AQUACIAT2 EVOLUTION

High energy efficiency with **R410A**
Compact *and* **quiet**
Scroll *compressors*
Brazed-plate heat exchangers
Self-adjusting
electronic control

Cooling capacity: **20 to 170 kW**
Heating capacity: **20 to 180 kW**

Cooling | **Cooling or heating** | **Hydraulic module** | **Heat recovery** | HFC R410A | EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

USE

AQUACIAT2 LD-LDC-LDH and **ILD-ILDC-ILDH** series packaged water chillers or heaters with air cooled condenser are medium-capacity units specifically designed for heating and air conditioning applications in offices, healthcare facilities, administration, shopping centres and the residential sector.

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

An optional XTRAFAN version enables installation with ductable fan(s), if required, if there is a risk of air recycling, or for sound insulation on site.

To operate in heating or cooling mode, they use the outdoor air as the only external source; this allows heat to be evacuated in summer and thermal energy to be supplied for heating in winter.

Connected to an underfloor heating or cooling system, fan coil units or an air handling unit, the reversible AQUACIAT2 ILD-ILDC-ILDH series is an extremely easy way to heat and air condition buildings.

Each unit is delivered fully assembled, wired (control and power), charged with refrigerant and factory tested.

Simply make the necessary electrical and hydraulic connections, and your unit is ready to operate.

RANGE

AQUACIAT2 LD series
Cooling only versions without hydraulic system,

AQUACIAT2 LDC-LDH series
Cooling only versions with hydraulic system (circulation pump only or pump and buffer tank).

AQUACIAT2 ILD series
Reversible air/water versions without hydraulic system,

AQUACIAT2 ILDC-ILDH series
Reversible air/water versions with hydraulic system (circulation pump only or pump and buffer tank).

DESCRIPTION

AQUACIAT2 LD-LDC-LDH cooling only or ILD-ILDC-ILDH reversible series models are supplied with the following components as standard:
- Air-cooled condenser with axial fan motor assembly,
- Chilled-water evaporator (or hot water condenser on reversible models),
- Chilled water or hot water capacity control,
- Control, automatic operation and startup box:
  . Power supply: 3~50Hz 400V (+10%/-10%) + Earth
  . 1~50Hz 230V control circuit (transformers fitted as standard on the machine),
- Casing for outdoor installation.

Models 80 to 300

Complies with European EC directives
- Machinery 2006/42/EC
- EMC directive (2004/108 EC)
- Pressure equipment PED 97/23 EC:
  category 2 for LD - LDC - LDH 80V to 700V
  category 2 for ILD - ILDC - ILDH 80V to 700V
- Low voltage (2006/95/EC)

Complies with standards
- EN 60-204, EN 378-2 (NFC 15-100, France)

DESCRIPTION

ILD	>	Reversible version	**H**	>	Hydraulic with pump and buffer tank
LD	>	Cooling only version	**540**	>	Unit size
C	>	Hydraulic with pump only	**V**	>	R410A refrigerant

MAIN COMPONENTS

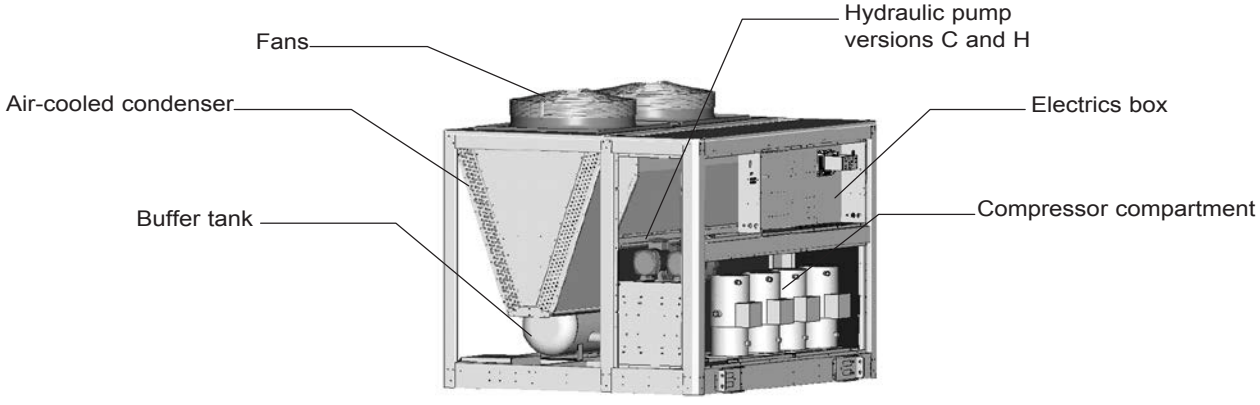
Casing
- Removable galvanised metal panels,
- RAL 7024 and RAL 7035 lacquer coating

Hermetic Scroll compressors
- Built-in electric motor cooled by suction gases
- Motor protected by internal winding thermostat
- Placed on anti-vibration mounts

Evaporator
- Brazed-plate exchanger(s)
- End and inside plates in AISI 316 stainless steel
- High-performance, optimised plate patterns
- 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 fan(s) with aluminium airfoil blades
- 2-speed motors - IP 54, class F

Control functions and safety devices
- Water flow control
- Thermostatic expansion valve(s)
- Refrigerant high and low-pressure safety devices
- Safety valves on refrigeration circuit
- Temperature and pressure sensors
- Water flow controller, evaporator fitted
- Unit start-up sequence



Electrics box

The fully wired electrics box which houses all the electrical components and the electronic CPU board, controls the entire unit, monitors its operation, adjusts water setpoints and interfaces with an external control system.

It comprises:

- Control and power circuits,
- Wire numbering,
- Main safety switch with handle on front,
- Control circuit transformer,
- Circuit breakers on the power and control circuits,
- Compressor and motor switches,
- Main earth connection,
- Microprocessor-controlled electronic control unit,
- Alarm or information signals on free terminals.

ELECTRONIC CONTROL MODULE

Connect 2

CIAT electronic control module with microprocessor and CPU, with central automatic operation and access to internal operation states.

Features:

- Start, stop, reset or remote control,
- Cooling or heating mode selector,
- Outputs. RS485 output for CMS link (ModBus-JBus):
  - . Board adapter for additional voltage-free contacts,
  - . Remote control adapter (optional)
- Multilingual analogue LCD and LEDs.

Functions:

- Operation information displayed via:
  - . Multilingual clear-text messages
  - . Direct temperature and pressure readings
- Complete management of compressors with start-up sequence, timer and runtime balancing,
- Self-adjusting and proactive functions with adjustment of settings drift control,
- Series stage capacity-reduction system on multi-compressors according to cooling and heating demands based on water temperatures,
- Monitoring of internal operation parameters,
- Pump standby based on demand,
- Second setpoint management,
- Direct display of water temperature and pressure,
- Diagnosis of operation and fault states:
  HP/LP, water flow rate, compressor motor(s), frost protection
- Short-cycle protection,
- Remote management and remote monitoring,
- Master/Slave Management allows two machines to be controlled on a single water loop, by alternating the Master and Slave according to the running time,
- Setpoint adjustable by 4-20 mA signal,
- Weekly programming.

OPTIONS

Main options

- Additional voltage-free contact boards,
- Remote control unit,
- Phase controller = rotation direction, missing phases, (factory fitted on 350 to 700 versions),
- Soft start system (factory fitted on 350 to 700 versions),
- Frost protection,
- Fan speed regulator (factory fitted on 350 to 700 versions)
- 800-micron water filter supplied as standard on LDC-LDH or ILDC-ILDH versions, and as an option on LD-ILD versions,
- Evaporator and condenser flexible couplings,
- Hydraulic control kit including manifold pressure gauges, control valve and shut-off valve,
- Pump intake minimum safety (factory fitted on sizes 350 to 700),
- Variable speed pump (350V to 700V)
- Dual pump for 180 to 700 versions (factory fitted on 350 to 700 versions),
- Refrigerant leak detection (factory fitted on sizes 350 to 700),
- 15 kW extra heater kit (ILD, ILDC, ILDH 80 to 150).
- 15-30-45-60 kW extra heater module kit (ILD, ILDC, ILDH 180 to 300),
- MULTICONNECT management of up to 8 units,
- Management of 4 auxiliary heating devices,
- LONWORKS protocol,
- BACNET protocol,
- Container handling kit (350 to 700).

VARIABLE SPEED PUMP

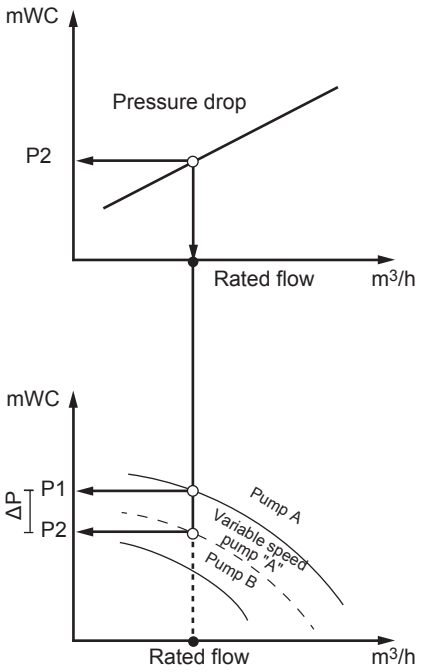
Description

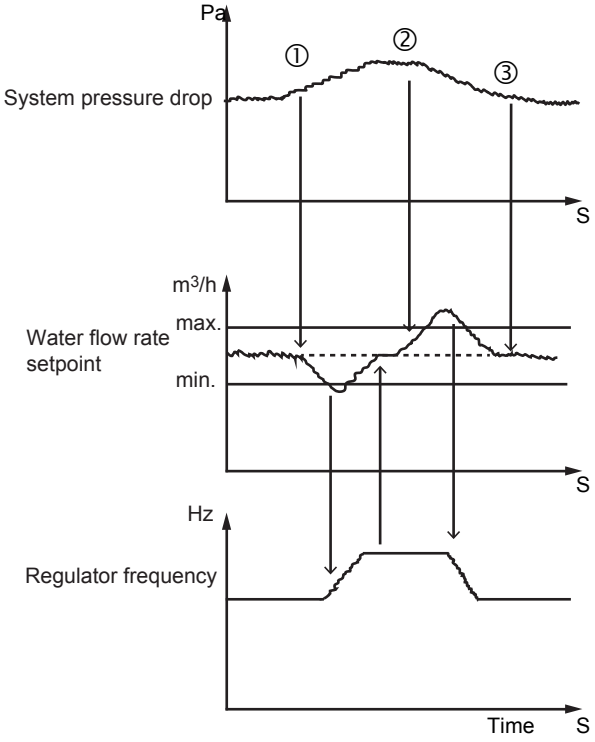
Available in sizes from 350V to 700V, the «variable speed pump» option on the primary circuit saves you energy by adjusting the electrical consumption of one pump to the actual requirements of a hydraulic system (P2 pressure), in particular for oversized installations.
A regulator enables one pump (pump A in the example below) to be adapted, by lowering its pressure P1 to the requirements of system P2, to obtain the optimal water flow setpoint.
Electricity bills relating to the pump's consumption are reduced proportionately, by around 25% per year on average; this means you will see a return on investment (ROI) in only a few years, compared with the same fixed speed pump equipped with a simple flow control valve.

Operating principle

This relies on precise adjustment of the water flow required for an installation when the unit is started up; this must subsequently be maintained within a minimum/maximum range by constantly measuring the differential pressure on the pump terminals.
The speed regulator is then triggered based on the events occurring in the hydraulic system, such as valves opening or closing, re-establishing the water flow setpoint.

Any deviation in the pressure recorded on the unit's terminals is immediately handled by the pump's variable speed control which is automatically adjusted based on the variations generated by the hydraulic system.
The machine independently controls adjustments in the water flow between two (minimum and maximum) setpoints, without any external intervention.





Simple to use

The “Variable Speed Pump” is fully integrated and protected on the CIAT machine and, as it is installed outdoors, there is no need for work to be carried out in the machine room.
The assembly is factory-fitted and pre-set on the unit by CIAT; it is therefore quick to install and reduces the cost of work, in particular because there is no water flow control valve on the outlet of the unit.
The ability to adjust the water flow to your requirements means that the pump pressure can be adapted precisely to the actual pressure drop on the system when it is started up on-site.

SOFT START

A "soft start" function prevents any current peaks when the pump is started up to protect the electrical system, thereby limiting the building’s electricity use at peak times and ensuring the smooth operation of the pipework.

STANDBY function

A “Standby” function controls the electricity consumed by the pump; this works by reducing the pump’s speed when the compressors are ordered to stop by the control, using a specific algorithm on the regulator.
Lowering the speed to the minimum frequency when the compressors are on standby reduces the water flow to ensure the water loop is perfectly homogenised and the control temperature sensors are well irrigated.
This reduces electricity consumption by around 70% during standby periods, which represents a significant proportion of the machine’s normal operating time, in particular for air conditioning applications.

CHARACTERISTICS - COOLING ONLY

AQUACIAT2 LD - LDC - LDH		350V	400V	500V	540V	600V	700V
Net cooling capacity (1)	**kW**	91.95	100.81	125.65	141.08	154.23	170.45
Net absorbed power	kW	30.23	35.02	43.17	46.31	53.73	62.95
Net energy efficiency rating (EER) (2)	kW/ kW	3.04	2.87	2.91	3.04	2.87	2.7
Net seasonal energy efficiency rating (ESEER) LN	kW/ kW	4.1	4.12	3.43	4.08	3.85	3.78
Net seasonal energy efficiency rating (ESEER) HP	kW/ kW	4.08	4.05	3.48	4.04	3.89	3.86
Lw / Lp (3) (High Performance version - HP)	dB(A)	87 / 55	88 / 56			89 / 57	
Lw / Lp (3) (Low Noise version - LN)	dB(A)	81 / 49	83 / 51				
No. of refrigerating circuits		1	2				
Refrigerant (GWP)		R410A (GWP = 2088)					
Refrigerant charge	kg	22		12+12.6	15.3+15.6	15.2+15.7	17+17.4
Tonne CO_2 Equivalent	TCO_2Eq	45.93		51.36	64.51		71.82
Compressor		Hermetic SCROLL (2 900 rpm)					
Start-up mode		Direct in line in series					
Quantity		2			4		
Power control	%	100-57-43-0	100-63-37-0	100-50-0	100-78-72-55-50-45-28-22-0	100-75-50-25-0	100-78-71-57-50-43-28-21-0
Oil type		Polyol ester POE 3MAF (32 cst)					
Oil capacity	l	8.8	9.8	11.2	14.8	16.6	17.6
Evaporator		Brazed-plate exchanger(s)					
Water content	l	6.4	7.5	9.3	9.3	10.6	11.8
Chilled water outlet temp. (min./max.)	°C	-12 °C/ +18°C					
Minimum water flow rate	m^3/h	10.7	11.8	17.3	18.1	20.8	
Maximum water flow rate	m^3/h	32.5	35.3	43.6	48.7	53	59
Water connections	∅	DN 80 flange					
Max. pressure. water end	bar	10 bar (LOD)/4 bar (LDC-LDH)					
Air-cooled condenser		Finned heat exchanger					
Fan Ø	mm	Direct drive propeller fan - diameter 800 mm					
No. x Motor output. High Performance (HP) version	no x kW	2x1.7			2x1.6		
Air flow. High Performance - HP	m^3/h	37600		40000	41500		
Qty x Motor output Low Noise version - LN	nb x kW	2x1.1					
Air flow. Low Noise - LN	m^3/h	29000		31000	33200		
Min water volume LD - LDC	l	220	213	357	164	207	203
Tank volume version LDH	l	250					
Expansion vessel LDC - LDH	l	18					
Standard pump	n°	(4)					
Height (excluding mounts)	mm	2117					
Length version LD - LDC - LDH	mm	2190 / 2190 / 2190			2740 / 2740 / 2740		
Depth	mm	2129					
Weight (empty. version LD)	kg	1064	1163	1245	1530	1666	1732
Weight (empty. version LDC)	kg	1162	1268	1315	1725	1845	1911
Weight (empty. version LDH)	kg	1233	1332	1380	1790	1908	1974
Maximum storage temperature	°C	+ 50°C					

(1) Capacities on HIGH PERFORMANCE version according to EN14511-2013
EUROVENT standard:
Chilled water: +12°C/+7°C and condenser air inlet temperature +35°C
(2) Net value EER (excluding pump)

(3) Lw: Overall sound power level as per standard ISO3744
Lp: Overall pressure level measured at 10m in a free field, calculated using the formula Lp=Lw- 10 log S
(4) Based on selection

TECHNICAL CHARACTERISTICS - REVERSIBLE HEAT PUMPS

AQUACIAT ILD - ILDC - ILDH		350V	400V	500V	540V	600V	700V
Net cooling capacity (1)	**kW**	92.41	104.77	127.51	139.23	154.68	162.42
Net absorbed power	kW	31.78	35.61	44.98	46.76	53.11	60.21
Net energy efficiency rating (EER) (2)	kW / kW	2.9	2.94	2.83	2.97	2.91	2.69
Seasonal energy efficiency rating (ESEER)	kW / kW	3.71	3.77	3.15	3.99	3.91	3.69
Seasonal energy efficiency rating (ESEER)	kW / kW	3.56	3.7	3.16	3.83	3.81	3.5
Lw / Lp (4) (High Performance version - HP)	dB(A)	89 / 57	90 / 58			91 / 59	
Lw / Lp (4) (Low Noise version - LN)	dB(A)	83 / 51		85 / 53			
Net heating capacity (2/3)	kW	95.4 / 99.1	109.25 / 113	133.22 / 137. 9	147.83 / 153.5	164.68 / 169.9	182.37 / 187.5
Net absorbed power (2/3)	kW	31.8 / 26.4	36.45 / 30.3	43.72 / 36.2	48.43 / 39.8	53.68 / 44.1	58.89 / 48.1
COP/net COP performance (2/3)		2.99 / 3.76	2.99 / 3.73	3.04 / 3.81	3.05 / 3.86	3.06 / 3.85	3.15 / 3.90
Seasonal efficiency SCOP net (5)	kW / kW	3.03	3.01	3.07	3.03	3.07	3.06
η_s	%	118	118	120	118	120	119
Prated	kW	55.03	64.08	76.61	83.22	93.62	104.46
No. of refrigerating circuits		1		2			
Refrigerant (GWP)		R410A (GWP = 2088)					
Refrigerant charge	kg	21	24	14 + 14	18 + 18	18.2 + 19.2	19.5 + 19.5
Tonne CO_2 Equivalent	TCO_2Eq	43.84	50.11	58.46	75.16	78.09	81.43
Compressor		Hermetic SCROLL (2 900 rpm)					
Start-up mode		Direct in line in series					
Quantity		2			4		
Power control	%	100-57-43-0	100-63-37-0	100-50-0	100-78-72-55-50-45-28-22-0	100-75-50-25-0	100-78-50-22-0
Oil type		Polyol ester POE 3MAF (32 cst)					
Oil capacity	l	8.80	9.8	11.2	14.8	16.6	17.6
Evaporator		Brazed-plate exchanger(s)					
Water content	l	8.68	9.88	10.66	12.48	15.42	
Chilled water outlet temp. (min./max.)	°C	-10°C/+18°C					
Hot water outlet temp. (min./max.)	°C	+30°C / +50°C					
Minimum water flow rate	m^3/h	11.7	13.3	17.3	18.1	20.8	
Maximum water flow rate	m^3/h	30.7	34.6	41.9	45.9	50.7	
Water connections	∅	Male G 2"	DN 80 flange				
Max. pressure, water end	bar	10 bar (ILD)/4 bar (ILDC-ILDH)					
Air-cooled condenser		Finned heat exchanger					
Fan	∅ mm	Direct drive propeller fan - diameter 800 mm					
Number x Motor output High Performance (HP version)	no. x kW	2x1.7		2x1.8	2x1.7		
Air flow, High Performance - HP	m^3/h	44000	42000	41000	44000		
Qty x Motor output Low Noise version - LN	no. x kW	2x1.2			2x1.1		
Air flow, Low Noise - LN	m^3/h	32000	29000	30500	35000		
Min water volume ILD - ILDC	l	220	213	357	164	207	203
Tank volume ILDH version	l	250					
Expansion vessel ILDC - ILDH	l	18					
Standard pump	no	(*)					
Height (excluding mounts)	mm	2117					
Length ILD - ILDC - ILDH version	mm	2190 / 2190 / 2190			2740 / 2740 / 2740		
Depth	mm	2129					
Weight (empty, version ILD)	kg	1096	1195	1283	1570	1706	1878
Weight (empty, version ILDC)	kg	1194	1292	1355	1675	1804	1976
Weight (empty, version ILDH)	kg	1257	1356	1418	1748	1868	2040
Maximum storage temperature	°C	+ 50°C					

Output for HIGH PERFORMANCE version : Net conditions (exc. pumps) According to EN14511-2013 EUROVENT standard

(1) Chilled water: +12°C/+7°C and condenser air inlet temperature +35°C
(2) Hot water 40°C/45°C and outdoor air temperature +7°C DB/ 6°C WB
(3) Hot water 30°C/35°C and outdoor air temperature +7°C DB/ 6°C WB
(4) Lw: Overall sound power level as per standard ISO3744
Lp: Overall pressure level measured at 10m in a free field, calculated using the formula Lp=Lw- 10 log S
(5) Hot water 30°C/35°C - Average climate conditions according to EN 14825-2013 standard
(*) Based on selection

This document is non-contractual. As part of its policy of continual product improvement, CIAT reserves the right to make any technical modification it feels appropriate without prior notification.

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ISO 9001 • ISO 14001
OHSAS 18001
Certified
Management System

Compagnie Industrielle d'Applications Thermiques - S.A. with a registered capital of 26 728 480 € - R.C.S. Bourg-en-Bresse B 545 620 114