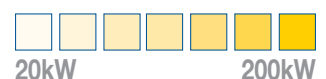




Ecolean™ Air to Water Liquid Chiller and Heat Pump

Energy efficiency acoustic performance



Ecolean™ Air to Water Liquid Chiller and Heat Pump Product Overview



The Ecolean™ delivers energy efficiency at full and partial load by the use of R410A multi scroll compressors and specific algorithms designed to reduce energy costs.

R410A, unequalled performance with reduced carbon footprint

The Ecolean™ is equipped with high performance cooling systems that protect the environment by the use of R410A multi scroll* compressors and an optimised heat exchange area.

- Reduced power input for improved COP
- Increased isentropic efficiency of the compressors
- Greater power efficiency than other HFC fluids
- Zero potential for destruction of the Ozone layer
- Very low refrigerant charge to limit environmental impact



Multi scroll* high performance compressors for optimum, long lasting efficiency

- Increased efficiency when operating at partial load.
- Increased relative heat exchange area while reducing power
- Intelligent defrost algorithm as standard (Dynamic™ defrost)



*Multi scroll from 47 kW to 200 kW.
Single scroll 25 to 43 kW.

Intelligent control that continuously optimises power consumption

With the 7 day time programming periods, Climatic™ control manages power consumption according to the use of the premises: automatic switching to occupation mode, unoccupied or frost-free, automatic water set point offset according to the outside air temperature.

Depending on the size of the installation, Climatic™ regulation can control from one to eight units in master/slave operation and provide communication with the technical department in the building or Lennox Adalink™ monitoring.

Depending on the desired communication protocol, the Ecolean™ can be fitted with a communication card

- ModBUS®
- LonWorks®
- BacNET®
- Adalink™



“eComfort™ eco-efficiency contribution by Lennox”



Ecolean™ Air to Water Liquid Chiller and Heat Pump Product Overview



One of the principle features of the Ecolean™ unit is an adjustable sound level for night and day to comply with the surrounding acoustic requirements.

Owlet™ fans and acoustic attenuation of compressor noise



“Owlet fan with profiled blades provides unequalled performance!”

The Ecolean™ is designed to achieve one of the lowest noise level on the market. The principal technological innovations are the new fan blades and scroll compressor operation. Usage of Owlet™ fans, together with acoustic insulation of the compressor housings, Ecolean™ has achieved acoustic performance that ensures compliance in the toughest environment.

The Ecolean™ is also designed to suit many varied applications and locations. For those locations that require ducting to be fitted to the condenser fans, there is a range of units designed with high static capacity fans specifically for these types of locations.

Low and super low noise versions (LN & SLN)

The Ecolean™ range includes two basic models: the standard (S) version mainly for outdoor installation and the high static pressure version (F) is mainly for indoor installations with an internal ducted installation.

Each standard Ecolean model is available in 3 main versions to match every customer need.

- **Standard version (S):**
This version features a standard efficiency unit with 2 speed fans.
- **Low noise version (LN):**
This version features quiet performance with an average reduction of -7 dB(A) obtained by the use of low speed fans and an insulated compressors.
- **Super low noise version (SLN):**
This is a very low noise version with an average reduction of -10 dB(A) owing to low speed fans and compressors insulated in a high performance acoustic housing.

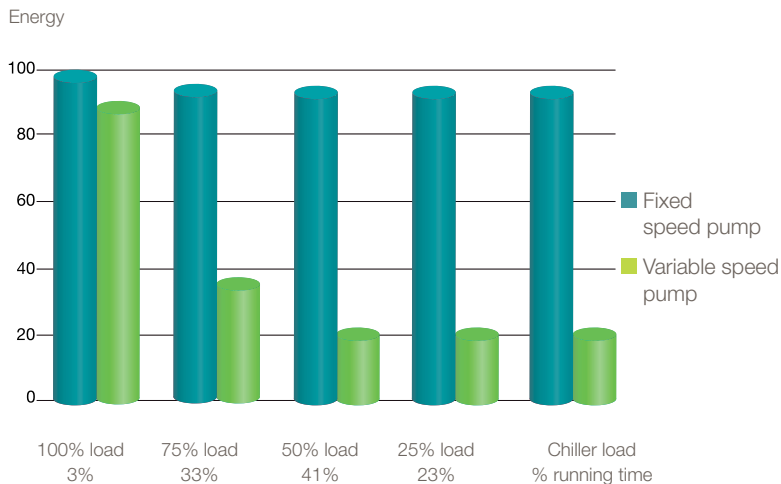


*European market study carried out in February 2011

Ecolean™ Air to Water Liquid Chiller and Heat Pump Product Overview



Pump energy consumption



“eDrive™: 70 % reduction of the annual pumping consumption”



The cost of pumping power represents more than 20% of the total energy cost

In a water system, the pump is one of the main energy consumption items. The energy cost of pumping can represent more than 20% of the total energy cost of a chiller. eDrive™ variable speed pump technology is part of the responses made by Lennox to save energy while exploring the possibilities of reducing installation costs.

The power consumption of the pump varies with the cube of the pump speed.

20% flow reduction = Power consumption reduced by 50%

40% flow reduction = Power consumption reduced by 80%

eDrive™ automatically controls energy costs

- At full load owing to electronic adjustment of the pump curve. Elimination of power losses caused by the manual water flow control valve.
- At partial load by automatically reducing the pump speed when operating at reduced chiller load.
- During shutdown periods of the cooler owing to operation of the pump at minimum speed.
- On starting owing to the speed controller which reduces the starting current pump.



Ecolean™ Air to Water Liquid Chiller and Heat Pump Product Overview



Lennox designed the Ecolean™ with a compact hydraulic module (Version HY). The machine also includes all the necessary hydraulic components: single pump (optional twin pumps), expansion tank, etc.



“Integrated pump, buffer tank with or without immersion heater in one of the most compact machines on the market!”

Ecolean™ with buffer tank (version HN)

A version with an additional buffer tank is available to increase the water volume of the system so as to avoid short cycles of the unit or for applications where maintenance of a precise water temperature is required. This tank also contributes to avoiding the effects of the heat pump defrost cycle, with heat from the tank being used for the heating circuit. As an option, immersion heaters can provide reduced power of the heat pump with a low ambient temperature.

The eDrive™ variable water flow reduces installation costs

Up to now, two types of hydraulic system were possible for liquid chillers: a “direct” constant flow circuit or a “decoupled” primary-secondary circuit with constant primary. The Ecolean™ fitted with optional eDrive™ now offers a 3rd possible choice: variable primary flow. A “direct” variable primary flow circuit is particularly beneficial in comparison with a “decoupled” primary-secondary circuit since the secondary pump and the costs incurred can be eliminated (pump, electrical power supply, hydraulic connections).

In addition, the flow control valve is eliminated since the pump is electronically adjusted to the actual requirements of the plant. These factors can considerably reduce the initial cost of installation. In comparison with a “direct” constant flow circuit, the “direct” variable primary flow circuit permits the use of 2-way instead of 3-way valves on the terminal units and thus contributes to reducing the cost of installation.

“Lennox eDrive™ variable primary water flow!”



Lennox variable speed pump



Lennox speed controller



Lennox control Algorithms
Constant delta P mode: terminal units with 2-way valves.

Optional eDrive™
Variable Primary Water Flow by Lennox.

Ecolean™

Air to Water Liquid Chiller and Heat Pump

Technical Information



Ecolean™		251	291	351	431	472	552	672	812	1003	1103	1203	1303	1403	1604	1804	2104
Cooling capacity ⁽¹⁾	kW	22	26	32	38	44	51	63	75	88	102	112	126	139	149	174	199
EER		2.9	2.8	2.8	2.8	2.7	2.8	2.8	2.8	2.8	2.9	2.8	2.8	2.8	2.7	2.9	2.8
Heating capacity ⁽²⁾	kW	24	28	34	38	48	55	68	76	95	108	118	130	143	159	180	205
COP		3.0	3.0	3.0	2.9	3.0	2.9	3.0	2.9	3.0	3.0	3.0	2.9	2.9	3.0	2.9	2.8
Length	mm	1195				1960				2250							
Width	mm	980				1195				1420				2300			
Height	mm	1616								2155				2250			
Operating Weight EAC	kg	238	246	263	292	470	482	518	562	640	809	938	990	1019	1328	1683	1703
Operating Weight EAR	kg	243	251	271	300	480	492	534	578	663	831	964	1016	1045	1347	1703	1723

Nominal conditions: (1) water 12/7°C, air 35°C
(2) water 40/45°C, air 7°C

Equipment	EAC (Cooling only)	EAR (Heat pump)
Scroll compressors, brazed plate heat exchanger, copper/aluminium condenser coil with epoxy coat, two-speed fans, R410A refrigerant, main switch, Climatic control, customer display, water filter protection grilles and all-season airflow controller.		Standard
Hydraulic module with single pump and expansion tank		HY Version
Hydraulic module with single pump, expansion tank and buffer tank		HN Version
Low speed fans and acoustic compressor jacket		LN Version
Low speed fans and high performance acoustic compressor housing		SLN version
e-Drive™ variable primary water flow	Option	Option
Twin pump	Option	Option
Electric water tank heaters	-	Option
Partial heat recovery	Option	Option
Acoustic compressor jacket (standard version only)	Option	Option
Evaporator anti-freeze heater	Option	Option
Low temperature operation down to -10°C (Glycol application)	Option	-
Cooling down to -15°C outside air temperature	Option	-
Anti-corrosion coil treatment	Option	Option
Electronic expansion valves	Option	Option
Electronic starter/Phase Controller	Option	Option
Remote display/Modbus/Bacnet/ Lonworks/Adalink™	Option	Option
Anti-vibration mounts	Option	Option





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