Ecologic

Ecologic WA, air-cooled screw chillers, capacities from 285 to 430 kW

Green
High Performance
Low Noise

Refac B.V.

Refac Ecologic, air-cooled screw chillers, capacities 285 - 430 kW

The Ecologic air-cooled screw chiller extends the successful Ecologic mid range scroll versions to a capacity of 430 kW.
The three most important points in the design of these air-cooled screw chillers are:
- Low-noise design as standard.
- Exceptionally energy-efficient, particularly when operating under partial loads.
- Virtually maintenance-free, semi-hermetic screw compressors with a maintenance cycle of up to 40,000 operating hours.

The range comprises four models (285, 325, 380 and 430 kW) provided with two completely separated refrigerant circuits each with a screw compressor offering individual capacity control.

Respect for our environment

Priority has been given to the environment in the development of the Ecologic. This is demonstrated by the following characteristics:
- Supplied with the ozone-friendly refrigerant R407C as standard.
- High efficiency: maximum use is made of the energy.
- The materials used are recyclable.
- 30% energy savings are possible with the Enertronic Control System
- Less refrigerant is needed through the use of a plate-type evaporator.
- Low-noise concept - one of the quietest products available.

High performance

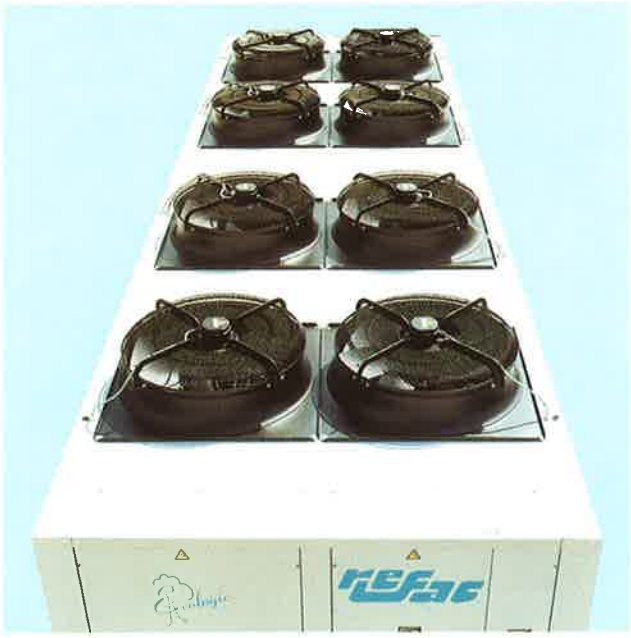
With the Ecologic, Refac's emphasis is on optimizing chiller performance. The chiller is equipped with Bitzer screw compressors that are highly efficient and vibration-free in operation.
The reliability of these compressors is evident from the fact that they require virtually no maintenance or inspection for up to 40,000 operating hours.
The control of the water outlet temperature (adaptive) in combination with the use of a plate-type evaporator in the dual-circuit version ensures great reliability and offers the possibility of remote setpoint adjustment as standard.

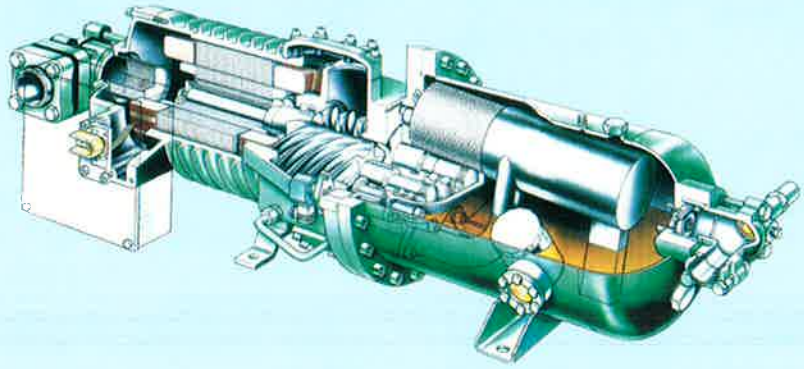
The Enertronic Control System ensures an optimized COP under all operating conditions.

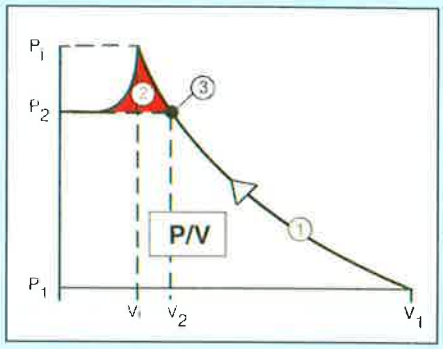
Low-noise model as standard

Thanks to the use of high-speed semi-hermetic screw compressors, this range of Ecologic air-cooled chillers for outdoor use comes in a low-noise version as standard.

This favourable noise performance is the result of:
- The use of superior new fan technology with low-speed 6-pole axial fans, high-tech sickle-shaped blades and an aerodynamically designed intake opening.
- The low air velocity over a large condenser surface minimises air noise.
- The installation of the screw compressors in a heavy-duty sound-absorbing enclosure with acoustic insulation panels.
- The ingenious use of sound-absorbing materials
- Mounting of the compressors on rubber vibration dampers.







The screw compressor

The modern Bitzer semi-hermetic screw compressor forms the basis of the Refac Ecologic screw chiller. This has been specially designed for air conditioning use. The integral oil separator guarantees perfect lubrication of the high-specification bearings under all operating conditions. Features of these screw compressors are:

- High energy efficiency, due to:
  - the automatic Vi control for adjusting capacity under operating conditions that differ from the design values.
  - the high efficiency of the suction gas cooled electric motor
- Capacity regulation for partial load, which also provides no-load start-up.
- Electric motor for part-winding starting method.
- Safety pressure relief valve.
- Protection against excessively high compressed gas temperature.

Automatic Vi control

Screw compressors are displacement compressors and it is very important that:

- the ratio between the intake volume and compressed volume (the internal volume ratio) is based on the type of application.
  The geometry of the outlet port is vital.
- the internal ratio can adjust to the actual operating conditions, which differ from the design condition for the screw compressor.

The extent to which the screw compressor meets these criteria determines the energy loss through over-compression and/or under-compression.

The Bitzer compressors have an automatic Vi control. This unique control ensures that the screw compressor works according to the actual operating conditions and not the initial design condition.
This significantly reduces the energy consumption of the screw compressor over a large operating range and is particularly important for use in air conditioning, where the required cooling capacity varies widely.

Standard economiser

The standard version includes an Economiser achieving a significant increase in the full-load capacity of the screw compressor whilst improving the efficiency. Each circuit is fitted with this Economiser, which provides extra supercooling and is integrated in the Enertronic Control System.

Enertronic Control System (ECS)

Ecologic screw chillers are supplied as standard with the SAIA PLC, otherwise known as the Enertronic Control System (ECS), that has been pre-programmed by Refac to guarantee minimum energy consumption under all operating conditions. This is achieved by keeping the condensing pressure as low as possible under all conditions. This will greatly reduce power consumption, giving annual energy savings of up to 30%, particularly when combined with the use of electronic expansion valves.
As a chiller operates almost entirely under partial load conditions, the ECS offers the maximum COP. It goes without saying that the operating, read-out and monitoring facilities of the ECS are detailed and user-friendly.

Communications

The ECS facilitates open communication with a building management system via the LONWORKS network technology as standard.

Chiller test bench

Every Ecologic chiller is tested under Eurovent conditions on the ultra-modern REFAC test bench to confirm the quoted capacity data.

Important options

- Alucoat 507 condenser coating
- Anti-vibration dampers (rubber/spring)
- Flow switch or differential pressure switch
- RAL colour as specified
- Pressure gauge panel
- Copper/copper condenser
- Refrigerant R22
- Super low-noise version on request

Technical data (R407C)

Ecologic Low-Noise		WA285D-LN	WA325D-LN	WA380D-LN	WA430D-LN
Cooling capacity 1)	kW	283.3	324.4	380.7	431,5
Power consumption 1)*	kW	110.3 / 1.4	129.1 / 1.4	145.9 / 1.4	164,8 / 1,4
Operating current 1)*	A	182.5 / 6	211.8 / 6	237.4 / 6	279.4 / 6
Maximum current*	A	192 / 6	230 / 6	265 / 6	311 / 6
Max. starting current 7)	A	367	414	495	591
Elec. connection value*	kVA	133 / 1.4	159.3 / 1.4	183.6 / 1.4	215.5 / 1.4
Sound power level 2)	dB(A)	90	90	91	91

General					
Number of compressors		2			
Number of fans		8		12	
Number of cooling circuits		2			
Capacity steps	%	0/25/37/50/75/87/100			
Electrical supply 6)		3~400V-50Hz+PE & 1~230V-50Hz+N+PE			
Refrigerant	kg	112	130	150	180
Water volume	l/s	13.5	15.4	18.1	20.5
Water pressure drop	kPa	36	38	39	30
Min. water vol. of system 5)	dm^3	1600	1900	2200	2500
Operating weight	kg	3250	3600	4450	4750
Dimensions					
Length	mm	6404		9204	
Width	mm	1910		1910	
Height	mm	2000		2040	
Water connections 3)	inch	2 1/2" Victaulic (76.1 mm)			

Notes:
1 Condenser air inlet temperature 35°C, chilled water inlet 12°C, outlet 7°C
2 Sound power level in dB(A) re 1 pW
3 Water connections with separately supplied counter-coupling and flange
4 The above data are based on a new machine with clean evaporator
Correction factor for a fouling factor of 0.44x10-4 m2K/W: on cooling capacity 0.98, on power consumption 0.99
5 Water volume of chiller compared with installation is negligible
6 Maximum allowable variation in supply voltage +/- 10%
7 Maximum starting current = start of one compressor, other compressor and all fans under maximum load
8 Maximum allowable static water pressure: 10 bar
* 400V / 230V supply

Subject to change

FOR THE NETHERLANDS AND EXPORT: REFAC B.V., P.O. BOX 1028, 3860 BA NIJKERK, TEL.: 033-2471800, FAX: 033-2459220
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printed by reproka b.v. - Oktober 1999 A999940245 Printed on chlorine-free paper