Water chillers
Heat pumps

AQUACIAT POWER

High ***energy efficiency***
Compact and ***quiet***
Scroll compressors
High efficiency ***brazed plate*** *heat exchangers*
CIAT self-adjusting electronic control

Cooling capacity: *190 to 640 kW*
Heating capacity: *190 to 500 kW*

Cooling only

Heat pump

Hydraulic module

Partial and total heat recovery

HFC R410A

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

USE

The latest generation of **AQUACIAT^{POWER}** air-to-water heat pumps and water chillers offers an optimal solution for all cooling or heating applications used for the Office, Healthcare, Industry, Administration, Retail and collective housing sectors.

These units are designed for outdoor installation and require no special protection against adverse weather conditions.

The range has been optimised to use ozone-friendly **HFC R410A** refrigerant. The use of this refrigerant guarantees compliance with the most demanding requirements for environmental protection and increased seasonal energy efficiency (ESEER).

RANGE

AQUACIAT^{power} LD series
Cooling only version without hydraulic system.

AQUACIAT^{power} LDC - LDH series
Cooling only version with hydraulic system (circulation pump only or pump and buffer tank).

AQUACIAT^{power} ILD series
Reversible heat pumps without hydraulic system.

AQUACIAT^{power} ILDC - ILDH series
Reversible heat pump version with hydraulic system (circulation pump only or pump and buffer tank).

DESCRIPTION

The **AQUACIAT**$^{\textbf{power}}$ units are packaged machines supplied as standard with the following components:

- hermetic SCROLL compressors
- water-cooled evaporator or hot water condenser with brazed plates
- air-cooled exchanger with axial fan motor assembly
- Electrical power and remote control cabinet:
  - general electrical power supply 400V-3ph-50Hz (+10% / -10%) + earth
  - transformer fitted as standard on the machine for supplying the remote control circuit with 230V-1ph-50Hz (+10% / -10%)
- CIAT CONNECT 2 electronic control module
- casing for outdoor installation

The entire **AQUACIAT**$^{\textbf{power}}$ range conforms to standards EN 60-204 and EN 378-2 and the following European Directives:

- Machinery 2006/42 EC
- EMC 2004/108/EC electromagnetics
- 2006/95/EC low voltage
- Pressure equipment directive 97/23/EC. category 2 for the cooling only series
  category 3 for the heat pump series

NOMENCLATURE

ILD	>	heat pump version	**H**	>	hydraulic with pump and buffer tank
LD	>	cooling only version	**1800**	>	unit size
C	>	hydraulic with pump only	**V**	>	R410A refrigerant

CONFIGURATION

STD	>	Standard (ventilation 905 rpm)
STDLN	>	Standard Low Noise (ventilation 715 rpm + acoustic insuation of compressors)
STDXLN	>	Standard Xtra Low Noise (specific ventilation 715 rpm + acoustic insuation of compressors)

LDC - ILDC 1400V - 1500 V models

DESCRIPTION OF THE MAIN COMPONENTS

Compressors

- Hermetic SCROLL
- built-in electric motor cooled by suction gases
- motor protected by internal winding thermostat
- placed on anti-vibration mounts

Evaporator

- brazed plate exchanger
- stainless steel plates (AISI 316)
- plate patterns optimised for high-efficiency
- armaflex thermal insulation

Condenser

- high efficiency air-cooled exchanger, aluminium fins with optimised profiles and grooved copper, tubes
- condenser or evaporator mode heat exchanger on ILD-ILDC-ILDH reversible heat pump versions
- axial fans with profiled blades
- IP 54 class F motors

Cooling accessories

- dehumidifier filters with rechargeable cartridges
- hygroscopic sight glasses
- solenoid valves on refrigerant lines (reversible heat pump version)
- thermostatic expansion valves heat pump and cooling only versions models 702 to 1100V
- electronic expansion valves (cooling only models 1200V to 2400V)

Control and safety instruments

- low and high pressure sensors
- safety valves on refrigeration circuit
- water temperature regulation sensors
- evaporator frost protection sensor
- factory-assembled evaporator water flow controller

Electrics box

- IP 44
- 400V-3Ph-50 Hz power supply + earth (+10% / -10%)
- main safety switch with handle on front
- control circuit transformer
- fan and compressor motor circuit breaker
- fan and compressor motor contactors
- CONNECT 2 microprocessor-controlled electronic control module
- wire numbering
- marking of the main electrical components
- RAL 7035

CONNECT 2 electronic control module

The CIAT electronic control module performs the following main functions:

- regulation of the chilled or hot water temperature
- regulation of the water temperature based on the outdoor temperature (water law)
- regulation for low temperature energy storage
- second setpoint management
- complete management of compressors with start-up sequence, timer and runtime balancing
- self-adjusting and proactive functions with adjustment of settings on drift control
- series stage system on compressors lowers power according to cooling and heating demands
- management of compressor short-cycle protection
- management of the machine operation limit according to outdoor temperature
- automatic switching between hot and cold according to outside temperature
- diagnosis of operation and fault states
- management of a fault memory allowing a log of the last 20 incidents to be accessed, with an operational reading taken when the fault occurs
- master/slave management of the two machines in parallel with balancing of the running times and automatic changeover if a fault occurs on one machine
- machine timer programming
- display and access to the operating parameters via a multilingual LCD screen with 4 lines of 24 characters

Remote control

CONNECT 2 is equipped as standard with an RS485 serial port offering a range of remote management, monitoring and diagnostic options via the communication bus.

Several contacts are available as standard which enable the **AQUACIAT POWER** to be controlled remotely by cabled link:

- automatic operation control: when this contact is open, the machine stops
- setpoint 1/setpoint 2 selection: when this contact is closed, a second cold setpoint is activated (energy storage mode, for example)
- HEATING/COOLING mode selection: this input switches from one operating mode to another.

  Contact closed = HEATING mode

  Contact open = COOLING mode
- setpoint adjustable by 4-20 mA signal: this input allows the setpoint to be adjusted in HEATING or COOLING mode
- compressor load shedding: closing the contact or contacts concerned allows the power or cooling consumption of the machine to be limited by stopping one or more compressors
- water pump 1 and 2 control: these outputs control the contact switches for one or two water pumps
- fault reporting: this contact indicates the presence of a major fault which has caused one or both cooling circuits to stop

Power control

Series stage output control system on the compressors

Frame

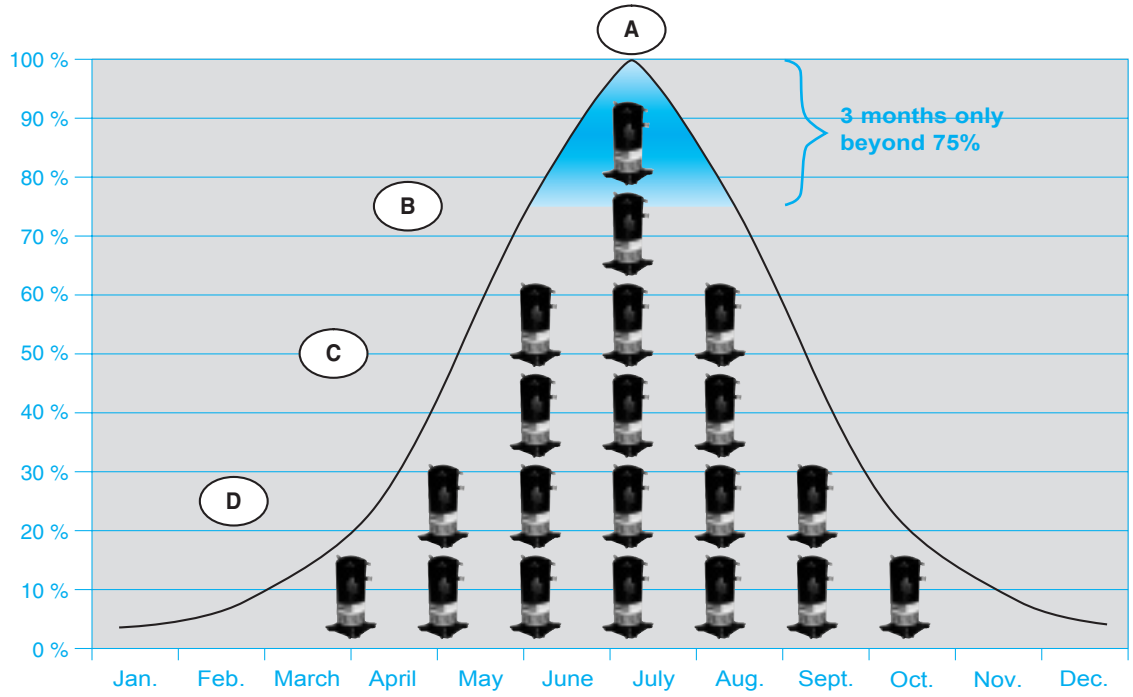
Frame made from RAL 7024 and RAL 7035 painted panels

SEASONAL PERFORMANCE

Most central air conditioning systems installed in the tertiary sector in Europe use water chillers to provide cooling.
Analyses of installed systems show that heat load varies from season to season and that a water chiller operates at **reduced capacity for the majority of the time**.

The **E**uropean **S**easonal **E**nergy **E**fficiency **R**atio (**ESEER**) measures the seasonal efficiency of water chillers by taking into account their efficiency under partial load using formula created by the **European certification body Eurovent**.

Seasonal heat load variations



ESEER = A x EER100% + B x EER75% + C x EER50% + D x EER25%

A. B. C and D are weighting coefficients pertaining to a unit's running time based on its load

The ESEER design conditions for WATER-cooled air chillers are as follows:

Unit load	Condenser air inlet temperature	Chilled water temperature	Weighting coefficient
100 %	35°C	12°C/7°C (*)	A = 0.03
75 %	30°C	10.8°C/7°C (*)	B = 0.33
50 %	25°C	9.5°C/7°C (*)	C = 0.41
25 %	20°C	8.3°C/7°C (*)	D = 0.23

(*) Water flow rate = Water flow rate at 100%

The efficiency under partial load is therefore essential when choosing a water chiller. It is with this in mind that the new **AQUACIAT^{power}** range was designed. In particular. the entire range uses **R410A** refrigerant which. thanks to its extremely high thermodynamic performance. makes it possible to obtain much higher **ESEER** ratings

As its compressors are connected in parallel on the refrigeration circuit. **AQUACIAT^{power}** easily and efficiently adjusts the cooling capacity to the system's needs. The self-adjusting **CONNECT 2** control anticipates variations in load and starts only the number of compressors needed. This ensures optimum operation of the compressors and guarantees energy efficiency for the majority of the system's life.

VERSION WITH HYDRAULIC PACK

LDC - LDH - ILDC - ILDH series

The All-in-One solution

The PLUG & COOL solution offered by AQUACIATpower LDC - LDH - ILDC - ILDH

The hydraulic module contains all the water circuit components needed for the system to operate correctly:

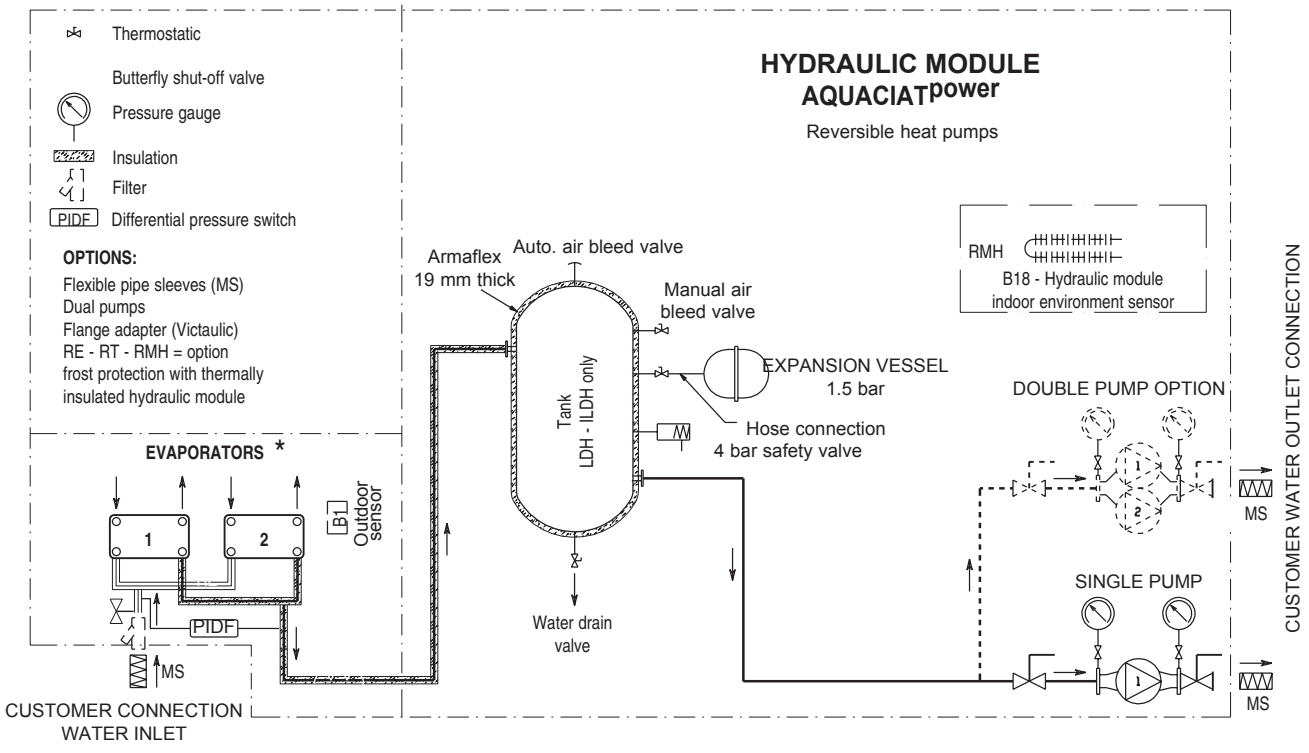
- Insulated buffer tank **(LDH - ILDH only)**
  . 500 litres for models 702V to 1100V
  . 950 litres for models 1200V to 2400V
- Expansion vessel:
  . 35 litres for (I)LD(H-C) 702V to 1100V
  . 50 litres for (I)LDC 1200V to 2400V
  . 80 litres for (I)LDH 1200V to 2400V
- Water filter
- Wide selection of single and dual pumps for your system's flow and pressure requirements **(1)**.
- Gauges with shut-off valves;
- 4 bar safety valve.
- Drain circuit.
- Manual and automatic air bleed valve.
- System regulation.
- Frost protection (option).

The components in the hydraulic system are carefully selected and factory assembled and tested to make the installation of the units simple and economical.

Preparation times. implementation times and space requirements are thus kept to a minimum.

(1) Our pumps are designed to operate on closed water loops (low NPSH). Please consult us for other applications (open water loop. high NPSH).

LDH - ILDH series hydraulic module



* 1 dual refrigerating circuit evaporator for cooling only versions

TECHNICAL SPECIFICATIONS - COOLING ONLY

AQUACIAT^{power} LD - LDC - LDH			1200V	1400V	1600V	1800V	2000V	2100V	2400V
Standard version	Net cooling capacity (1)	kW	333	379	437	491	532	568	640
	Net power input (1) (2)	kW	111.7	128.7	146.8	164.6	178.60	192.8	216
	net EER/ESEER		2.98/3.93	2.95/4.05	2.97/3.91	2.99/4.05	2.98/3.99	2.95/4.02	2.96/3.99
	Lw / Lp (3)	dB(A)	93 / 61	95 / 63	97 / 65	94 / 62	98 / 65	97/64	99/66
Xtra Low Noise Version	Net cooling capacity (1)	kW	326	370	428	480	522	555	623
	Net power input (1) (2)	kW	112	130.7	147	165.7	177.50	191.7	214.9
	net EER/ESEER		2.91/4.01	2.83/4.14	2.91/3.97	2.89/4.10	2.94/4.07	2.9/4.09	2.9/4.06
	Lw / Lp Low Noise (3)	dB(A)	85/53	86/54	87/55	87/55	88/55	88/55	88/55
	Lw / Lp Xtra Low Noise (3)	dB(A)	82/50	83/51	84/52	84/52	85/52	85/52	85/52
Refrigeration circuit	Refrigerant (GWP)		R410A (2088)						
	Quantity		2						
	Refrigerant circuit 1	kg	30	40	45	49	60	63	60
	Refrigerant circuit 2	kg	30	40	45	49	48	52	60
Compressor	Type		HERMETIC SCROLL						
	Quantity		4			6	5	6	
	Rotation speed	rpm	2900						
	Power control	%	100-75-50-25-0	100-78-71-50-28-21-0	100-75-50-25-0	100-83-66-50-33-16-0	100-80-60-40-20-0	100-84-66-48-36-30-18-15-0	100-83-66-50-33-16-0
	Type of oil for R410A		POLYOLESTER POE 3MAF						
	Oil capacity circuit 1	litres	2 x 6.3	2 x 6.3	2 x 6.3	3 x 6.3	3 x 6.3	3 x 6.3	3 x 6.3
	Oil capacity circuit 2	litres	2 x 6.3	2 x 6.3	2 x 6.3	3 x 6.3	2 x 6.3	3 x 6.3	3 x 6.3
Evaporator	Type		BRAZED PLATES						
	Quantity		1						
	Water capacity	litres	32	37	50	57	63	63	76
	Hydraulic connection		VICTAULIC DN 125				VICTAULIC DN 150		
	Max. pressure. water end	bar	10 bar (LOD)/4 bar (LDC-LDH)						
	Min/max water flow	m³/h	38 / 113	43 / 124	50 / 137	56 / 150	58/150	62/150	70/150
Air-cooled condenser	Fans		DIRECT-DRIVE AXIAL- DIAMETER 800 mm						
	Number of fans		6		8		10		
	Rotation speed	rpm	HIGH PERFORMANCE 905 rpm VERSION						
	Air flow	m³/h	126000	121200	168000	161600	206800	206800	202000
	Motor output power	kW	1.64						
	Rotation speed	tr/mn	LOW NOISE - XTRA LOW NOISE 715 rpm VERSION						
	Air flow	m³/h	103200	97200	137600	129600	168000	168000	162000
	Motor output power	kW	1.13						
Dimensions	Longueur versions LD-LDC	mm	4185		5551		6913		
	Longueur version LDH	mm	5215		6581		7942		
	Width	mm	2200						
	Height	mm	2260 (XTRA LOW NOISE VERSION: 2450)						
Weight	Version LD (à vide / en service)	kg	3225 / 3273	3482 / 3530	3929 / 4001	4605 / 4681	5090 / 5164	5282 / 5359	5603 / 5695
	Version LDC (à vide / en service)	kg	3700 / 3798	3930 / 4028	4384 / 4506	5065 / 5191	5588 / 5712	5786 / 5913	6101 / 6243
	Version LDH (à vide / en service)	kg	4296 / 5374	4554 / 5632	4994 / 6096	5660 / 6766	6220 / 7324	6432 / 7539	6732 / 7854

(1) Net capacity for chilled water temperature 12°C/7°C and condenser air inlet temperature 35°C-EN14511 EUROVENT conditions
(2) Net power input = compressors + fans
(3) **Lw**: Overall sound power level, as per ISO standard 3744, at nominal operating conditions EN 14511
Lp: Overall pressure levels measured at 10m in a free field, calculated using the formula LP=Lw-10 log S