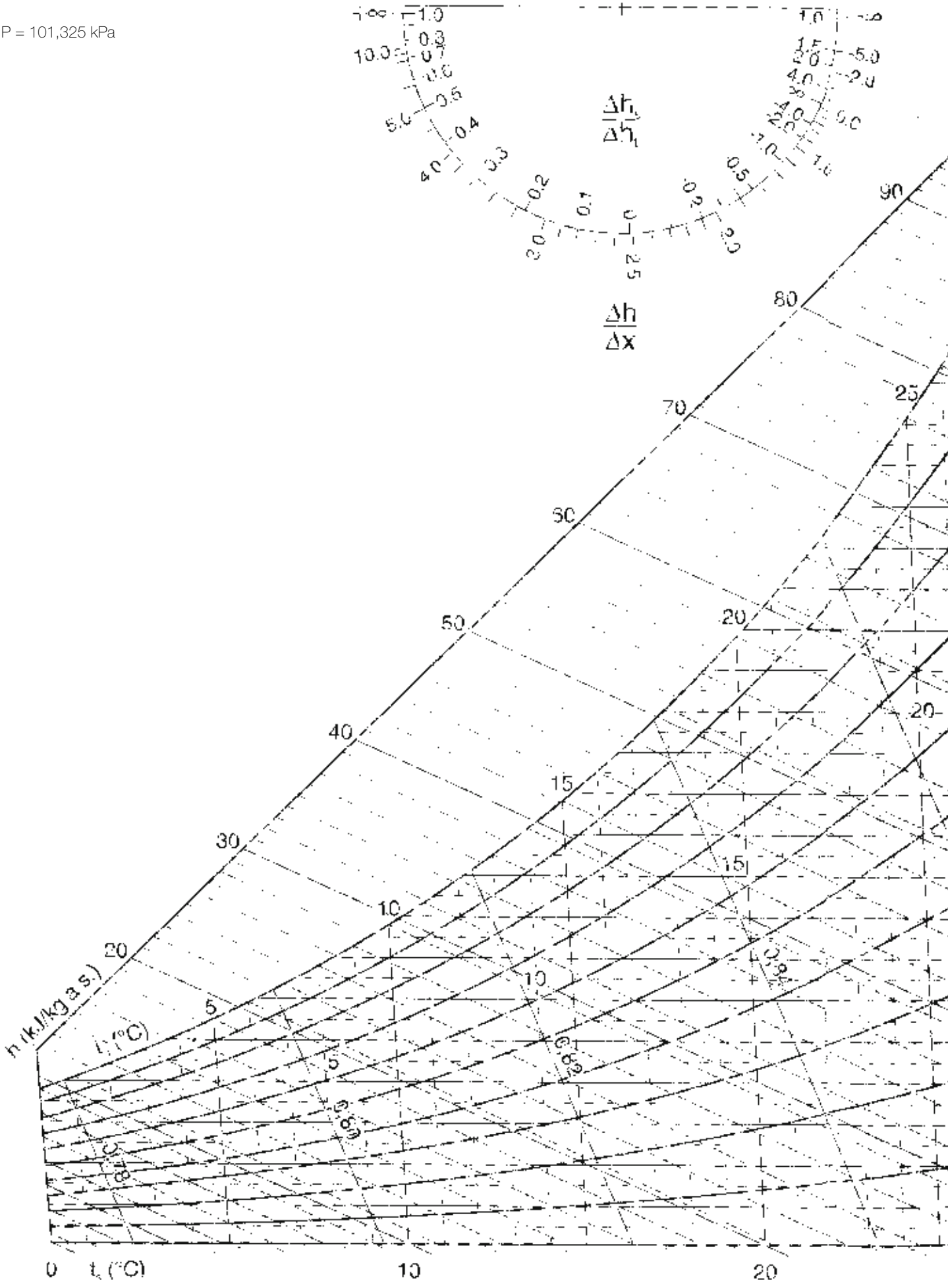
Table 2 : Classification of very high efficiency filters according to Eurovent recommendation 4/4.

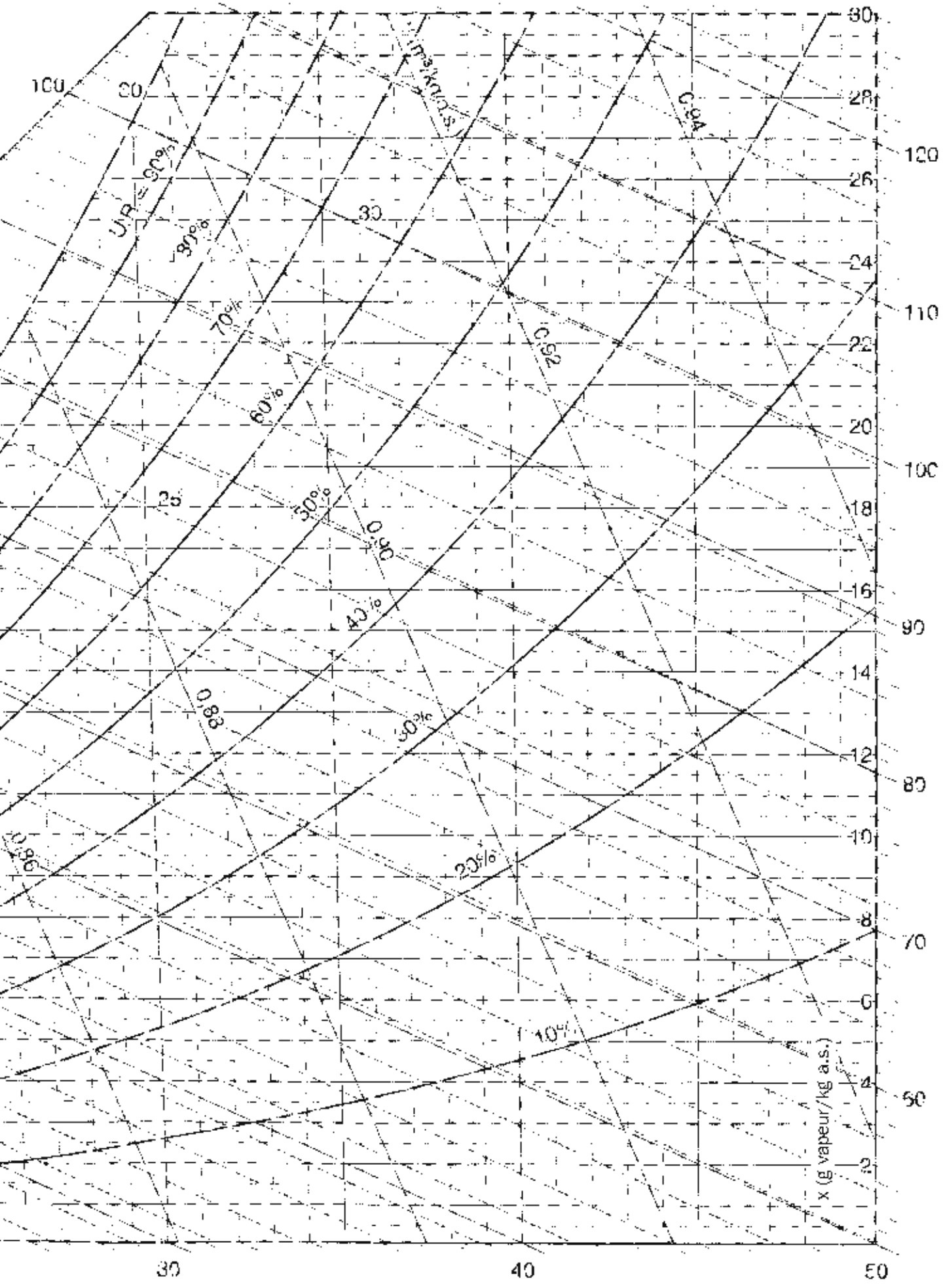
INITIAL EFFICIENCY		
Filter class	**Limits of filter classes**	
EU 10	95 < or = Ei < 99,9	5 > or = Pi > 0,1
EU 11	99,9 < or = < 99,97	0,1 > or = Pi > 0,03
EU 12	99,97 < or = Ei < 99,99	0,03 > or = Pi > 0,01
EU 13	99,99 < or = Ei < 99,999	0,01 > or = Pi > 0,001
EU 14	99,999 < or = Ei	0,001 > = Pi

These two pages on filtration summarize the information available in the guide «Climatisation et santé» [«Air Conditioning and Health»] produced by Uniclima, which has kindly allowed us to use it. For further information, you can obtain this publication from Editions Separ, 92 038 Paris la Défense cedex.

Psychrometric diagram

P = 101,325 kPa




UR = 90%
80%
70%
60%
50%
40%
30%
20%
10%
0,94
0,92
0,90
0,88
0,86
m³/kg a.s.
x (g vapeur/kg a.s.)
100
90
80
70
60
50
40
30
20
10
0
2
4
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28
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120
110
100
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25

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- Simulator for the programmed controllers in our range
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- A relaxation room for refreshments and meals.

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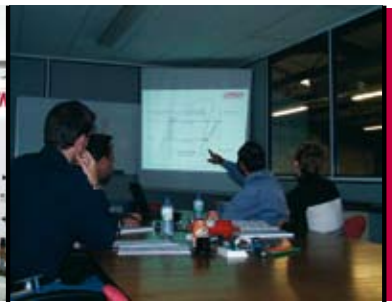

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