

LENNOX[®]

APPLICATION GUIDE



PROVIDING GLOBAL SYSTEM SOLUTIONS



Jan 2002

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Our products comply with the European standards.

Our company is a member of the Eurovent Certification Programme. The ECOLOGIC™ liquid chillers are listed in the Directory of Certified Products.

The manufacturing of ECOLOGIC™ chillers answers to ISO 9001 control quality system. A copy of the certificat can be get on request.



AFAQ N° 1993/1009b

The specifications and technical characteristics in this booklet are given for information purposes. The manufacturer reserves the right to modify them without prior notice or obligation to modify in a similar manner, the equipments previously supplied.

The new ECOLOGIC™ chiller range from 40 to 360 kW has been engineered and designed to meet the needs of our customers while minimising the Environmental impact.

LENNOX ECOLOGIC™ CHILLERS - ENGINEERED FOR FLEXIBILITY, ENVIRONMENTAL SENSITIVITY AND HIGH PERFORMANCE.

LENNOX ECOLOGIC™ Chillers are engineered for flexibility and with advanced environmental protection technology to accommodate the most demanding of industrial and commercial applications.

To meet your specific design requirements, LENNOX ECOLOGIC™ Chillers are semi-customized so you purchase what you need for your application.

LENNOX engineers have designed the ECOLOGIC™ Chillers to reduce negative impacts on the environment by incorporating green refrigerants, recyclable materials, intelligent control for lower energy consumption, and noise reduction technology.

Our company is a member of the Eurovent Certification Programme. Lennox chillers are Tested & Rated in accordance with Eurovent Certification Programme.



The LENNOX ECOLOGIC™ range utilises the latest technology in heat exchanger and compressor design, controls and materials. This enable LENNOX to offer a unique combination of packages and options meeting the needs of the users while significantly reducing the environmental impact. This is evident in the following characteristics :

- Use of ozone benign refrigerants as standard
- Option to use high efficiency machines
- Recycling of the applied materials
- Ability to reduce energy consumption upto 30% compared to traditional systems
- Minimising the refrigerant charge by using and plate heat exchangers
- Opportunity to reduce noise emission with the Low noise and super low noise versions

Unique design philosophy - Going green right from the drawing board

LENNOX's commitment to environmental responsibility is reflected in the re-engineering of our chillers and the development of the ECOLOGIC™ line.

These chillers maximize opportunities to reduce negative environmental impacts while maintaining exceptional performance :

Efficiency

LENNOX ECOLOGIC™ Chillers are engineered for high energy efficiency to reduce power consumption and thus contribute to lower CO2 generation at power supply sources.

Refrigerant



The LENNOX ECOLOGIC™ mid-range chillers are among the first to be designed specifically for high performance using a green refrigerant.

The LENNOX ECOLOGIC™ utilizes HFC 407C, a zero ozone depleting refrigerant, and requires minimum refrigerant charge.

Reduced leakage

Computer-aided design and pipe-bending technology permits fewer mechanical points in the refrigerant circuit. Refrigerant carrying tubes never touch any metal end or center supports.

This innovative condenser coil design significantly reduces refrigerant leakage caused by end plate chafing and reduces costs of refrigerant replacement, emergency service calls and unit downtime.

Intelligent control technology

The LENNOX ECOLOGIC™ line of chillers incorporates intelligent control with CLIMATIC control system.

- providing up to 30% savings in energy consumption at partial loads as well as at full load (with Climatic II).

With its predictive control logic, CLIMATIC™ II reduces compressor cycle times, reducing operating costs as well as noise pollution.

Acoustic treatment

Noise from vibration and machinery movement is aggressively addressed by the LENNOX ECOLOGIC™ line of chillers. Rotary compressors in most models minimize vibrational noise transmission. Advanced aerodynamic fan design insures quieter operation. Noise abatement can be further enhanced with LENNOX's economic noise reduction option.

Recyclable components



The ECOLOGIC™ Chiller is constructed from recyclable materials including sheet steel, plastics and copper. At the end of the unit's useful life (mini 10 years), the components can be recycled and the refrigerant recovered.

The LENNOX ECOLOGIC™ range is available as a chiller or condensing unit. All with a low profile and small installed footprint.

- Standard to provide LENNOX quality and value on a standard unit with the flexibility of multiple options.
- Standard plus for the same flexibility and value as the standard range but for operation at higher ambient.
- Low noise for those installations where acoustic requirements and value are paramount.
- High efficiency a range that is the bench mark for lowest operating costs.
- Super low noise when the chiller installation must have virtually no audible sound output.

Factory Testing

Factory testing of all the EcoLogic range means trouble free start ups. Each individual refrigerant circuit is pressure tested, evacuated and vacuum tested before being charged with refrigerant and oil. The system is then subject to a complete functional test via the Climatic controller that is self diagnostic on all its external sensors. The unit is then placed on the test stand and given a full operational run test to ensure that the unit is fully functional and operating correctly before leaving the factory. This detailed testing insures that the Climatic has the standard operating parameters, communication and control sequence are installed. All the electrical wiring and connections are checked, condenser fans and compressors are operated and checked. The refrigeration system operation is checked for the correct refrigerant charge, setting of the expansion valves and the operation of the safety and protection devices are fully functional. Each and every EcoLogic unit spends a minimum of two hours in the test stand. All options that are factory fitted are tested to insure that they operate correctly and any customer external connections such as flow switch or remote on/off are simulated. After testing and recording the operation the unit is then given a final refrigerant leak test before passing for cleaning and finishing. All the external components are given a final coat of a clear epoxy coating to help maintain the appearance and corrosion resistance of the complete chiller (optional).

ECOLOGIC™ AIR COOLED CHILLER RANGE FROM 80 TO 360 KW

The new LENNOX ECOLOGIC™ chiller range is made up of chillers packaged to meet the different market needs. Flexibility, performance and quality From LENNOX.

All the chillers are built with high quality construction and are fully tested in our test stand before packing and shipping. This assures you that when the unit arrives at your project you can simply hook up the power supply and chilled water connections and be ready to operate.

ECOLOGIC™ chillers are built using CENE guidelines to minimise refrigerant leakage potential and are part of the Eurovent chiller testing program.

ECOLOGIC™ chillers are available with option packages for TUV & STEK certification.

- The standard unit is a range of chillers that provides cooling at the lowest first cost.
- The Standard Plus is the standard unit with the addition of high performance condenser fans this allows the unit to operate at full load in ambients above 35°C the nominal limit of the unit at full load capacity is 42°C. Apart from the addition of the higher performance fan the unit is identical to the STANDARD unit. The power absorbed will increase and the sound level will be slightly higher. This unit is intended for use in Southern European applications.
- A low noise range that uses the basic platform but is enhanced with features to reduce the external sound level
- Where a customer requires the lowest operating costs then select from the ECOLOGIC™ HIGH Efficiency range of units engineered to provide the highest COP, which in turn gives the lowest operating costs.
- For those applications that demand the lowest sound levels then the ECOLOGIC™ Super low noise chiller range is there to meet your needs. This range of units breaks new ground using the latest technology and materials to give the minimum audible sound emissions.

The LENNOX ECOLOGIC™ chiller range features High efficiency fully hermetic scroll compressors through out. This offer the benefits of high-energy efficiency, low noise and vibration partnered with the high reliability levels expected from LENNOX products. The scroll compressors are utilised in multiple refrigerant circuits that further enhances the reliability of this chiller range.

The LENNOX ECOLOGIC™ chiller range uses plate heat exchanger technology to maximise the thermodynamic properties of HFC refrigerants. When used with HFC407C the plate heat exchangers have a better performance than similar shell and tube evaporators and also benefit from the impact of the refrigerant glide.

The use of plate heat exchangers and multiple compressors on dual refrigerant circuits make these chillers excellent performers when operating under part load conditions.

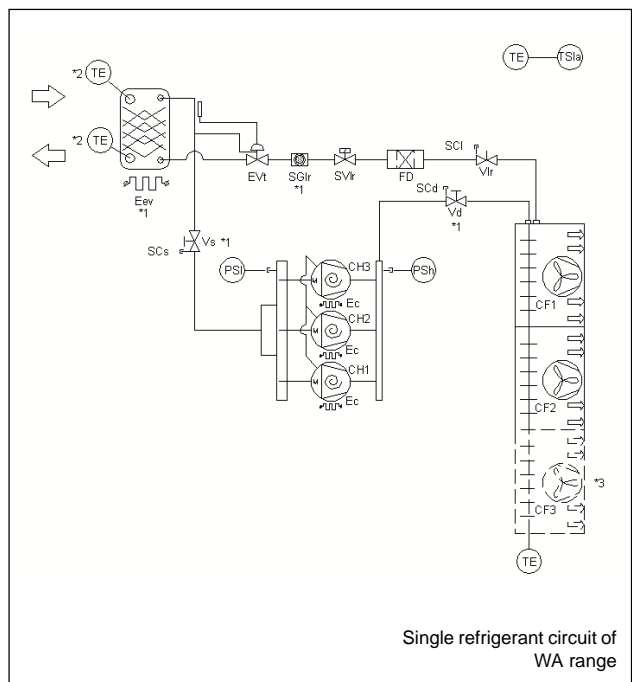
The LENNOX ECOLOGIC™ units feature multiple option packages that can be added to the basic chiller platforms to insure that the chiller matches the users needs.



Ecologic



Ecologic



Single refrigerant circuit of WA range

Multiple control platforms are available from the compact advance microprocessor digital display unit up to the full LCD graphic display and diagnostic package. All the control platforms are able to communicate with each other to form a network or with a BMS system. Controls can communicate both locally or remotely to service centres to insure trouble free operation and the possibility of preventive intervention.

The STD, STD Plus, LN, SLN & HA units all come supplied with the standard microprocessor controller. This gives the information via a digital screen display for the operation, chilled water temperature and alarm conditions. The controller can be scrolled through various menu modes for both reading and to set operating parameters. Full details are in the specification listed at the back of this catalogue.

There is the option for this controller of a remote display screen.

The High Efficiency unit (HE) and SLN comes with the advanced microprocessor controller (Climatic II) that is fitted digital interface (KP02) as standard with a LCD graphic display screen (KP07) as option. This has additional functionality and information reporting of all the operating conditions on the system both pressure and temperature. The full details are in the specification at the back of this catalogue.

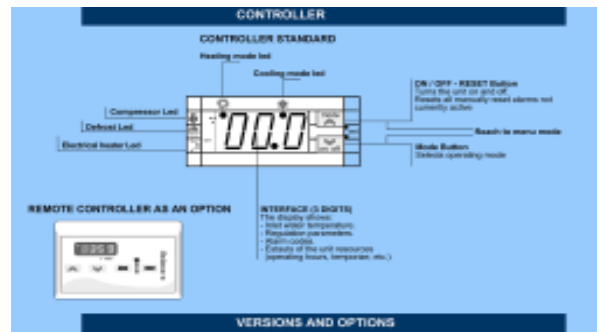
This is available as an option on the STD, STD Plus, LN, SLN & HA units to replace the standard microprocessor with more sophisticated controller with a full visual display, which is unique to Lennox. At a glance all the operating conditions of the unit can be seen on one screen, which is ideal for operators and service personal.

Additional options can be applied to the Climatic II advanced microprocessor to have remote control and display upto 1km of cable away from the units. To have a remote sequence panel to control and sequence upto 8 identical chillers. This controller can also fully interface with most major BMS systems via a J bus interface communications card available as a further option.

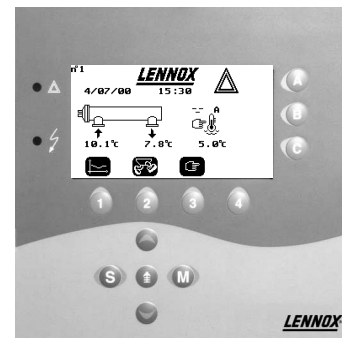
The LENNOX ECOLOGIC™ chillers come with options designed to meet the challenges faced by engineers owners and installers. In installations where electrical power consumption and maximum inrush currents represent a problem. The ECOLOGIC™ range has options such as soft start on the compressors significantly reducing current drawn on start up. Other options can be added to further reduce running costs to the already High COP on the High efficiency units.

Options are available to allow the chiller to operate down to -18°C complete with anti freeze protection on the evaporator and hydraulic module if selected.

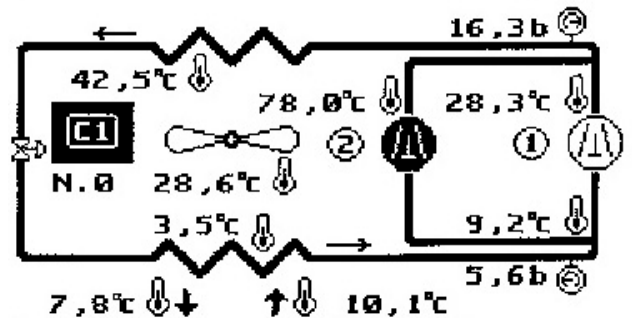
It is possible to have the full chilled water hydraulic package consisting of, pumps, expansion vessel, relief valve vent and fill points together with isolation valves integral with in the basic chiller footprint. A buffer tank is integral up to WA150D and available as a stand alone option on the rest of the range.



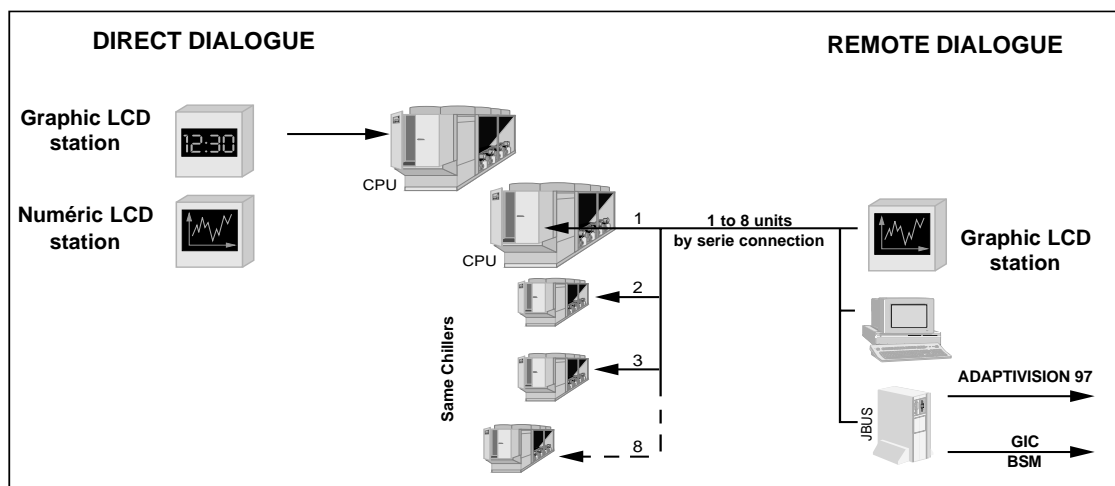
Standard Controller



Climatic II KP07



KP07 display



Description of the different versions

STANDARD

The Ecologic Standard range of Air cooled helical rotary scroll chillers from LENNOX bring to specifiers, owners and operators performance and reliability in a compact package.

The Ecologic standard range consists of 9 units with a capacity from 80 to 370kW. This range of units is intended to offer the lowest cost per kW cooling solution. It will operate up to a nominal ambient limit of 35°C with the basic condenser fan. The Standard unit uses all the basic components of the ECOLOGIC range. Scroll compressors in single or on larger units dual refrigerant circuits. A single plate heat exchanger, Cu/Al air cooled condenser, mechanical thermal expansion valve, solenoid stop valve, brazed refrigerant drier and liquid line isolation and charging valve. The control and power sections are mounted in a single wardrobe weatherproof panel, all the compressor and condenser fan power supplies are individually fitted with thermal overloads. The three phase power and earth connections is via a low level gland plate and connects to a fused thermal overload ensuring complete discrimination. The unit provided with our basic microprocessor controller as the standard. The frame and base are galvanised and the external sheet metal surfaces are fully painted with Epoxy paint to RAL9002. The evaporator includes a drain, and is insulated with 13 mm (1/2 inch) (K-0.26) fire classification M1. This unit is intended to be used in Central and Northern European applications. The Ecologic standard range has a large number of customer configurable options to meet the local legislative requirements and specific customer needs.

STANDARD PLUS

The Standard Plus is the standard unit with the addition of high performance condenser fans this allows the unit to operate at full load in ambients above 35°C the nominal limit of the unit at full load capacity is 42°C. Apart from the addition of the higher performance fan the unit is identical to the STANDARD unit. The sound level will be slightly higher. This unit is intended for use in Southern European applications.

LOW NOISE LN

The Ecologic Low Noise range of units uses the same range of Quality components that are utilised in the Standard range previously detailed. In addition the Low Noise range uses larger condenser surface with low speed fans to achieve similar capacity range as the Standard units. The already low noise rotary scroll compressors are enclosed in an acoustical jacket, which is constructed of sound attenuating material.

This combination significantly reduces the sound power from the chiller. The utilisation of low speed rotary scroll compressors and the management of the oil system within the compressor combined with the acoustic compressor treatment results in an extremely low emitted sound level radiated from the chiller.

The Ecologic Low Noise range is supplied with both low speed fans and the compressor acoustic enclosure as the standard.

The addition of additional condenser surface area means there is no compromise in performance when selecting an Ecologic Low Noise chiller. These units are built and factory tested to the same demanding quality standards that the Lennox brand is renown for.

This range has 9 units and capacity range 90 to 370kW. This version is positioned to give an alternative to the Super Low Noise units. It has a lower sound level than the Standard and Standard Plus units. It is intended to be used in applications that are sound sensitive but that do not need the performance of the super low noise version.

SUPER LOW NOISE

The super low noise version is the leading low noise chiller in Europe of those listed in the 2001 Eurovent directory. It has a range of 13 units with capacities from 40 to 360kW. It has a larger footprint than the Standard and LN versions it is always one size larger to accommodate the larger condenser surface required. The super low noise uses the same compressors and basic unit assembly as the standard unit. It is fitted as standard with the advanced ClimaticII controller with a KP02 user interface. In addition the unit is fitted with low speed low noise condenser fans and the compressors are housed in an acoustic ventilated enclosure. The acoustic housing is constructed of removable galvanised sheet metal sections the outer surface is painted with Epoxy paint to RAL 9002. The inner surfaces have acoustic waffle foam attached to prevent noise breakout and vibration in the panels. Compartment is covered with sound-insulated foam: PAE 28 mm, 3 kg/m² mass, protection films, fire classification M1. This unit is also fitted with a thermostatic controlled ventilation fan to prevent heat build up in the acoustic housing

HIGH EFFICIENCY

The Ecologic high efficiency range of units is designed to ensure that cooling both at full and part load is provided at the minimum electrical power absorbed. This provides the owner with the lowest operating costs and by reducing power consumption the indirect global warming impact is minimised. The indirect global warming is the generation of CO₂ in producing the electrical power to operate the chiller by selecting from Ecologic high efficiency range CO₂ production is minimised. The HE range is made up of 13 units capacity from 40 to 380 kW.

When selecting an Ecologic high efficiency unit the additional costs associated with the additional components required can be recovered in the first few years of operation. A Lennox Ecologic unit has a life expectancy in excess of 15 years so after the initial capital difference is recovered in the first few years the continued cost savings can be utilised for other purposes.

The Ecologic high efficiency range uses oversized heat exchanger surfaces in both condenser to get the highest efficiencies. The Climatic II controller is supplied with KP02 LED graphic display screen. The unit is fitted with the very latest in Electronic expansion valve technology that is controlled by the Climatic II and uses Lennox unique control algorithms to operate the compressors, condenser fans and expansion valve to provide the best operating efficiency at all operating conditions. The Climatic II controller is looking at 2050 different operating parameters every minute and making adjustments to ensure the efficient and safe operation of the chiller.

The Ecologic uses the same range of components as the Ecologic Standard range of chillers and is also fully factory tested to insure trouble free start up.

CONSTRUCTION

The Lennox Ecologic™ Chiller is designed for outdoor use. Its rugged chassis is constructed of heavy gauge, pre-painted, hot-dipped galvanized steel for superior corrosion resistance and appearance. Removable panels, made of galvanize, permit easy access to all maintenance and service components.

COMPRESSORS

Depending on the model, Lennox Ecologic™ Chillers employ a scroll compressor.

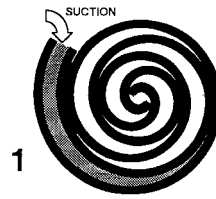
SCROLL COMPRESSOR :

Scroll compressors are comprised of two identical scrolls mated together to form concentric spiral shapes. During compression, one scroll remains stationary while the other orbits around it. The orbiting scroll draws gas into the pocket formed by the two scrolls. As the orbiting continues, the gas is forced toward the center of the scroll and the gas pockets become compressed. When the compressed gas reaches the center, it is discharged vertically into a chamber and discharge port in the top of the compressor.

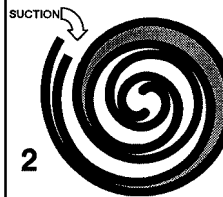
During a single orbit, several pockets of gas are compressed simultaneously providing smooth, continuous compression. Precisely designed, manufactured and balanced scrolls ensure high efficiency, no wasted motion and long term optimal performance. Scroll compressors are simple, efficient, durable and quiet.



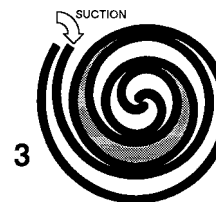
SCROLL GAS FLOW



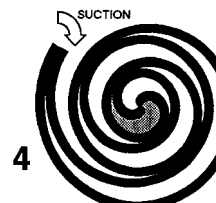
Compression in the scroll is created by the interaction of an orbiting scroll and a stationary scroll. Gas enters through an outer opening as one of the scrolls orbits.



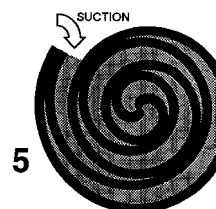
The open passage is sealed off as gas is drawn into the scroll.



As the scroll continues to orbit, the gas is compressed into an increasingly smaller pocket.

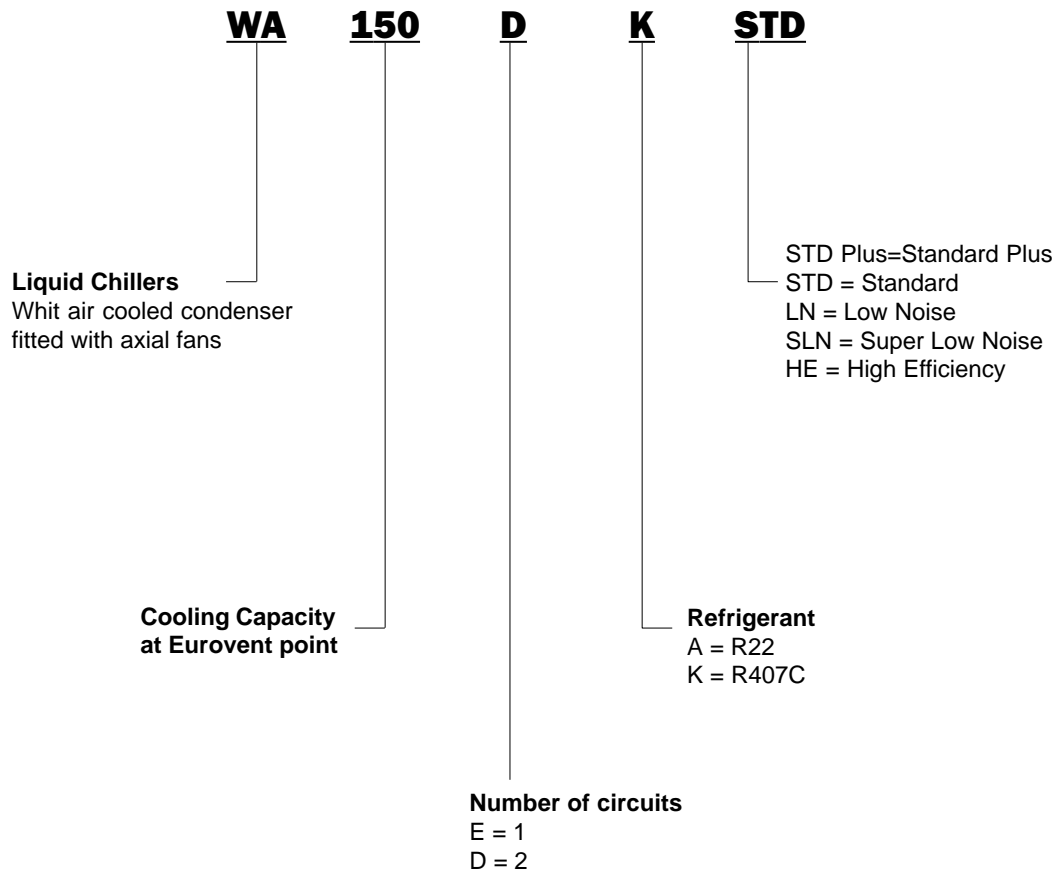


By the time the gas arrives at the center port, discharge pressure has been reached.



Actually, during operation, all six gas passages are in various stages of compression at all times, resulting in nearly continuous suction and discharge.

MODEL NUMBER DESCRIPTION



PERFORMANCE TABLES

STANDARD

ECOLOGIC STD	°C Water outlet Temperature	Air inlet temperature																	
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
90D	6	92,6	32,4	90,9	33,5	89,2	34,7	86,7	36,4	84,1	38,4	82,4	39,7	80,7	41,1	-	-	-	-
	7	95,2	32,7	93,4	33,8	91,7	35	89,1	36,8	86,5	38,7	84,7	40,1	82,9	41,5	-	-	-	-
	9	100,4	33,4	98,6	34,5	96,8	35,7	94	37,5	91,3	39,5	89,4	40,9	-	-	-	-	-	-
	11	105,8	34,1	103,9	35,2	102	36,4	99,1	38,3	96,2	40,3	94,3	41,7	-	-	-	-	-	-
	13	111,4	34,8	109,4	36	107,4	37,2	104,4	39,1	101,3	41,1	-	-	42,9	18,1	-	-	-	-
100E	6	94,4	36,7	92,7	38	90,9	39,3	88,2	41,4	85,5	43,6	-	-	-	-	-	-	-	-
	7	97	37,1	95,1	38,4	93,3	39,7	90,6	41,8	87,8	44,1	-	-	-	-	-	-	-	-
	9	102,1	38	100,2	39,3	98,3	40,6	95,4	42,8	-	-	-	-	-	-	-	-	-	-
	11	107,4	38,9	105,4	40,2	103,4	41,6	100,3	43,8	-	-	-	-	-	-	-	-	-	-
	13	112,8	39,8	110,7	41,2	108,6	42,6	-	-	-	-	-	-	-	-	-	-	-	-
110E	6	105,9	45,2	103,8	46,8	101,7	48,4	98,5	51,1	-	-	-	-	-	-	-	-	-	-
	7	108,6	45,7	106,5	47,4	104,4	49,1	-	-	-	-	-	-	-	-	-	-	-	-
	9	114,2	47	112	48,6	109,7	50,4	-	-	-	-	-	-	-	-	-	-	-	-
	11	119,9	48,3	117,5	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13	125,7	49,6	123,2	51,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
130D	6	128,2	48,8	125,8	50,4	123,4	52,1	119,8	54,9	116,1	57,8	113,6	59,8	-	-	-	-	-	-
	7	131,7	49,3	129,2	51	126,7	52,7	123	55,5	119,3	58,4	-	-	-	-	-	-	-	-
	9	138,7	50,4	136,2	52,1	133,6	53,9	129,7	56,7	125,7	59,7	-	-	-	-	-	-	-	-
	11	146	51,5	143,3	53,3	140,6	55,1	136,5	58	-	-	-	-	-	-	-	-	-	-
	13	153,5	52,8	150,7	54,6	147,8	56,4	143,4	59,4	-	-	-	-	-	-	-	-	-	-
150D	6	144,1	59,7	141,3	61,7	138,5	63,9	134,2	67,3	-	-	-	-	-	-	-	-	-	-
	7	147,9	60,4	145,1	62,5	142,2	64,7	137,8	68,2	-	-	-	-	-	-	-	-	-	-
	9	155,6	62	152,6	64,1	149,6	66,4	-	-	-	-	-	-	-	-	-	-	-	-
	11	163,5	63,6	160,3	65,8	157,1	68,1	-	-	-	-	-	-	-	-	-	-	-	-
	13	171,6	65,3	168,2	67,6	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

STANDARD

ECOLOGIC STD	°C Water outlet Temperature	Air inlet temperature																	
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
200D	6	192,6	78,8	189	81,6	185,3	84,5	179,7	89	174,1	93,9	-	-	-	-	-	-	-	-
	7	197,7	79,7	194	82,5	190,2	85,5	184,5	90,1	-	-	-	-	-	-	-	-	-	-
	9	208,1	81,6	204,2	84,5	200,2	87,5	194,2	92,2	-	-	-	-	-	-	-	-	-	-
	11	218,8	83,7	214,6	86,6	210,5	89,6	204,2	94,5	-	-	-	-	-	-	-	-	-	-
	13	229,7	85,8	225,4	88,8	221	91,9	-	-	-	-	-	-	-	-	-	-	-	-
230D	6	236,3	98,4	231,7	102	227,2	105,7	220,2	111,5	-	-	-	-	-	-	-	-	-	-
	7	242,5	99,6	237,8	103,2	233,1	107	226,1	112,9	-	-	-	-	-	-	-	-	-	-
	9	255	102,1	250,2	105,8	245,2	109,7	237,8	115,7	-	-	-	-	-	-	-	-	-	-
	11	267,8	104,8	262,7	108,5	257,6	112,5	-	-	-	-	-	-	-	-	-	-	-	-
	13	281	107,6	275,6	111,4	270,1	115,5	-	-	-	-	-	-	-	-	-	-	-	-
300D	6	285,1	119,1	279,7	123,3	274,2	127,7	265,9	134,6	-	-	-	-	-	-	-	-	-	-
	7	292,6	120,5	287,1	124,7	281,5	129,2	273	136,2	-	-	-	-	-	-	-	-	-	-
	9	307,9	123,4	302,1	127,8	296,2	132,3	287,3	139,5	-	-	-	-	-	-	-	-	-	-
	11	323,5	126,5	317,4	130,9	311,2	135,6	-	-	-	-	-	-	-	-	-	-	-	-
	13	339,5	129,7	333	134,3	326,5	139	-	-	-	-	-	-	-	-	-	-	-	-
370D	6	354,4	148,4	347,5	153,7	340,7	159,3	330,3	168,1	-	-	-	-	-	-	-	-	-	-
	7	363,7	150,2	356,7	155,6	349,6	161,3	339	170,2	-	-	-	-	-	-	-	-	-	-
	9	382,5	154	375,2	159,6	367,8	165,3	-	-	-	-	-	-	-	-	-	-	-	-
	11	401,7	158	394	163,7	386,3	169,6	-	-	-	-	-	-	-	-	-	-	-	-
	13	421,4	162,3	413,3	168,1	405,2	174,1	-	-	-	-	-	-	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

STANDARD Plus

ECOLOGIC STD Plus	°C Water outlet Temperature	Air inlet temperature																			
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C		48°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
90D	6	95	32,7	93,3	33,7	91,7	34,8	89,1	36,5	86,6	38,3	84,8	39,6	83,1	40,9	80,5	43	79,6	43,7	-	-
	7	97,7	33	96	34	94,3	35	91,7	36,8	89	38,6	87,3	39,9	85,5	41,2	82,8	43,3	-	-	-	-
	9	103,2	33,5	101,4	34,5	99,6	35,6	96,9	37,4	94,1	39,2	92,2	40,5	90,4	41,9	-	-	-	-	-	-
	11	108,9	34,1	107	35,1	105,1	36,2	102,2	38	99,3	39,9	97,4	41,2	95,4	42,6	-	-	-	-	-	-
	13	114,8	34,7	112,8	35,7	110,8	36,9	107,8	38,7	104,7	40,6	102,7	42	100,6	43,4	-	-	-	-	-	-
100E	6	97,4	36,4	95,6	37,6	93,8	38,9	91,2	40,8	88,4	42,9	86,6	44,4	84,8	45,9	-	-	-	-	-	-
	7	100	36,8	98,2	38	96,4	39,2	93,7	41,2	90,9	43,3	89	44,8	-	-	-	-	-	-	-	-
	9	105,5	37,5	103,6	38,7	101,7	40	98,8	42	95,9	44,2	93,9	45,7	-	-	-	-	-	-	-	-
	11	111,1	38,2	109,1	39,5	107,1	40,8	104,1	42,9	101	45	-	-	-	-	-	-	-	-	-	-
	13	116,9	39	114,8	40,3	112,7	41,6	109,5	43,7	106,3	46	-	-	-	-	-	-	-	-	-	-
110E	6	109,9	44	107,8	45,5	105,7	47	102,6	49,5	99,4	52,1	-	-	-	-	-	-	-	-	-	-
	7	112,8	44,5	110,7	46	108,6	47,5	105,4	50	102,1	52,6	-	-	-	-	-	-	-	-	-	-
	9	118,8	45,5	116,6	47	114,3	48,6	111	51,1	-	-	-	-	-	-	-	-	-	-	-	-
	11	124,9	46,5	122,6	48,1	120,2	49,7	116,7	52,3	-	-	-	-	-	-	-	-	-	-	-	-
	13	131,2	47,7	128,8	49,3	126,3	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6	131,6	49,1	129,2	50,7	126,8	52,3	123,2	54,9	119,5	57,7	117,1	59,6	114,6	61,6	-	-	-	-	-	-
	7	135,2	49,6	132,8	51,2	130,3	52,8	126,6	55,4	122,8	58,2	120,3	60,2	117,8	62,2	-	-	-	-	-	-
	9	142,6	50,5	140,1	52,1	137,5	53,8	133,6	56,5	129,7	59,3	127	61,3	-	-	-	-	-	-	-	-
	11	150,3	51,5	147,6	53,2	144,9	54,9	140,8	57,6	136,6	60,5	133,9	62,5	-	-	-	-	-	-	-	-
	13	158,2	52,6	155,4	54,2	152,5	56	148,2	58,8	143,8	61,7	-	-	-	-	-	-	-	-	-	-
150D	6	156	54,3	153,2	56,1	150,4	57,9	146,2	60,8	141,9	63,9	139	66,1	136,2	68,4	-	-	-	-	-	-
	7	160,3	54,8	157,5	56,6	154,6	58,4	150,3	61,3	145,9	64,5	143	66,7	140,1	69	-	-	-	-	-	-
	9	169,2	55,8	166,2	57,6	163,2	59,5	158,7	62,5	154,1	65,6	151	67,9	147,9	70,2	-	-	-	-	-	-
	11	178,4	56,8	175,3	58,6	172,1	60,6	167,4	63,6	162,5	66,9	159,3	69,1	156	71,5	-	-	-	-	-	-
	13	188	57,9	184,7	59,8	181,4	61,7	176,4	64,8	171,3	68,2	167,8	70,5	-	-	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

STANDARD PI us

ECOLOGIC STD Plus	°C Water outlet Temperature	Air inlet temperature																			
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C		48°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
200D	6	198,9	77,8	195,3	80,3	191,6	83	186,1	87,3	180,5	91,9	176,7	95,1	-	-	-	-	-	-	-	-
	7	204,3	78,5	200,6	81,1	196,8	83,9	191,2	88,2	185,4	92,8	181,6	96	-	-	-	-	-	-	-	-
	9	215,3	80,1	211,4	82,8	207,5	85,6	201,6	90	195,5	94,7	-	-	-	-	-	-	-	-	-	-
	11	226,7	81,8	222,6	84,5	218,5	87,3	212,2	91,8	205,9	96,6	-	-	-	-	-	-	-	-	-	-
	13	238,4	83,6	234,1	86,3	229,7	89,2	223,2	93,8	-	-	-	-	-	-	-	-	-	-	-	-
230D	6	245,2	95,2	240,7	98,5	236,2	101,9	229,3	107,4	222,4	113,2	217,7	117,2	-	-	-	-	-	-	-	-
	7	251,8	96,2	247,2	99,5	242,6	103	235,6	108,5	228,5	114,3	223,7	118,4	-	-	-	-	-	-	-	-
	9	265,3	98,3	260,4	101,6	255,6	105,2	248,2	110,8	240,8	116,7	-	-	-	-	-	-	-	-	-	-
	11	279,1	100,4	274	103,9	268,9	107,5	261,2	113,2	253,4	119,3	-	-	-	-	-	-	-	-	-	-
	13	293,3	102,7	288	106,2	282,6	109,9	274,5	115,7	-	-	-	-	-	-	-	-	-	-	-	-
300D	6	294,6	117,3	289,2	121,2	283,8	125,3	275,6	131,8	267,3	138,7	261,7	143,5	-	-	-	-	-	-	-	-
	7	302,6	118,5	297,1	122,4	291,5	126,5	283,1	133,1	274,6	140,1	268,9	144,9	-	-	-	-	-	-	-	-
	9	318,8	120,9	313	124,9	307,2	129,1	298,4	135,8	289,5	142,9	-	-	-	-	-	-	-	-	-	-
	11	335,4	123,4	329,4	127,5	323,3	131,9	314	138,7	304,6	145,9	-	-	-	-	-	-	-	-	-	-
	13	352,6	126,1	346,2	130,3	339,8	134,7	330	141,7	-	-	-	-	-	-	-	-	-	-	-	-
370D	6	367,9	143,5	361,2	148,4	354,3	153,6	344	161,8	333,6	170,5	326,6	176,5	-	-	-	-	-	-	-	-
	7	377,8	145	370,9	150	363,9	155,2	353,4	163,5	342,7	172,2	335,6	178,4	-	-	-	-	-	-	-	-
	9	398	148,1	390,8	153,2	383,5	158,5	372,4	166,9	361,2	175,9	-	-	-	-	-	-	-	-	-	-
	11	418,7	151,4	411,1	156,6	403,4	162	391,8	170,6	-	-	-	-	-	-	-	-	-	-	-	-
	13	440,1	154,8	432,1	160,1	424	165,7	411,8	174,5	-	-	-	-	-	-	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

LOW NOISE

ECOLOGIC LN	°C Water outlet Temperature	Air inlet temperature																	
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
90D	6	93,6	32	91,9	33	90,2	34,1	87,7	35,9	85,1	37,8	83,4	39,1	81,7	40,4	-	-	-	-
	7	96,2	32,3	94,5	33,3	92,7	34,4	90,1	36,2	87,5	38,1	85,7	39,4	84	40,8	-	-	-	-
	9	101,5	32,9	99,7	33,9	97,9	35,1	95,2	36,9	92,4	38,8	90,6	40,2	88,7	41,6	-	-	-	-
	11	107	33,5	105,2	34,6	103,3	35,8	100,4	37,6	97,5	39,6	95,5	40,9	-	-	-	-	-	-
	13	112,8	34,2	110,8	35,3	108,8	36,5	105,8	38,4	102,7	40,3	100,6	41,7	-	-	-	-	-	-
100E	6	98,9	33,8	97,2	35	95,4	36,2	92,7	38	90	40,1	88,2	41,5	86,4	43	-	-	-	-
	7	101,7	34,1	99,9	35,3	98,1	36,5	95,3	38,4	92,6	40,4	90,7	41,9	88,8	43,4	-	-	-	-
	9	107,3	34,8	105,4	36	103,5	37,2	100,6	39,1	97,7	41,2	95,8	42,7	93,8	44,2	-	-	-	-
	11	113,1	35,5	111,1	36,7	109,1	37,9	106,1	39,9	103	42	101	43,5	-	-	-	-	-	-
	13	119,1	36,2	117	37,4	114,9	38,7	111,7	40,7	108,5	42,8	106,3	44,3	-	-	-	-	-	-
110E	6	112	40,9	109,9	42,3	107,9	43,8	104,7	46,2	101,6	48,7	99,4	50,4	-	-	-	-	-	-
	7	115	41,4	112,9	42,8	110,8	44,3	107,6	46,7	104,4	49,2	102,2	51	-	-	-	-	-	-
	9	121,2	42,3	119	43,7	116,8	45,3	113,4	47,7	110	50,3	-	-	-	-	-	-	-	-
	11	127,6	43,2	125,3	44,7	122,9	46,3	119,4	48,8	115,8	51,4	-	-	-	-	-	-	-	-
	13	134,1	44,2	131,7	45,8	129,2	47,4	125,5	49,9	-	-	-	-	-	-	-	-	-	-
130D	6	129,2	48,3	126,8	49,9	124,4	51,6	120,8	54,3	117,1	57,2	114,7	59,2	-	-	-	-	-	-
	7	132,7	48,8	130,3	50,4	127,8	52,1	124,1	54,9	120,3	57,7	117,8	59,8	-	-	-	-	-	-
	9	139,9	49,8	137,3	51,5	134,8	53,3	130,8	56	126,9	59	-	-	-	-	-	-	-	-
	11	147,3	50,9	144,6	52,7	141,9	54,4	137,8	57,3	133,6	60,3	-	-	-	-	-	-	-	-
	13	154,9	52,1	152,1	53,9	149,2	55,7	144,9	58,6	-	-	-	-	-	-	-	-	-	-
150D	6	152,9	53,9	150,1	55,7	147,3	57,6	143	60,7	138,8	63,9	135,9	66,2	133	68,5	-	-	-	-
	7	157,1	54,4	154,2	56,3	151,3	58,2	147	61,3	142,6	64,5	139,7	66,8	-	-	-	-	-	-
	9	165,6	55,5	162,7	57,4	159,7	59,4	155,1	62,5	150,5	65,9	147,4	68,2	-	-	-	-	-	-
	11	174,5	56,7	171,4	58,6	168,2	60,7	163,4	63,9	158,6	67,2	-	-	-	-	-	-	-	-
	13	183,7	58	180,4	59,9	177,1	62	172	65,3	166,9	68,7	-	-	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

LOW NOISE

ECOLOGIC LN	°C Water outlet Temperature	Air inlet temperature																	
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
200D	6	202,3	72,3	198,6	74,8	195	77,4	189,4	81,5	183,9	85,9	180,1	89	176,4	92,2	-	-	-	-
	7	207,8	73	204,1	75,5	200,4	78,1	194,7	82,3	189	86,7	185,2	89,8	181,3	93	-	-	-	-
	9	219,2	74,4	215,3	76,9	211,4	79,6	205,4	83,9	199,4	88,4	195,4	91,6	-	-	-	-	-	-
	11	230,9	75,9	226,8	78,5	222,7	81,2	216,5	85,6	210,2	90,2	205,9	93,4	-	-	-	-	-	-
	13	243	77,5	238,7	80,2	234,4	82,9	227,8	87,3	221,2	92	-	-	-	-	-	-	-	-
230D	6	244,6	92,5	240,1	95,8	235,5	99,3	228,7	104,7	221,7	110,5	217,1	114,6	-	-	-	-	-	-
	7	251,1	93,5	246,5	96,8	241,9	100,3	234,9	105,8	227,8	111,7	223	115,8	-	-	-	-	-	-
	9	264,5	95,6	259,7	99	254,8	102,5	247,5	108,2	240	114,2	-	-	-	-	-	-	-	-
	11	278,2	97,7	273,2	101,2	268,1	104,9	260,3	110,6	-	-	-	-	-	-	-	-	-	-
	13	292,4	100,1	287,1	103,6	281,7	107,3	273,5	113,2	-	-	-	-	-	-	-	-	-	-
300D	6	300	108,8	294,6	112,5	289,2	116,5	281	122,7	272,7	129,3	267,2	134	261,6	138,8	-	-	-	-
	7	308,2	109,8	302,7	113,6	297,1	117,6	288,7	123,9	280,3	130,6	274,6	135,3	268,9	140,2	-	-	-	-
	9	324,9	112	319,1	115,8	313,3	119,9	304,5	126,3	295,7	133,1	289,7	137,9	-	-	-	-	-	-
	11	342,1	114,3	336,1	118,2	330	122,3	320,8	128,9	311,5	135,8	305,2	140,7	-	-	-	-	-	-
	13	359,9	116,7	353,5	120,7	347,2	124,9	337,5	131,6	327,7	138,6	-	-	-	-	-	-	-	-
370D	6	366,9	139,4	360,2	144,4	353,3	149,6	343	157,8	332,6	166,5	325,6	172,6	-	-	-	-	-	-
	7	376,8	140,9	369,9	146	362,9	151,2	352,3	159,5	341,7	168,3	-	-	-	-	-	-	-	-
	9	396,9	144,1	389,6	149,2	382,3	154,6	371,2	163	360,1	172	-	-	-	-	-	-	-	-
	11	417,5	147,4	409,9	152,6	402,2	158,1	390,6	166,8	-	-	-	-	-	-	-	-	-	-
	13	438,7	150,9	430,7	156,3	422,6	161,9	410,4	170,7	-	-	-	-	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

SUPER LOW NOISE

ECOLOGIC SLN	°C Water outlet Temperature	Air inlet temperature																			
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C		48°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
40E	6	41,9	11,1	41,2	11,5	40,5	11,9	39,4	12,6	38,3	13,3	37,6	13,8	36,9	14,3	35,8	15,1	35,4	15,4	34,7	16
	7	43,2	11,2	42,4	11,6	41,7	12	40,6	12,7	39,5	13,4	38,7	13,9	38	14,4	36,8	15,2	36,5	15,5	35,7	16,1
	9	45,6	11,4	44,9	11,8	44,1	12,2	43	12,9	41,8	13,6	41	14,1	40,2	14,6	39	15,5	38,6	15,8	37,8	16,4
	11	48,2	11,5	47,4	12	46,6	12,4	45,4	13,1	44,2	13,8	43,4	14,3	42,5	14,9	41,3	15,7	40,8	16	40	16,6
	13	51	11,7	50,1	12,1	49,3	12,6	48	13,3	46,7	14	45,8	14,5	44,9	15,1	43,6	16	43,2	16,3	-	-
45E	6	48,3	13,5	47,4	14	46,6	14,5	45,3	15,3	44	16,2	43,2	16,8	42,3	17,5	41	18,5	40,6	18,8	-	-
	7	49,6	13,6	48,8	14,1	47,9	14,6	46,6	15,5	45,3	16,3	44,4	17	43,5	17,6	42,2	18,6	41,8	19	-	-
	9	52,5	13,9	51,6	14,4	50,7	14,9	49,3	15,7	47,9	16,6	47	17,3	46,1	17,9	44,7	19	44,2	19,3	-	-
	11	55,4	14,1	54,4	14,6	53,5	15,2	52,1	16	50,6	16,9	49,6	17,6	48,7	18,2	47,2	19,3	-	-	-	-
	13	58,5	14,4	57,5	14,9	56,5	15,5	55	16,3	53,4	17,2	52,4	17,9	51,4	18,6	-	-	-	-	-	-
65E	6	67	20,2	65,8	20,9	64,6	21,7	62,8	23	60,9	24,3	59,7	25,2	58,5	26,2	-	-	-	-	-	-
	7	68,8	20,4	67,6	21,1	66,4	21,9	64,5	23,2	62,7	24,5	61,4	25,5	60,2	26,4	-	-	-	-	-	-
	9	72,7	20,8	71,4	21,6	70,1	22,4	68,2	23,7	66,2	25	64,9	26	63,6	27	-	-	-	-	-	-
	11	76,6	21,2	75,3	22	73,9	22,9	71,9	24,2	69,8	25,5	68,4	26,5	67	27,5	-	-	-	-	-	-
	13	80,8	21,7	79,3	22,5	77,9	23,4	75,8	24,7	73,6	26,1	72,1	27,1	-	-	-	-	-	-	-	-
75E	6	77,3	23,9	75,9	24,8	74,5	25,8	72,4	27,2	70,3	28,8	68,9	29,9	67,4	31,1	-	-	-	-	-	-
	7	79,5	24,2	78,1	25,1	76,6	26	74,5	27,5	72,3	29,1	70,8	30,2	69,3	31,4	-	-	-	-	-	-
	9	83,9	24,7	82,4	25,6	80,9	26,6	78,6	28,1	76,3	29,7	74,8	30,9	73,2	32	-	-	-	-	-	-
	11	88,4	25,2	86,8	26,2	85,2	27,2	82,9	28,7	80,4	30,4	78,8	31,5	-	-	-	-	-	-	-	-
	13	93,1	25,8	91,4	26,8	89,8	27,8	87,3	29,4	84,7	31,1	83	32,2	-	-	-	-	-	-	-	-
90D	6	96,5	27,7	94,9	28,6	93,2	29,6	90,6	31,3	88,1	33	86,4	34,3	84,6	35,6	82	37,6	81,2	38,3	-	-
	7	99,3	27,9	97,6	28,9	95,8	29,9	93,2	31,5	90,6	33,3	88,9	34,5	87,1	35,8	84,4	37,9	83,5	38,6	-	-
	9	104,9	28,4	103,1	29,4	101,3	30,4	98,6	32,1	95,8	33,9	94	35,1	92,1	36,5	89,3	38,5	88,4	39,2	-	-
	11	110,8	28,9	108,9	29,9	107	30,9	104,1	32,7	101,2	34,5	99,3	35,8	97,3	37,1	94,4	39,2	-	-	-	-
	13	116,9	29,4	114,9	30,4	112,9	31,5	109,9	33,3	106,8	35,1	104,8	36,4	102,7	37,8	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

SUPER LOW NOISE

ECOLOGIC SLN	°C Water outlet Temperature	Air inlet temperature																			
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C		48°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
100E	6	99,8	30,8	98	31,9	96,2	33	93,5	34,9	90,8	36,9	89	38,3	87,2	39,7	84,5	42	-	-	-	-
	7	102,5	31,1	100,7	32,2	98,9	33,4	96,2	35,2	93,4	37,2	91,6	38,6	89,7	40,1	-	-	-	-	-	-
	9	108,2	31,7	106,3	32,8	104,4	34	101,6	35,9	98,7	38	96,7	39,4	94,7	40,9	-	-	-	-	-	-
	11	114,1	32,3	112,1	33,5	110,1	34,7	107,1	36,6	104	38,7	102	40,2	99,9	41,7	-	-	-	-	-	-
	13	120,2	33	118,1	34,2	116	35,4	112,8	37,4	109,6	39,5	107,5	41	-	-	-	-	-	-	-	-
110E	6	115	36,4	113	37,7	110,9	39,1	107,8	41,3	104,6	43,7	102,5	45,4	100,4	47,1	-	-	-	-	-	-
	7	118,2	36,7	116,1	38,1	114	39,5	110,8	41,7	107,6	44,1	105,4	45,8	103,2	47,6	-	-	-	-	-	-
	9	124,7	37,5	122,5	38,9	120,3	40,3	116,9	42,6	113,5	45	111,3	46,8	109	48,5	-	-	-	-	-	-
	11	131,4	38,3	129,1	39,7	126,8	41,2	123,2	43,5	119,7	46	117,3	47,7	-	-	-	-	-	-	-	-
	13	138,3	39,2	135,9	40,6	133,5	42,1	129,7	44,5	126	47	123,5	48,8	-	-	-	-	-	-	-	-
130D	6	133,9	41	131,6	42,5	129,2	44,1	125,5	46,5	121,9	49,2	119,4	51,1	117	53	-	-	-	-	-	-
	7	137,7	41,4	135,2	42,9	132,8	44,5	129,1	47	125,4	49,7	122,8	51,6	120,3	53,5	-	-	-	-	-	-
	9	145,3	42,2	142,8	43,8	140,2	45,4	136,3	47,9	132,4	50,7	129,8	52,6	127,1	54,6	-	-	-	-	-	-
	11	153,3	43,1	150,6	44,7	147,9	46,3	143,8	48,9	139,7	51,7	136,9	53,6	134,1	55,7	-	-	-	-	-	-
	13	161,5	44	158,7	45,6	155,8	47,3	151,5	50	147,2	52,8	144,2	54,8	-	-	-	-	-	-	-	-
150D	6	154,7	48,5	151,9	50,3	149,1	52,1	144,9	55,1	140,6	58,2	137,7	60,5	134,9	62,8	-	-	-	-	-	-
	7	158,9	49	156,1	50,8	153,2	52,7	148,9	55,7	144,6	58,8	141,6	61,1	138,7	63,4	-	-	-	-	-	-
	9	167,7	50	164,7	51,8	161,7	53,8	157,2	56,8	152,6	60,1	149,5	62,3	146,4	64,7	-	-	-	-	-	-
	11	176,8	51,1	173,7	53	170,5	54,9	165,7	58	160,9	61,4	157,6	63,7	-	-	-	-	-	-	-	-
	13	186,2	52,3	182,9	54,2	179,6	56,2	174,5	59,3	169,4	62,7	166	65,1	-	-	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

SUPER LOW NOISE

ECOLOGIC SLN	°C Water outlet Temperature	Air inlet temperature																			
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C		48°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
200D	6	199,5	61,3	196	63,5	192,4	65,9	187,1	69,6	181,7	73,5	178,1	76,3	174,4	79,2	168,9	83,8	-	-	-	-
	7	205,1	61,9	201,5	64,1	197,8	66,5	192,4	70,2	186,8	74,2	183,1	77,1	179,4	80	-	-	-	-	-	-
	9	216,4	63,1	212,6	65,4	208,8	67,8	203,1	71,6	197,3	75,7	193,4	78,5	189,5	81,5	-	-	-	-	-	-
	11	228,2	64,4	224,2	66,7	220,2	69,2	214,2	73	208,1	77,2	204	80,1	199,9	83,1	-	-	-	-	-	-
	13	240,3	65,7	236,2	68,1	232	70,6	225,7	74,6	219,2	78,8	214,9	81,7	-	-	-	-	-	-	-	-
230D	6	230,7	72,8	226,5	75,5	222,4	78,3	216,1	82,8	209,8	87,5	205,6	90,9	201,3	94,3	-	-	-	-	-	-
	7	237	73,6	232,8	76,3	228,6	79,1	222,2	83,6	215,7	88,4	211,4	91,8	207	95,3	-	-	-	-	-	-
	9	250	75,1	245,6	77,8	241,2	80,7	234,5	85,3	227,7	90,2	223,1	93,6	218,5	97,2	-	-	-	-	-	-
	11	263,5	76,7	258,8	79,5	254,2	82,5	247,1	87,1	240	92,1	235,2	95,6	-	-	-	-	-	-	-	-
	13	277,4	78,4	272,5	81,3	267,6	84,3	260,2	89	252,7	94,1	247,6	97,6	-	-	-	-	-	-	-	-
300D	6	297,1	110,4	291,7	114,3	286,3	118,3	278,1	124,7	269,8	131,4	264,2	136,2	-	-	-	-	-	-	-	-
	7	305,1	111,5	299,6	115,4	294,1	119,5	285,7	125,9	277,2	132,8	271,5	137,6	-	-	-	-	-	-	-	-
	9	321,6	113,8	315,8	117,8	310	121,9	301,2	128,5	292,3	135,5	286,3	140,4	-	-	-	-	-	-	-	-
	11	338,5	116,3	332,4	120,3	326,3	124,5	317,1	131,2	307,8	138,3	-	-	-	-	-	-	-	-	-	-
	13	355,9	118,8	349,6	123	343,2	127,3	333,4	134,1	323,6	141,3	-	-	-	-	-	-	-	-	-	-
370D	6	362,5	142,3	355,7	147,4	348,9	152,8	338,5	161,2	328,1	170,1	-	-	-	-	-	-	-	-	-	-
	7	372,1	144	365,2	149,1	358,2	154,5	347,6	163	336,9	172,1	-	-	-	-	-	-	-	-	-	-
	9	391,8	147,3	384,5	152,6	377,2	158,1	366,1	166,8	-	-	-	-	-	-	-	-	-	-	-	-
	11	411,9	150,9	404,3	156,3	396,6	161,9	384,9	170,8	-	-	-	-	-	-	-	-	-	-	-	-
	13	432,6	154,7	424,6	160,2	416,5	165,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

HIGH EFFICIENCY

ECOLOGIC HE	°C Water outlet Temperature	Air inlet temperature																			
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C		48°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
40E	6	41,5	12,5	40,8	12,9	40,1	13,3	39,1	13,9	38	14,6	37,3	15,1	36,6	15,6	35,5	16,4	35,1	16,6	34,4	17,2
	7	42,7	12,6	42	13	41,3	13,4	40,2	14	39,1	14,7	38,4	15,2	37,7	15,7	36,6	16,5	36,2	16,7	35,5	17,3
	9	45,2	12,8	44,5	13,1	43,7	13,5	42,6	14,2	41,5	14,8	40,7	15,3	39,9	15,8	38,8	16,6	38,4	16,9	37,6	17,5
	11	47,9	12,9	47,1	13,3	46,3	13,7	45,1	14,3	43,9	15	43,1	15,5	42,3	16	41,1	16,8	40,7	17,1	39,8	17,7
	13	50,6	13	49,8	13,4	49	13,8	47,7	14,5	46,5	15,2	45,6	15,7	44,8	16,2	43,5	17	43	17,3	42,2	17,9
45E	6	48,2	14,7	47,4	15,1	46,6	15,6	45,3	16,4	44,1	17,2	43,3	17,8	42,4	18,4	41,1	19,3	40,7	19,7	39,9	20,4
	7	49,6	14,8	48,8	15,2	48	15,7	46,7	16,5	45,4	17,3	44,5	17,9	43,7	18,5	42,4	19,5	41,9	19,8	41,1	20,5
	9	52,5	15	51,6	15,4	50,8	15,9	49,4	16,7	48,1	17,5	47,2	18,1	46,3	18,7	44,9	19,7	44,4	20,1	43,5	20,8
	11	55,5	15,2	54,6	15,6	53,7	16,1	52,3	16,9	50,9	17,8	49,9	18,4	49	19	47,5	20	47	20,3	46,1	21
	13	58,7	15,4	57,7	15,8	56,7	16,3	55,3	17,2	53,8	18	52,8	18,6	51,8	19,3	50,2	20,3	49,7	20,6	48,7	21,3
65E	6	68,6	21,5	67,4	22,2	66,2	23	64,4	24,2	62,6	25,5	61,3	26,4	60,1	27,4	58,3	28,9	57,7	29,4	56,4	30,4
	7	70,5	21,7	69,3	22,4	68,1	23,2	66,2	24,4	64,4	25,7	63,1	26,6	61,9	27,6	60	29,1	59,3	29,6	-	-
	9	74,5	22	73,3	22,8	72	23,5	70	24,8	68,1	26,1	66,8	27	65,5	28	63,5	29,5	62,8	30,1	-	-
	11	78,7	22,4	77,4	23,1	76	23,9	74	25,2	71,9	26,5	70,6	27,5	69,2	28,5	67,1	30	66,4	30,5	-	-
	13	83,1	22,8	81,7	23,5	80,2	24,3	78,1	25,6	75,9	27	74,5	27,9	73	28,9	70,8	30,5	-	-	-	-
75E	6	80,3	24,1	78,9	24,9	77,5	25,8	75,3	27,2	73,2	28,6	71,8	29,6	70,4	30,7	68,2	32,4	67,5	33	-	-
	7	82,5	24,3	81,1	25,1	79,7	26	77,5	27,4	75,3	28,8	73,9	29,9	72,4	31	70,2	32,7	69,4	33,3	-	-
	9	87,2	24,7	85,7	25,6	84,2	26,4	81,9	27,8	79,6	29,3	78,1	30,4	76,6	31,5	74,2	33,2	73,4	33,8	-	-
	11	92	25,1	90,5	26	88,9	26,9	86,5	28,3	84,1	29,8	82,5	30,9	80,9	32	78,4	33,8	-	-	-	-
	13	97,1	25,6	95,5	26,5	93,8	27,4	91,3	28,8	88,7	30,4	87	31,5	85,3	32,6	-	-	-	-	-	-
90D	6	96,6	29,2	95	30,1	93,3	31,1	90,8	32,6	88,3	34,2	86,7	35,4	85	36,6	82,4	38,6	81,6	39,2	79,9	40,6
	7	99,4	29,4	97,7	30,3	96,1	31,3	93,5	32,8	90,9	34,5	89,2	35,6	87,5	36,9	84,9	38,8	84	39,5	82,3	40,9
	9	105,2	29,8	103,4	30,7	101,7	31,7	99	33,2	96,3	34,9	94,5	36,1	92,7	37,4	89,9	39,3	89	40	87,2	41,4
	11	111,2	30,2	109,4	31,1	107,5	32,1	104,7	33,7	101,9	35,4	100	36,6	98,1	37,9	95,2	39,9	94,2	40,6	92,2	42
	13	117,5	30,6	115,6	31,6	113,6	32,6	110,7	34,2	107,7	35,9	105,7	37,1	103,7	38,4	100,6	40,5	99,6	41,2	97,5	42,6

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

HIGH EFFICIENCY

ECOLOGIC HE	°C Water outlet Temperature	Air inlet temperature																			
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C		48°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
100E	6	102,3	30,9	100,6	31,9	98,8	33	96,2	34,8	93,5	36,6	91,7	37,9	89,9	39,3	87,1	41,4	86,2	42,2	84,4	43,7
	7	105,2	31,2	103,4	32,2	101,6	33,3	98,9	35	96,2	36,9	94,3	38,2	92,5	39,6	89,7	41,8	88,8	42,5	86,9	44,1
	9	111,2	31,6	109,3	32,7	107,4	33,8	104,6	35,6	101,7	37,5	99,8	38,8	97,8	40,2	94,9	42,4	93,9	43,2	-	-
	11	117,4	32,1	115,4	33,2	113,4	34,3	110,5	36,1	107,4	38,1	105,4	39,4	103,4	40,8	100,3	43,1	99,2	43,8	-	-
	13	123,8	32,7	121,8	33,8	119,7	34,9	116,6	36,7	113,4	38,7	111,2	40,1	109,1	41,5	105,8	43,8	-	-	-	-
110E	6	119,4	35,9	117,3	37,1	115,2	38,4	112,1	40,5	109	42,7	106,8	44,2	104,7	45,8	101,5	48,4	100,4	49,3	-	-
	7	122,7	36,2	120,6	37,4	118,5	38,7	115,3	40,8	112,1	43	109,9	44,6	107,8	46,2	104,5	48,8	103,4	49,7	-	-
	9	129,6	36,8	127,4	38	125,2	39,4	121,9	41,5	118,5	43,7	116,2	45,3	113,9	47	110,5	49,6	109,3	50,5	-	-
	11	136,8	37,4	134,5	38,7	132,2	40	128,6	42,2	125,1	44,5	122,7	46,1	120,3	47,8	116,7	50,4	-	-	-	-
	13	144,2	38,1	141,8	39,4	139,4	40,7	135,7	42,9	131,9	45,3	129,4	46,9	126,9	48,6	-	-	-	-	-	-
130D	6	137,4	41,3	135	42,7	132,6	44,2	129	46,5	125,4	48,9	123	50,7	120,5	52,5	116,8	55,4	115,6	56,4	113,1	58,4
	7	141,3	41,7	138,9	43	136,4	44,5	132,7	46,8	129	49,3	126,5	51,1	124	52,9	120,3	55,8	119	56,8	-	-
	9	149,3	42,3	146,8	43,7	144,2	45,2	140,4	47,6	136,5	50,1	133,9	51,9	131,2	53,7	127,3	56,7	125,9	57,7	-	-
	11	157,7	43	155	44,4	152,3	45,9	148,3	48,3	144,2	50,9	141,4	52,7	138,7	54,6	134,5	57,6	133,1	58,6	-	-
	13	166,4	43,7	163,6	45,2	160,8	46,7	156,5	49,2	152,2	51,8	149,3	53,6	146,4	55,5	142	58,6	-	-	-	-
150D	6	160,5	48,2	157,7	49,8	154,9	51,5	150,7	54,2	146,4	57,2	143,6	59,2	140,7	61,4	136,3	64,8	134,9	66	-	-
	7	165	48,5	162,2	50,2	159,3	51,9	155	54,7	150,6	57,6	147,7	59,7	144,8	61,9	140,3	65,3	138,8	66,5	-	-
	9	174,4	49,3	171,4	51	168,4	52,8	163,9	55,6	159,3	58,6	156,2	60,7	153,1	62,9	148,4	66,4	146,9	67,6	-	-
	11	184,1	50,2	180,9	51,9	177,8	53,7	173	56,6	168,2	59,6	165	61,8	161,7	64	156,8	67,5	-	-	-	-
	13	194,2	51,1	190,9	52,8	187,6	54,7	182,5	57,6	177,5	60,7	174	62,9	170,6	65,2	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

PERFORMANCE TABLES

HIGH EFFICIENCY

ECOLOGIC HE	°C Water outlet Temperature	Air inlet temperature																			
		28°C		30°C		32°C		35°C		38°C		40°C		42°C		45°C		46°C		48°C	
		Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P	Qo	P
200D	6	204,5	61,5	201	63,6	197,5	65,7	192,2	69,2	186,8	72,9	183,2	75,5	179,6	78,2	174,2	82,5	172,3	84	168,7	87,1
	7	210,3	62	206,7	64	203,1	66,2	197,7	69,7	192,2	73,4	188,5	76,1	184,8	78,8	179,3	83,1	177,4	84,6	173,6	87,7
	9	222,2	62,9	218,5	65	214,7	67,2	209	70,8	203,3	74,6	199,4	77,2	195,5	80	189,7	84,4	187,7	85,9	-	-
	11	234,6	63,9	230,7	66,1	226,7	68,3	220,8	71,9	214,7	75,8	210,7	78,5	206,6	81,3	200,4	85,8	198,3	87,3	-	-
	13	247,5	65	243,4	67,2	239,2	69,5	233	73,1	226,6	77	222,3	79,8	218	82,7	211,5	87,2	-	-	-	-
230D	6	239,3	71,8	235,2	74,2	231	76,8	224,8	80,9	218,5	85,3	214,2	88,4	210	91,6	203,5	96,7	201,4	98,5	-	-
	7	246	72,4	241,8	74,8	237,6	77,4	231,2	81,6	224,7	86	220,4	89,1	216	92,4	209,5	97,5	207,3	99,3	-	-
	9	259,9	73,5	255,5	76,1	251	78,7	244,3	82,9	237,6	87,4	233	90,6	228,4	93,9	221,5	99,1	219,2	100,9	-	-
	11	274,2	74,8	269,6	77,3	264,9	80	257,9	84,3	250,8	88,9	246	92,1	241,2	95,5	233,9	100,8	-	-	-	-
	13	289,1	76,1	284,3	78,7	279,4	81,5	272	85,8	264,5	90,5	259,5	93,8	254,4	97,2	-	-	-	-	-	-
300D	6	307,8	100,8	302,5	104,2	297,1	107,9	288,9	113,8	280,7	120,1	275,2	124,5	269,6	129,1	261,2	136,3	-	-	-	-
	7	316,4	101,6	310,9	105,1	305,4	108,9	297	114,8	288,6	121,1	283	125,5	277,3	130,2	268,7	137,5	-	-	-	-
	9	333,9	103,4	328,1	107	322,4	110,8	313,6	116,8	304,8	123,2	298,9	127,8	292,9	132,5	-	-	-	-	-	-
	11	351,9	105,3	345,9	109	339,9	112,8	330,7	118,9	321,5	125,5	315,3	130,1	309	134,9	-	-	-	-	-	-
	13	370,7	107,3	364,4	111	358	114,9	348,4	121,2	338,7	127,9	332,1	132,5	325,5	137,4	-	-	-	-	-	-
370D	6	378,4	128,6	371,7	133,2	364,9	138,1	354,6	145,7	344,3	153,9	337,3	159,7	330,3	165,6	-	-	-	-	-	-
	7	388,8	129,9	381,9	134,5	375	139,4	364,5	147,1	353,9	155,4	346,8	161,2	339,6	167,2	-	-	-	-	-	-
	9	410	132,5	402,8	137,2	395,5	142,2	384,5	150,1	373,4	158,5	366	164,4	358,4	170,5	-	-	-	-	-	-
	11	431,8	135,2	424,3	140	416,7	145,1	405,1	153,1	393,5	161,7	385,6	167,7	-	-	-	-	-	-	-	-
	13	454,5	138	446,5	143	438,5	148,2	426,4	156,4	414,1	165,1	405,8	171,2	-	-	-	-	-	-	-	-

Pa : Total power input in kW including compressor, fans and control

Qo : Gross cooling capacity in kW

TECHNICAL DATA

STDPlus = Standard Plus
STD = Standard
LN = Low Noise
SLN = Super Low Noise
HE = High Efficiency

GENERAL

SIZE		WA40E	WA45E	WA65E	WA75E	WA100E	WA110E
Number of compressors	STDPlus-STD-LN	*				3	
	HE-SLN	1				3	
Number of fans	STDPlus-STD-LN	*				2	
	HE-SLN	2				3	
Number of circuits		1					
Capacity reduction %	STDPlus-STD-LN	*				0-33-66-100	
	HE-SLN	0-50-100				0-33-66-100	
Power supply (7)		3-400V-50Hz+PE & 1-230V-50Hz+N+PE					
Refrigerant charge kg	STDPlus-STD	*	*	*	*	19	20
	LN	*	*	*	*	26	26
	HE-SLN	19	19	24	32	36	45
Water flow l/s	STDPlus-STD	*	*	*	*	4,5	5
	LN	*	*	*	*	4,5	5,1
	HE	1,9	2,2	3,2	3,7	4,7	5,5
	SLN	1,9	2,2	3,1	3,5	4,6	5,3
Water pressure drop kPa	STDPlus-STD	*	*	*	*	24	24
	LN	*	*	*	*	25	25
	HE	20	19	21	21	24	27
	SLN	19	18	18	19	23	25
Minimum content hydraulic circuit dm3	STDPlus-STD-LN	*	*	*	*	800	900
	HE-SLN	500	600	800	950	800	950
Water connections "		2" Victaulic (60.3 mm)					

(7) : Maximum allowable fluctation on supply voltage +/- 10%.

(*) : Not Available

DIMENSIONS

SIZE		WA40E	WA45E	WA65E	WA75E	WA100E	WA110E
Length mm	STD Plus-STD-LN	*				3304	
	HE-SLN	3304				4704	
Width mm	STD Plus-STD-LN	*				1054	
	HE-SLN	1054					
Height mm	STD Plus-STD-LN	*				1940	
	HE-SLN	1940					
Operating weight kg	STD Plus-STD-LN	*	*	*	*	1020	1120
	HE-SLN	900	930	1000	1100	1350	1450

(*) : Not Available

TECHNICAL DATA

STDPlus = Standard Plus
STD = Standard
LN = Low Noise
SLN = Super Low Noise
HE = High Efficiency

GENERAL

SIZE			WA90D	WA130D	WA150D	WA200D	WA230D	WA300D	WA370D	
Number of compressors	STDPlus-STD-LN		4				6			
		HE-SLN	4			6				
Number of fans	STD-LN		2	3	3	4	4	6	6	
		HE-SLN	4	4	4	6	6	8	8	
Number of circuits			2							
Capacity reduction %	STDPlus-STD-LN		0-25-50-75-100				0-17-33-50-67-83-100			
		HE-SLN	0-25-50-75-100			0-17-33-50-67-83-100				
Power supply (7)			3-400V-50Hz+PE & 1-230V-50Hz+N+PE							
Refrigerant charge kg	STDPlus-STD	LN	30	30	38	40	56	68	86	
		HE-SLN	30	30	38	54	68	82	106	
			38	48	64	72	94	112	130	
Water flow l/s	STDPlus-STD	LN	4,4	6	7,2	9,1	11,2	13,5	16,8	
		HE	4,3	5,9	7	9,3	11,2	13,7	16,8	
		SLN	4,5	6,3	7,4	9,4	11	14,1	17,4	
			4,4	6,1	7,1	9,2	10,6	13,6	16,6	
Water pressure dropkPa	STDPlus-STD	LN	31	32	36	36	41	40	42	
		HE	30	31	35	37	41	41	42	
		SLN	34	36	39	39	40	43	45	
			32	34	36	37	37	40	41	
Minimum content hydraulic circuit dm3	STDPlus-STD-LN	600	800	950	1200	1500	1250	1550		
	HE-SLN	600	850	1000	850	1000	1300	1600		
Water connections "			2 1/2" Victaulic (76.1 mm)							

(7) : Maximum allowable fluctuation on supply voltage +/- 10%.

DIMENSIONS

SIZE			WA90D	WA130D	WA150D	WA200D	WA230D	WA300D	WA370D	
Length mm	STDPlus-STD-LN		4704			3304		4704		
		HE-SLN	3304			4704		6404		
Width mm	STDPlus-STD-LN		1054			1904				
		HE-SLN	1904					1910		
Height mm	STDPlus-STD-LN		1960							
		HE-SLN	1960					2000		
Operating weight kg	STDPlus-STD-LN		1250	1380	1520	1990	2080	2750	2912	
		HE-SLN	1750	1900	2050	2500	2700	-	-	

ELECTRICAL DATA

ECOLOGIC™ STANDARD Plus

SIZE	WA	100E	110E	90D	130D	150D	200D	230D	300D	370D
Cooling capacity (1)*	kW	93,7	105,4	91,7	126,6	150,3	191,2	235,6	283,1	353,4
Power absorbed (1)*	kW	41,2	50	36,8	55,4	61,3	88,2	108,5	133,1	163,5
Operating current (1)*	A	77,2/ 4,0	87,6/ 4,0	68,6/ 6,0	104,3/ 6,0	111,7/ 6,0	163,5/ 6,0	200,1/ 6,0	245,9/ 6,0	300,6/ 6,0
Maximum current (1)*	A	87,3/ 4,0	99,0/ 4,0	84,4/ 6,0	118,3/ 6,0	133,9/ 6,0	173,8/ 6,0	209,8/ 6,0	260,2/ 6,0	314,2/ 6,0
Max. starting current		197	244,8	186,4	228	279,7	350,8	432,8	437,2	537,2
Supply value (1)*	kvA	60,5/ 0,9	68,6/ 0,9	58,5/ 1,4	82,0/ 1,4	92,8/ 1,4	120,4/ 1,4	145,4/ 1,4	180,3/ 1,4	217,7/ 1,4
Sound power level (3)	dB(A)	94	95	93	96	96	97	98	99	100

ECOLOGIC™ LOW NOISE

SIZE	WA	100E	110E	90D	130D	150D	200D	230D	300D	370D
Cooling capacity (1)*	kW	95,3	107,6	90,1	124,1	147	194,7	234,9	288,7	352,3
Power absorbed (1)*	kW	38,4	46,7	36,2	54,9	61,3	88,3	105,8	123,9	159,5
Operating current (1)*	A	72,2/ 4,0	82,1/ 4,0	66,2/ 6,0	101,0/ 6,0	108,9/ 6,0	153,1/ 6,0	193,5/ 6,0	229,9/ 6,0	290,8/ 6,0
Maximum current (1)*	A	83,7/ 4,0	95,4/ 4,0	80,8/ 6,0	112,9/ 6,0	128,5/ 6,0	166,6/ 6,0	202,6/ 6,0	249,4/ 6,0	303,4/ 6,0
Max. starting current		193,4	241,2	182,8	222,6	274,3	343,6	425,6	426,4	526,4
Supply value (1)*	kvA	58,0/ 0,9	66,1/ 0,9	56,0/ 1,4	78,2/ 1,4	89,0/ 1,4	115,4/ 1,4	140,4/ 1,4	172,8/ 1,4	210,2/ 1,4
Sound power level (3)	dB(A)	88	89	89	90	91	92	92	93	94

ECOLOGIC™ SUPER LOW NOISE

SIZE	WA	40E	45E	65E	75E	100E	110E	90D	130D	150D	200D	230D	300D	370D
Cooling capacity (1)*	kW	40,6	46,6	64,5	74,5	96,2	111,0	93,2	129,0	149,0	192,0	222,0	285,7	347,6
Power absorbed (1)*	kW	13,5	16,3	24,0	28,4	35,7	42,2	32,2	47,6	56,3	70,8	83,8	119,4	156,5
Operating current (1)*	A	27,9/ 4,0	31,4/ 4,0	46,6/ 4,0	51,7/ 4,0	68,5/ 4,0	76,4/ 4,0	60,8/ 6,0	90,9/ 6,0	101,5/ 6,0	134,9/ 6,0	150,8/ 6,0	220,8/ 6,0	285,4/ 6,0
Maximum current (1)*	A	30,4/ 4,0	37,7/ 4,0	52,3/ 4,0	59,1/ 4,0	77,4/ 4,0	87,6/ 4,0	73,4/ 6,0	102,6/ 6,0	116,2/ 6,0	152,8/ 6,0	173,2/ 6,0	239,5/ 6,0	293,5/ 6,0
Max. starting current		115,2	140,8	203,1	206,5	228,2	235,0	176,5	253,4	263,6	306,6	320,6	416,5	516,5
Supply value (1)*	kvA	21,1/ 0,9	26,1/ 0,9	36,2/ 0,9	40,9/ 0,9	53,6/ 0,9	60,7/ 0,9	50,8/ 1,4	71,1/ 1,4	80,5/ 1,4	105,9/ 1,4	120,0/ 1,4	165,9/ 1,4	203,4/ 1,4
Sound power level (3)	dB(A)	78	78	79	80	81	82	81	82	83	84	85	85	86

ECOLOGIC™ HIGH EFFICIENCY

SIZE	WA	40E	45E	65E	75E	100E	110E	90D	130D	150D	200D	230D	300D	370D
Cooling capacity (1)*	kW	40,2	46,7	66,3	77,5	98,9	115,0	93,5	133,0	155,0	198,0	231,0	297,0	364,5
Power absorbed (1)*	kW	14,0	16,5	24,4	27,4	35,0	40,8	32,6	46,6	54,4	69,5	81,0	114,8	147,1
Operating current (1)*	A	28,7/ 4,0	32,0/ 4,0	46,3/ 4,0	51,2/ 4,0	68,2/ 4,0	75,6/ 4,0	62,0/ 6,0	90,5/ 6,0	100,3/ 6,0	134,4/ 6,0	149,1/ 6,0	219,3/ 6,0	276,3/ 6,0
Maximum current (1)*	A	32,0/ 4,0	39,2/ 4,0	53,8/ 4,0	60,6/ 4,0	79,7/ 4,0	89,9/ 4,0	76,4/ 6,0	105,6/ 6,0	119,2/ 6,0	257,4/ 6,0	177,8/ 6,0	246,0/ 6,0	300,0/ 6,0
Max. starting current		116,7	142,3	204,6	208,0	230,5	237,3	179,5	256,4	266,6	308,2	325,2	423	523
Supply value (1)*	kvA	22,1/ 0,9	27,2/ 0,9	37,3/ 0,9	42,0/ 0,9	55,2/ 0,9	62,3/ 0,9	52,9/ 1,4	73,2/ 1,4	82,6/ 1,4	109,0/ 1,4	123,2/ 1,4	170,4/ 1,4	207,8/ 1,4
Sound power level (3)	dB(A)	84	84	86	86	86	86	86	87	87	88	89	90	90

(1) : Condenser air inlet temperature : 35°C / chilled water 12/7°C

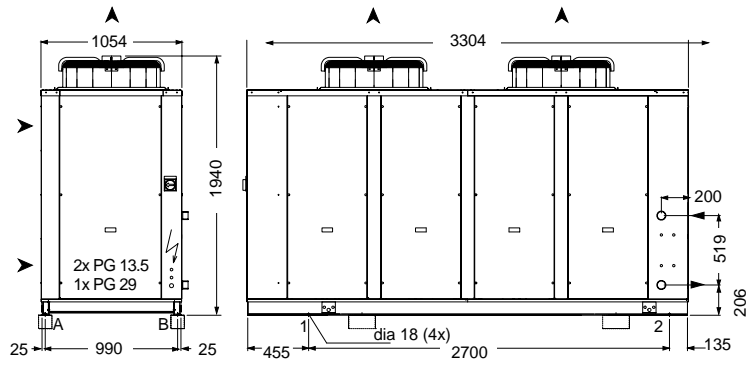
(3) : Sound power level in dB(A)

(*) : Power : 400V/III/50 Hz Control : 230V/I/150 Hz

DIMENSIONAL DATA

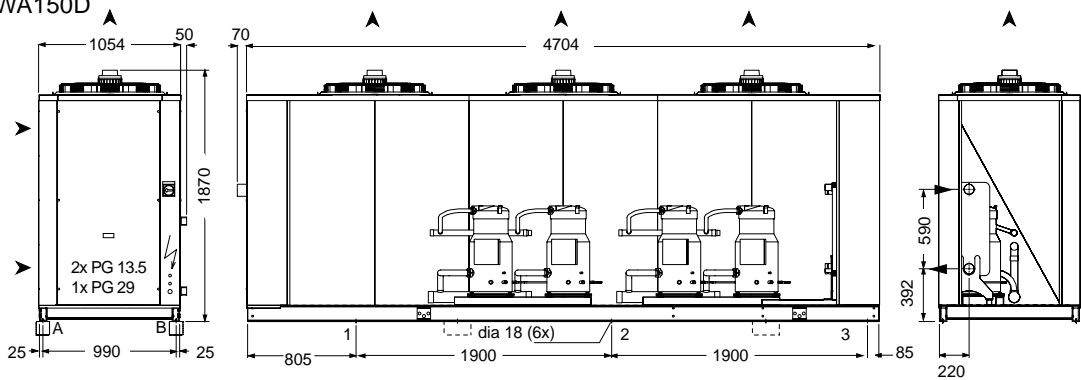
STANDARD - STANDARD Plus & LOW NOISE MODELS

2 FANS MODELS WA110E/WA110E



Standard Plus unit show for standard unit height is 1870

3 FANS MODELS WA90D only two fans WA130D/WA150D



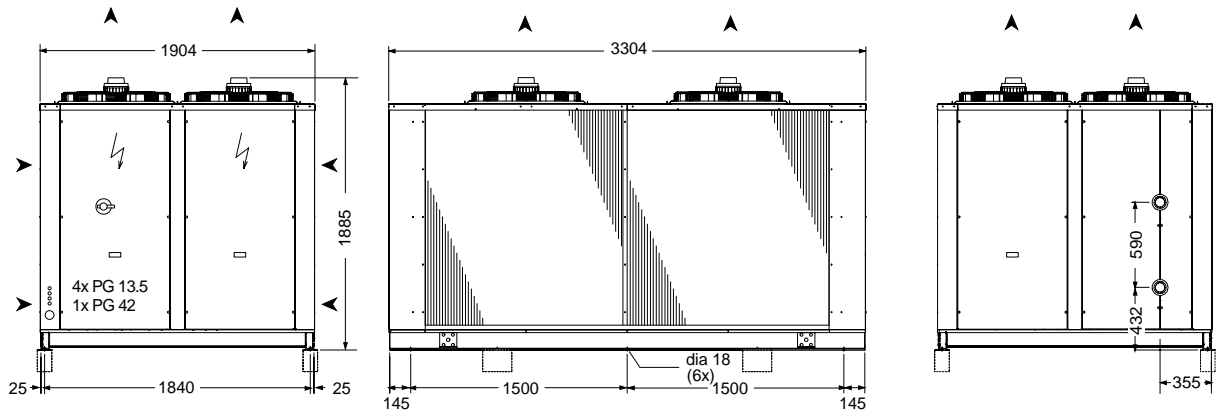
Standard unit show

Low Noise & Standard Plus unit adds 70 mm height

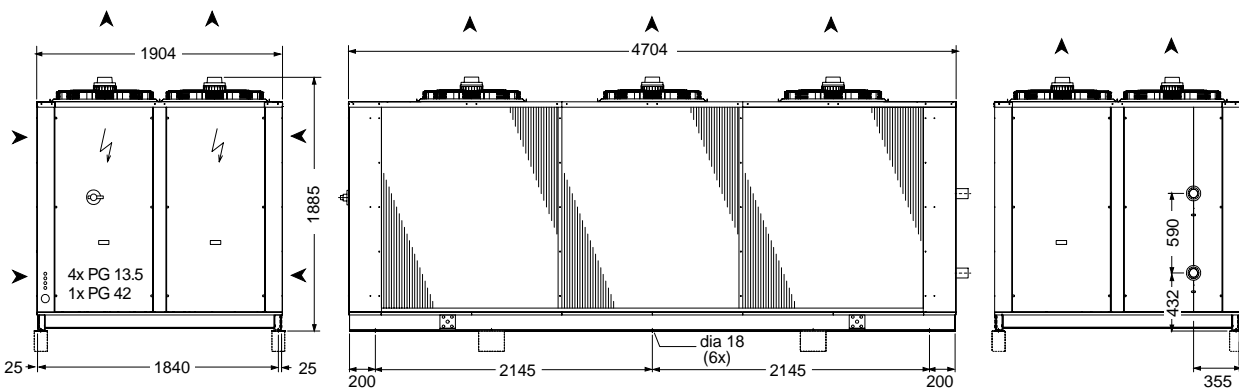
DIMENSIONAL DATA

STANDARD - STANDARD Plus & LOW NOISE MODELS

4 FANS MODELS WA200D/WA230D



6 FANS MODELS WA300D/WA370D

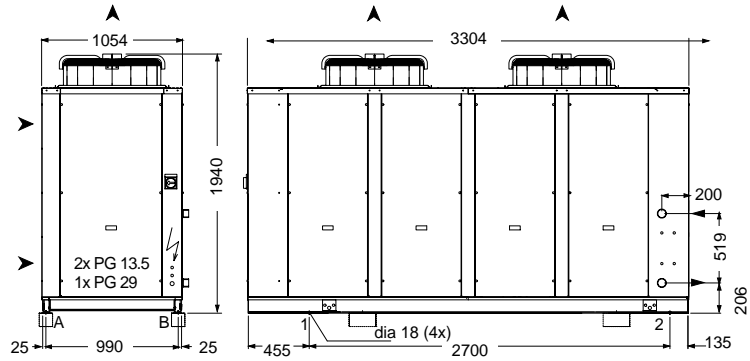


Note : Standard Plus & Low Noise unit adds 70 mm height

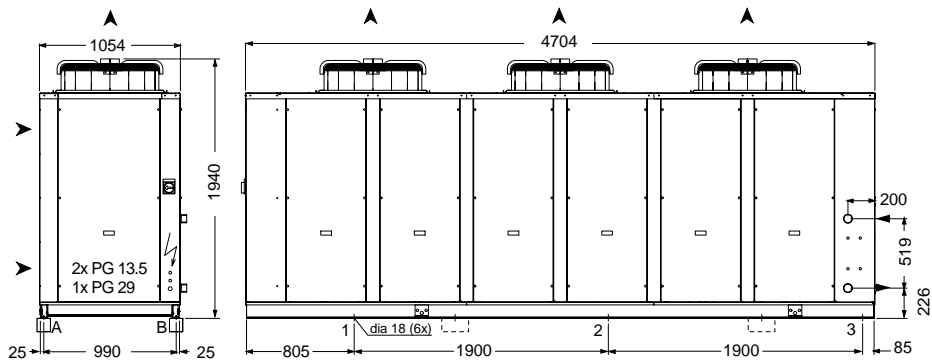
DIMENSIONAL DATA (cont'd)

HIGH EFFICIENCY & SUPER LOW NOISE MODELS

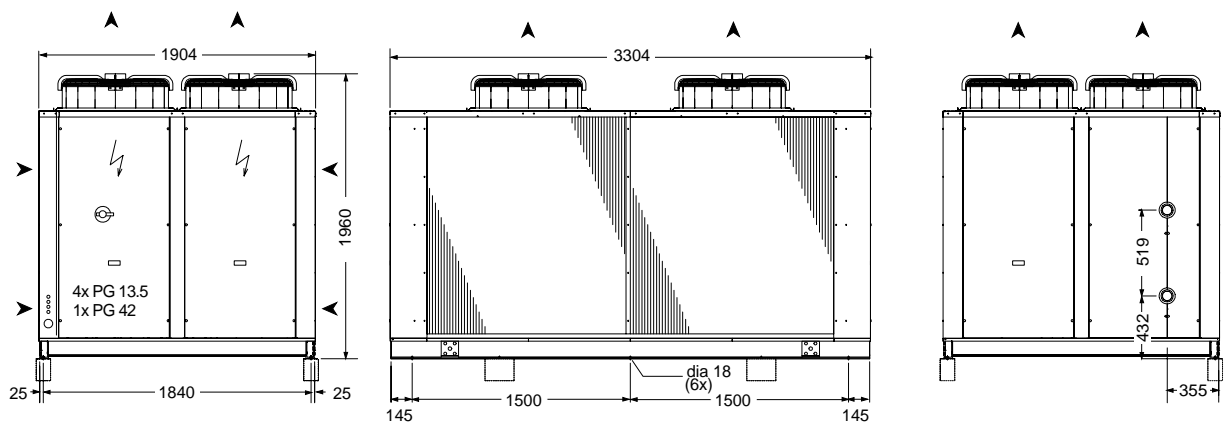
2 FANS MODELS WA40E/WA45E/WA65E/WA75E



3 FANS MODELS WA100E/WA110E



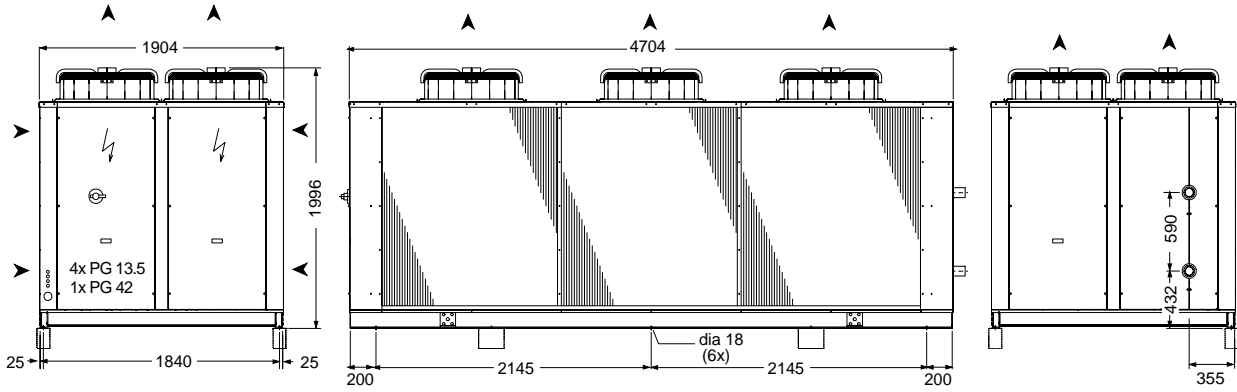
4 FANS MODELS WA90D/WA130D/WA150D



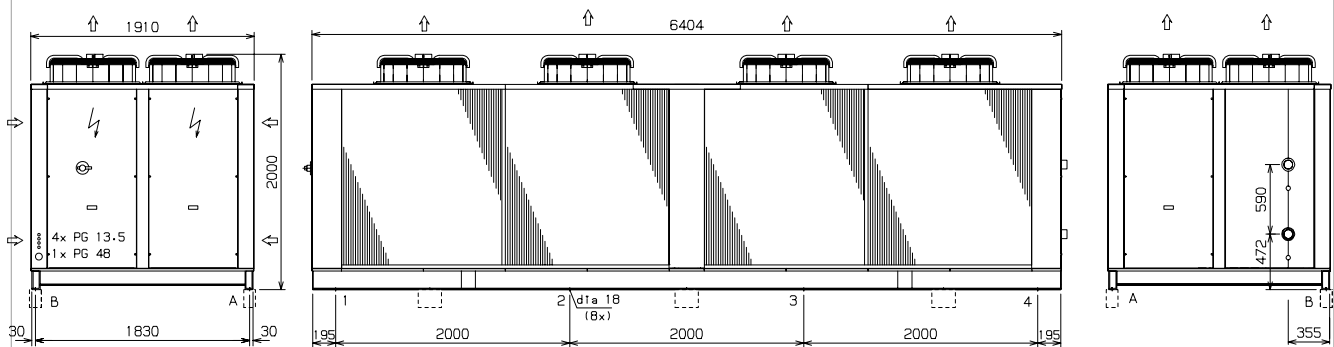
DIMENSIONAL DATA (cont'd)

HIGH EFFICIENCY & SUPER LOW NOISE MODELS

6 FANS MODELS WA200D/WA230D



8 FANS MODELS WA300D/WA370D



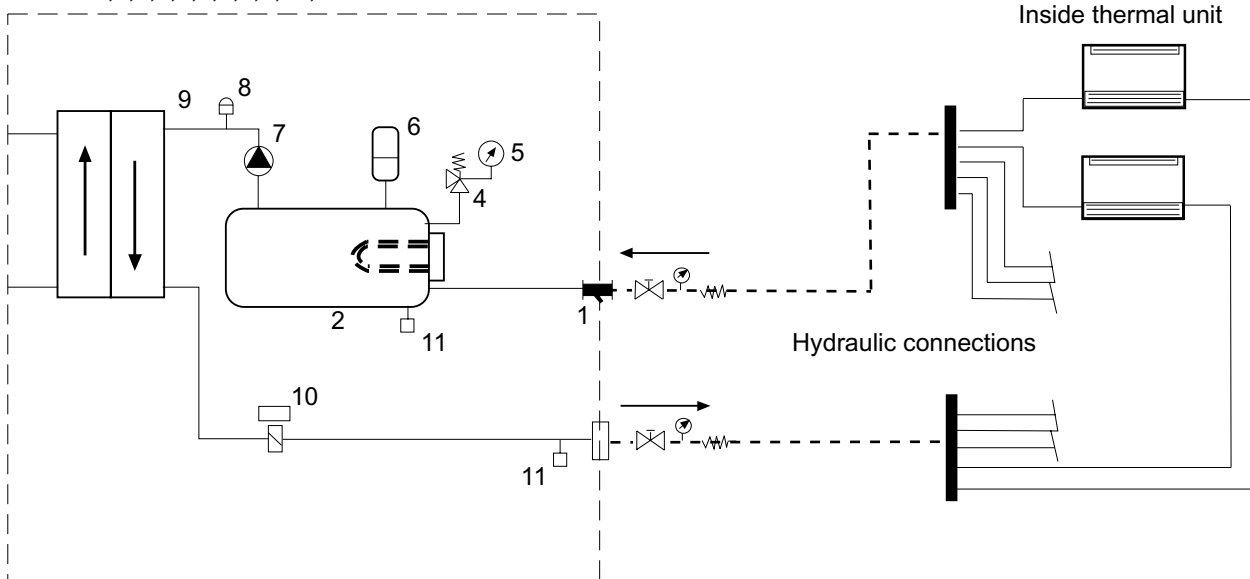
HYDRONIC & HYDRAULIC MODULE

The Ecologic system comprises a water cooler combined with a Hydronic or Hydraulic module.
The Hydronic and Hydraulic module contains the components which provide a multi-zone air conditioning system; these are as follows:

- | | |
|-----------------------------------|---------------------|
| 1.- Detachable water filter | 7.- Water pump |
| 2.- Water tank | 8.- Air purge valve |
| 3.- Water tank heater (in option) | 9.- Plate exchanger |
| 4.- Safety valve | 10.- Flow switch |
| 5.- Manometer | 11.- Drain valve |
| 6.- Expansion vessel (in option) | |

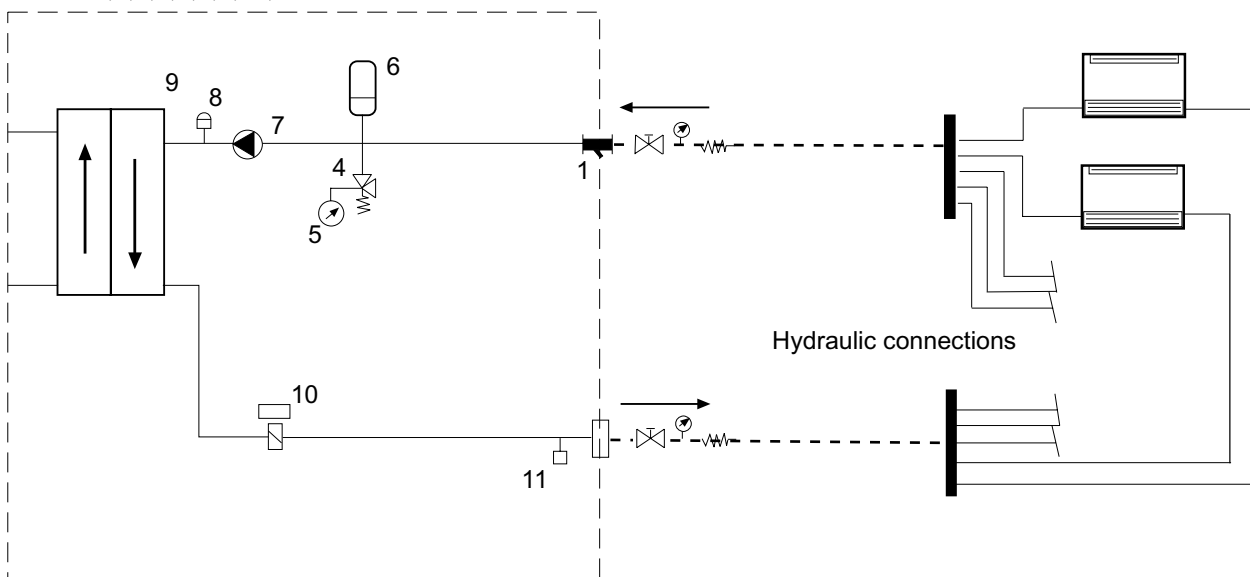
HYDRONIC module

Items n 1,2,3,4,5,6,7,8,9,10, 1



HYDRAULIC module

Items n 1,4,5,6,7,8,9,10,11



Hydronic Option 200 and 500 LITRE CAPACITIES Single and Dual Pump Options Models with Standard and High Pressure Options

Lennox Hydraulic packages are integral on Ecologic chillers. They are a compact design suitable for chilled circuits. The chiller unit can have a full hydronic module that consists of all the water system and a storage tank or there is the option to just have a pump set.

As the hydraulic system is integral with in the existing dimensions of the chiller it takes no additional plant space. This offers a saving to the owner as no rental space is used and there is no need for a separate pump plant room. It offers savings to the contractor as construction time is reduced and the whole pump installation including controls and electrics are supplied with the chiller.

The system can be easily coupled to the large range of terminal products offered by Lennox to complete the system. It requires only the installation of the interconnecting water pipework, flushing of the system and filling to complete the system. Lennox recommends that suitable water treatment be used to avoid damage to the heat exchangers.

SPECIFICATION HYDRONIC

Lennox Hydronic option shall be completely assembled with all interconnecting piping and wiring ready for field installation.

They must be integrated directly within the existing dimensions of Lennox chillers .

The unit structure shall be of heavy gauge galvanized steel fastened with stainless steel screws and bolts. All panels shall be easily removed for access to components. Galvanised steel parts shall be painted with baked on enamel colored white (RAL 9002).

Buffer Tank

The tank shall be manufactured from carbon steel and insulated with 13 mm thick closed-cell neoprene elastomer foam. Integral up to WA 150D.

It is not possible to offer a storage tank on units above the WA 150D in the STD and LN configurations

It is not possible to offer a storage tank on units above the WA 110E in the SLN and HE configurations

Pump(s)

The pumps shall be centrifugal type with stainless steel impellers. Standard or high head pressure pumps will be available on all models.

Pressure Gauge

A pressure gauge shall be included; Standard on Hydraulic kit and on pump system

Paddle Flow switch

A paddle flow switch is available suitable for various pipe sizes and flow rates supplied loose for fitting and set up by others. Flow switch is factory mounted on the hydraulic module or pump module

Safety Valve

The water side high pressure valve shall be fitted as standard and is calibrated at 3 bar

Automatic Vent Valve

The valve shall be installed at the highest point of the system in order to discharge air from the unit.

Drain/Charge Valve

Drain and charge valves shall be mounted as standard on the unit. The water drain will be positioned at the lowest point in the tank.

Pipe Insulation

All the pipes and hydraulic components shall be insulated with 13 mm thick closed-cell neoprene elastomer foam.

Control Panel

All power and control connections will be integral within the main chiller control panel. The control of the pumps will be via the unit microprocessor. The power circuit will have thermal over load protection for each pump with on/off isolator switch. The microprocessor will control the function of the pump or this can be interlocked with a remote on/off connection. The power panel will conform to CEI EN 60204-1, and include a mains isolator (option), contactors and for the pump and electric antifreeze heater, if present. The electrical panel shall conform to IP-43 weather protection (IP 55 an option).

SPECIFICATION HYDRAULIC

Lennox Hydraulic option shall be completely assembled with all interconnecting piping and wiring ready for field installation.

They must be integrated directly within the existing dimensions of Lennox chillers .

The unit structure shall be of heavy gauge galvanized steel fastened with stainless steel screws and bolts. All panels shall be easily removed for access to components. Galvanised steel parts shall be painted with baked on enamel colored white (RAL 9002).

Pump(s)

The pumps shall be centrifugal type with stainless steel impellers. Standard or high head pressure pumps will be available on all models.

Pressure Gauge

A pressure gauge shall be included; Standard on Hydraulic kit and on pump system

Paddle Flow switch

A paddle flow switch is available suitable for various pipe sizes and flow rates supplied loose for fitting and set up by others. Flow switch is factory mounted on the hydraulic module or pump module

Safety Valve

The water side high pressure valve shall be fitted as standard and is calibrated at 3 bar

OPTION

Automatic Vent Valve

The valve shall be installed at the highest point of the system in order to discharge air from the unit.

Drain/Charge Valve

Drain and charge valves shall be mounted as standard on the unit. The water drain will be positioned at the lowest point in the tank.

Pipe Insulation

All the pipes and hydraulic components shall be insulated with 13 mm thick closed-cell neoprene elastomer foam.

Electrical Panel

All power and control connections will be integral within the main chiller control panel. The control of the pumps will be via the unit microprocessor. The power circuit will have thermal over load protection for each pump with on/off isolator switch. The microprocessor will control the function of the pump or this can be interlocked with a remote on/off connection. The power panel will conform to CEI EN 60204-1, and include a mains isolator (option), contactors and for the pump and electric anti freeze heater, if present. The electrical panel shall conform to IP-43 weather protection (IP 55 an option).

SEPARATE OPTIONS

Antifreeze Electric Heater

A factory fitted 750 or 1500 W armored electric heater fitted around the buffer tank for antifreeze protection. The pipework wound with a trace heating element and insulated on the pump section

Anti-vibration Mounts

The hydraulic module adds additional weight and point load distribution please select the correct selection. As the hydraulic module is integral with the chiller no additional AVMs are required.

Larger Buffer tank

The standard Buffer tank is 200 litre this is available on STD and LN unit's upto WA150D there is an option to have a larger 500 litre tank on 90D, 130D and 150D. On the SLN and HE units it is possible to have a buffer tank only on the E type single circuit units. A buffer tank is not available on the D dual circuit machines.

Water Valves

Flow and return manual isolation valves to prevent the flow of water through the unit and allow the unit to be serviced or drained down for the winter.

Differential flow switch

A flow switch that operates on differential pressure between the flow and return is available supplied loose for fitting by others.

Water Filter

A water filter supplied loose for fitting in the flow to the evaporator. The water filter is required to prevent dirt and debris entering the evaporator. The water filter is fitted with a removable strainer element that can be removed without dismantling the whole filter assembly.

Pressure Gauges

Water pressure manometer gauges are available for the flow and return headers so that the pressure drop across the evaporator can be monitored.

Inlet and outlet thermometers

Mercury filled thermometers are available for the inlet and outlet water connections

Expansion Tank

A diaphragm tank with nitrogen charge will be provided. Single or double units (option).

Note

A full pump set is available as an option on all Ecologic Units.

It is not possible to offer a storage tank on units above the WA 150D in the STD and LN configurations

It is not possible to offer a storage tank on units above the WA 110E in the SLN and HE configurations

You can have the full pump module plus options integral on unit and offer a buffer tank as a remote item either to be mounted close to the chiller (fully paneled) or just the tank to go into the system inside the building.

On larger systems with 6 compressors and a larger water volume there is not the same need for a buffer vessel as on the smaller capacity systems.

Pumps

A selection of pumps is offered to match the performance of each chiller, Twin pump sets are offered as an option. Additional pumps are available as special order items contact customer service.

WA	40E to 65E	75E to 110E/90D	130D to 200D	230D to 370D
Pumps simples	UPS 50-180	UPS 50-180 LP 65-125/104	UPS 65-180 LP 65-125/117	LP65-125/128
Pumps doubles	-	LPD 80-125/104	LPD 80-125/117	LPD 80-125/128

To supply and install, where specified in the project n° unit(s) air-cooled water chiller with cooling capacity of kW, to cool m³/hr. of water from °C to working with °C ambient temperature. The unit should work with electricity at V. 3ph. 50Hz. The electrical power absorbed should not overcome kW. The units COP will be at least at the working conditions of the project. Part load COP will be at least at the working conditions of the project. For the units with 2, 3, 4 and 6 compressors the chillers will have (1) or (2) independent refrigerant circuits, with the respective electronic microprocessor will allow the starting of the compressors and the control of the chiller. Each chiller will be factory assembled on a robust base frame made of zinc coated steel. The panels will be zinc coated steel panels protected by an epoxy coated paint. The unit will be tested in the factory at the nominal working conditions and water temperatures. Before shipment a full refrigerant leak test will be held to avoid any losses, and the units will be filled with oil and refrigerant.

General

Units are leak and pressure-tested at 27 bars (400 psi) high side and 16.5 bars (200 psi) low side, and then evacuated and charged. Packaged units ship with a full operating charge of oil and refrigerant. Unit panels, structural elements, and control boxes are constructed of 1.5 to 3 mm (11 to 16 gauge) galvanized sheet metal. The chiller is constructed on a solid rugged base frame constructed of "C" section steel beams welded together to form a ridged base. The base is structurally able to carry the unit weight and is torsion ally ridged with no vibrating sections. The base is hot dipped galvanised for corrosion protection. The chiller is lifted, moved and mounted via the base frame that contains AVM mounting and lifting points as standard. Unit panels and control boxes are finished with baked-on powder paint, and the structural-steel base is finished with an air-dry paint. The unit is painted to RAL 9002 as standard. All the internal surfaces are coated in a clear urethane lacquer to protect the insulation and pipework (option). The units must be constructed to meet European regulations and standards specifically EN $\text{C} \text{€}$ 60204-1, NR 2037/2000, ISO9001, & Eurovent certification performance standards

Compressors

All units will have direct driven hermetic Scroll compressors . The scroll compressor axial seal will be achieved by floating tip seals the radial seal is achieved via a micro cushion of oil. The compressor motors will be suction gas cooled and have thermal overload device. The operating limits of the compressor motors will allow for +/- 10% of the nameplate voltage. The compressors must be mounted on vibration isolation pads to reduce noise transmission.

Evaporator

The evaporator is twin brazed plate type designed, tested, and stamped in accordance with the appropriate pressure-vessel code approval. The evaporator is designed for a waterside working pressure of 30 bars (146psi) and refrigerant side 30 bars (450psi). Water connections are grooved stubs for simple site connection; the water connections must be sealed for shipping. The evaporator includes and is insulated with 13 mm (1/2 inch) (K-0.26). Optional evaporator heaters with thermostats are provided to protect the evaporator from freezing at

ambient temperatures down to -20°C (-6°F). The evaporator is designed to operate with a flow detection device. Options are for a paddle type (supplied loose fitting by others) or differential pressure type switch . The evaporator will have independent refrigerant circuits. The evaporator should be protected from debris and a water filter is available as an option

Condenser coil

the condenser coils are constructed with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into rippled aluminum fins with full fin collars for higher efficiencies. A collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion, gives the spacing between the fins. The coils fin space should allow the coil to be washable to maintain operating efficiency. The coils will have an integral subcooler circuit which provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency of 5,7% without an increase in power absorbed, and the surface area will be dimensioned in a way to permit an air velocity not greater than 2.8 m/sec.

Condenser fans

the condenser fans are direct drive vertical discharge Hushtone helical type with multiple aerofoil blades for higher efficiencies and lower noise. The fan blade will be of the sickle end type mounted in a bell mouth orifice. The air discharge is vertical and each fan will be coupled to the electrical motor, supplied as standard to IP55 class "F" insulation with and capable to work to ambient temperatures of -20°C to +55°C max humidity 80%. The fans are direct driven via or three-phase motor with permanently lubricated ball bearings. The motors are designed for external operation and are available in 4 different speeds with the option of two-speed motor.

Low Noise and Super Low Noise Versions

The low noise version uses low noise fans designed to minimise external noise emissions while maintaining a high airflow. The fan blade will be of the sickle end type mounted in a bell mouth orifice. The air discharge is vertical and each fan will be coupled to the electrical motor, supplied as standard to IP55 class "F" insulation and capable to work to ambient temperatures of -20°C to +55°C max humidity 80%. The fans are direct driven via a three-phase motor with permanently lubricated ball bearings.

Control panel - field power connection, controls interlock terminals, and unit control system shall be centrally located in a weatherproof cabinet accessible through a lockable door. Power and starting controls shall be separate from safety and operating controls in different compartments of the same panel. All 3-phase connections shall be fully shrouded to prevent accidental contact. Power and starting controls shall include lockable individual thermal overloads and contactors for each compressor winding and fan motors. Operating and safety controls shall be via a microprocessor controller. Solid-state protection for compressor motor; high and low pressure cut-out switch (for each refrigerant circuit);

anti-freeze thermostat. Standard single point power connections include main three-phase power to the compressors, condenser fans, and (optional) control power transformer, and (optional) connections are available for the 230-volt single-phase power for freeze protection on the evaporator heaters. All internal cables must be tied. The chillers will have full earth bonding between isolated metal parts.

Climatic II option plus solid-state protection for compressor motor; high and low pressure cut-out switch (for each refrigerant circuit); anti-freeze thermostat. Standard single point power connections include main three-phase power to the compressors, condenser fans, and (optional) control power transformer, and (optional) connections are available for the 230-volt single-phase power for freeze protection on the evaporator heaters. All internal cables must be mounted on cable tray and tied. The chillers will have full earth bonding between isolated metal parts.

Control & capacity regulation

The standard control module is a weatherproof digital display. The display shows upto 4 numeric or letter sequences. In addition to the digital display there are functional LEDs to denote unit operation. Control interface will be via push button and menu screens for simple use.

All alarms and faults are shown via the display

Functions

Remote stop start (remote connection by others)

Flow switch (remote connection by others)

Compressor overload Alarm

High pressure Alarm

Low pressure Alarm

Operating hours compressors

Operating hours Pump

Condenser fan control

Chilled water pump

Freeze protection

Chilled water set point control

Remote chilled water reset (4-20mA)

Alarm counter to go from auto reset to manual reset

Self-diagnostic on sensors

Password protection of settings

Remote display option

Remote communication to PC option

Advanced Controller

All the above functions plus

This is supplied with a removable Digital user interface KP02

Display is a digital single line

1. Status of Pumps (chilled water, condenser water and secondary system)
2. Fault history for each refrigeration circuit (last 24 occurrences)
3. Fault history for pumps
4. Hours run
5. Automatic balance of compressor run hours
6. Time clock, day, date for auto scheduling of the chiller
7. Chilled water set point, with programmable predictive PID control
8. Programmable auto reset of chilled water set point based on ambient temperature
9. Programmable condenser fan staging
10. Start and stop of pumps (run and standby)
11. Auto switching if lead pump fails
12. Display of all refrigerant temperature and pressure values, Ambient and Chilled water temperatures
13. Display of timer status (Start and anti recycle)
14. Display of chilled water temperature curve over 24Hrs
15. Adaptive logic to avoid nuisance fault trips
16. General machine faults; chilled water flow, loss of power, freeze protection
17. Refrigeration circuit faults; Hp & Lp and high discharge temperature
18. Compressor faults; Motor temperature, phase protection,
19. Capacity staging, plus loading delay on start, and predictive control logic
20. Common alarm
21. Fan circuit breaker trip
22. Pump circuit breaker trip
23. Insufficient chilled water flow
24. Programmable temperature difference set point between flow and return water
25. Freeze protection
26. Programmable Minimum and maximum water set point
27. Self diagnostic on sensors and communications
28. Self diagnostic on electronic expansion valves
29. Adaptive Control of Electronic TEV
30. Phase protection (option)
31. Password protection
32. Options for remote control and BMS interface
On the High efficiency and Super low noise Climatic II is standard, LCD display is an option. Weatherproof LCD crystal backlight display 240x128 pixels. Monitoring upto 2050 points. Control interface will be via push button and menu screens with graphic icons for simple use.
All alarms and fault are in full written display, fault codes are not acceptable.
33. A full screen display of all operating conditions in a graphic layout
34. Status of Pumps graphic display (chilled water, condenser water and secondary system)

Refrigerant piping

Each refrigerant circuit shall include a factory insulated suction line, manual liquid line isolation valve with charging connection; a refrigerant filter drier, sensor indicator; liquid line solenoid valve, thermostatic or (option) electronic expansion valve (std on HE), and 27 bar relief valve. All refrigerant pipework must be clamped to prevent vibration and all small-bore lines should be high pressure plastic with aircraft type fittings. The refrigerant lines should contain independent Schrader valve test points for maintenance

Electronic expansion valve

(standard on high efficiency unit Optional on others)

Each refrigerant circuit will be equipped with an motorized electronic expansion valve controlled by 0-10V working with a PID system, this type of system allows a simple control system that quickly interacts at load variations. This valve combines two functions as a liquid solenoid and electronic expansion valve. It shall be managed directly by the *ClimaticII* microprocessor

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