

Model: NRL1800°°°A°°°00
Cooling

Capacity	kW	526.49
Input power	kW	148.37
Input current	A	264.58
E.E.R.	W/W	3.55
E.S.E.E.R.	W/W	3.88
Dry bulb air inlet temperature	°C	27.00
Inlet water temperature	°C	12.00
Temperature difference	°C	5.00
Outlet water temperature	°C	7.00
Ethylene glycol	%	0
Water flow rate	l/s	25.2606
Pressure drops	kPa	79.03

Data declared according to UNI EN 14511:2013

General data

Refrigerant		R410A
Compressor type		Scroll
Number of compressors	n.	6
Number of cooling circuits	n.	2
Evaporator type		Plate
Number of evaporators	n.	1
Evaporator water connections		4"
Total air flow rate	mc/s	33.8889
Maximum full load current (FLA)	A	398.00
Peak current (LRA)	A	666.00
Power supply		400V/3N/50Hz with thermal-magnetic cut-outs

Sound data

Sound power to EN ISO 9614-2	dB(A)	93.5
Sound pressure at 10 meters to EN ISO 3744	dB(A)	61.5

Sound pressure in unrestricted range on reflecting plane (directivity factor $Q = 2$).

Sound power band middle frequency

							Octave band	
125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		
103.0	92.0	90.0	88.0	84.0	78.0	73.0		

Dimensional data

Height	m	2.45
Width	m	2.2
Depth	m	5.75
Net weight	Kg	3,735



Aermec participates in the Eurovent Certification Programme.
The certified data of certified models are listed in the Eurovent Directory.

NRL RANGE

Air to water chillers

Range

Supply and placement of the latest generation NRL series air to water chiller unit; also available in heat pump version, reversible on chiller side by relevant valve. All sizes have double chiller circuit, favouring safety and reliability. The machine is suitable for outdoor installation and has an IP24 protection level.

Cooling circuit

Two independent cooling circuits that allow to keep the machine running even when the compressor must be repaired. Just one refrigerant-water exchanger with two cooling circuits and one hydraulic circuit.

Operational fields

Possibility of producing cooled water with outdoor temperature up to 46 °C.

Refrigerant

The chillers in the NRL series use the almost azeotropic mixture of HFC R410A as refrigerant; it is characterised by ODP (ozone depletion potential) nil and is classified within the safety group A1 according to the ASHRAE 34-1997 standard. Thanks to its physical characteristics it allows to realise up to 10% more efficiency than equivalent models with R407C. Moreover, it being an “almost azeotropic” mixture it is characterised by a negligible shift in the composition even in the case of leakage.

Model

°: Refrigerator in “cooling only” version suitable to produce cooled water at the temperature set on the circuit board.

Versione

High efficiency version. The unit uses the increased fin pack coils that have a large exchange surface, this allows to increase the operational limits reaching a maximum external air temperature of 46 °C.

Support frame

Made in hot galvanised sheet steel with suitable thickness and painted with polyester powders able to resist atmospheric agents through time.

Composition

Unit composed of a frame with a unique module, containing just one refrigerant-water exchanger.

Number of compressors

6 scroll compressors. The two cooling circuits each have 3 parallel compressors. (2 trio).

Description of the compressors

The scroll-type hermetic compressors mounted on the NRLs are optimised to work with R410A refrigerant and are characterised for high efficiency and low power absorption. As standard, it is also equipped with the sump anti-freeze electrical resistance. This is powered automatically at every stop, so that the unit is kept live. They are moved by 2-pole electric motors with internal circuit breaker protection, cooled by intake gas. They are assembled on rubber anti-vibration mounts positioned at the base. To reduce sound emission to a maximum, the compressors are enclosed inside an acoustically insulated compartment.

The use of several scroll compressors, used according to plant load requirements, allows efficient “step” adjustment of the power issued by the unit, obtaining a much more efficient functioning of the partial loads. All of this translates into noteworthy seasonal energy efficiency ratios ESEER, calculated according to Eurovent specifications.

Thermostatic valve

°: Standard mechanical thermostatic valve with external equaliser positioned at the exit of the evaporator and bulb sensitive to the intake temperature. Depending on the heat load it modulates the flow of gas, always maintaining the correct heating level of the intake gas to the compressor. This allows to work with minimum temperature of the water produced at 4 °C.

Evaporator

Just one plate type, high efficiency dry expansion water-refrigerant exchanger braze welded AISI 316 stainless steel with two independent circuits on refrigerant side and one on the water side, with closed cell external insulation in order to prevent the formation of condensation and to reduce heat loss. The anti-freeze electric resistance is mounted as per standard: its functioning is controlled by a dedicated probe positioned in the heat exchanger itself; activation is managed by the circuit board and takes place when the temperature of the water is +3 °C (default value, which can be modified). Respect the PED standard.

Number of evaporators

To ease installation of the unit the NRL have been designed with just one exchanger and one hydraulic system and with two independent cooling circuits.

Coils

°: The air-refrigerant exchangers with condenser function are coils with louvered fins, copper pipes and aluminium hydrophilic louvered fins, blocked by mechanical expansion of the pipes.

Description of the cooling circuit

Realised using copper pipes with welded joints in silver alloy including the following components as well as the compressors and exchangers:

- thermostatic valve that modulates the flow of gas depending of the refrigerant load;
- mechanical dehydrator filter realised in ceramics and hygroscopic material, able to withhold impurities and any traces of humidity present in the cooling circuit;
- liquid indicator used to check the refrigerant gas load and the eventual presence of humidity in the cooling circuit;
- liquid and pressing line taps that allow to interrupt the refrigerant in the case of extraordinary maintenance;
- solenoid valve on the liquid line that closes when the compressor switches off, blocking the flow of refrigerant gas to the evaporator.

Ventilation Unit

Increased ventilation unit made up from statically and dynamically balanced helical fans, activated directly by electric motors, which are protected electrically by magnet-circuit breakers and mechanically by anti-intrusion metal grids, according to IEC EN 60335-2-40 Standard and fixed on the upper part of the framework.

Number of fans

The ventilation unit for the disposal of the heat produced by the condensers is composed of 8 fans with rotor measuring 800 mm, positioned in two rows.

Recuperator

°: Without heat recuperators.

Electric Control Board

Contains the power section and the management of controls and safety devices. It is in compliance with the LVD 2006/95/CE Directive and the Directives regarding electromagnetic compatibility EMC 2004/108/CE. Moreover, all cables are numbered for immediate recognition of all electric components. It is always equipped with a door-lock isolating switch: the electric control board can be accessed by removing the voltage. Act on the opening lever of the control board itself. This lever can be locked using one or more padlocks during maintenance interventions to prevent the machine being powered up

accidentally. Inside the control board is a control keyboard that allows complete control of the appliance.

Power supply

°: Three-phase power supply, 400V, 50Hz with magnet circuit breakers.

2: Three-phase + neutral power supply, 500V, 50Hz with magnet-circuit breakers.

Safety devices and protections

The following devices are always present in the chiller:

- High pressure switch with fixed calibration (40 bar) and manual resetting: it is positioned on the pressing line side of the compressor and stops functioning of the compressor itself in the case of anomalous working pressures.
- High pressure transducer: it is positioned on the pressing line side of the compressor and stops functioning of the compressor itself in the case of anomalous working pressures.
- Low pressure transducer with lower pressure switch function. It is positioned on the compressor intake line. It stops compressor functioning when anomalous working pressures occur.
- Cooling circuit safety valves, the one on the low pressure side is calibrated at 30 bar and that on the high pressure side at 45 bar: they intervene by discharging the overpressure in the case of anomalous pressures.
- The electric control board is protected by an access door interlock system: This lever can be locked using one or more padlocks during maintenance interventions to prevent the machine being powered up accidentally.
- Also present:
 - compressors magnet circuit-breaker protection;
 - fans magnet circuit-breaker protection;
 - auxiliary circuit magnet circuit-breaker protection;
 - exhaust gas temperature control thermostat for every circuit.

Transducers

The unit is supplied complete with: input and output water temperature probe. In this way it is possible to activate the compressors in order to keep the temperature of the water produced or the temperature of the plant return water constant. The chiller also has high pressure transducers (one per circuit): these allow to view the values of the compressor delivery pressure on the microprocessor board display. Low pressure transducers are also present (one per circuit): these allow to view the compressor intake values on the board display; these are installed on the low pressure side of the chiller circuit and stop functioning of the compressor in the case of anomalous working pressures.

Electronic adjustment

The microprocessor has the following functions:

- Complete management of the machine.
- Temperature adjustment by means of step thermostating controlled on the water inlet of the chiller (with proportional control) or on outlet (with proportional + total control).
- Complete compressor management for compressor times (stand-by between peaks, stand-by between switch off and switch on, minimum functioning time etc.) and rotation of the compressors on the basis of the working hours and minimum stand-by times (favouring machine efficiency and precision regarding water temperature).
- Management of any chiller anomalies by: automatic pre-alarms with re-arm, alarms, historical anomalies to ease diagnosis of the fault.
- Display of all main sizes regarding chiller functioning.
- Possibility of changing the main functioning parameters.
- Cold functioning management with: desuperheater (accessory) or total recovery (accessory) and possible hydraulic side flow switch on the recovery circuit.

- Pumping unit management.
- Anti-freeze management on the evaporator by means of resistances and circulation pump contact.
- Remote control by: remote control (supplied as per standard), potential-free contacts, RS485 serial and compatible Modbus protocol (AER 485 accessory).
- Double set-point, both summer and winter pre-set in the menu and can be selected via potential-free contact.
- Power reduction function can be inserted via potential-free contact.
- Step safety capacity control management for high pressure and anti-freeze.
- Daily/weekly timer programmer with 2 time periods (accessory PGS).
- The board also allows to display all functioning parameters read by the probes, such as temperature of the water, delivery pressure etc.

Hydronic unit

00. Without storage tank and pumping unit.

Description of the hydraulic circuit components

The machine is supplied with Y type water filter, mounted on board. This allows to block and eliminate any impurities present in the hydraulic circuits. It contains a filtering mesh with holes that do not exceed one millimetre.

Management of the pumping units

No pumping unit. The circuit board can manage an eventual external pumping unit with ON-OFF control.

Accessories

- AER485: RS-485 interface for supervising systems with MODBUS protocol.
- AERWEB30. The AERWEB30 device allows the remote control of the chiller from a common PC via serial connection. Using additional modules the device allows to control the chiller via telephone network using the AERMODEM accessory or via GSM network using the AERMODEMGSM accessory. AERWEB can pilot up to 9 chillers, each of which must be equipped with the AER485 accessory.
- DCPX: Low temperature device, allows correct functioning in cooling mode, with external temperatures lower than 10 °C. In the heat pump versions this allows the unit to work in heat pump mode even with external temperatures exceeding 30 °C.
- DRE: Peak current reduction electronic device. Can only be applied in the factory.
- DUALCHILLER: Simplified control system for control, switch-on and switch-off of two chillers, with Aermec GR3 control, in the same plant as if they were a single unit.
- GP: Protection grid, protects the external coil from blows.
- MULTICHILLER: Control system for control, switch-on and switch-off of the single chillers in a plant in where multiple units are installed in parallel, always ensuring constant flow to the evaporators.
- PGS: Daily/weekly programmer. Allows to program two time periods per day (two switch-on/off cycles) and to have differentiated programming for every day of the week.
- RIF: Current rephaser. Connected in parallel to the motor, it allows a reduction of the input current. It can only be installed in the factory and so must be requested on ordering.
- TP 2: Low pressure transducer, allows to display the value of the relative work pressure (one per circuit).

- TP 3: High pressure transducer, allows to display the value of the relative work pressure (one per circuit).
- TRX1: Metal cap that replaces the plastic cap mounted for protection in the storage tanks with holes and integrative resistances.
- VT and AVX: Anti-vibration mounts to be installed under the base. They allow to reduce the vibrations transmitted to the structure.

Conformity

The installation and user manual is present inside every appliance, complete with declaration of conformity with reference to the appliance's serial number. The feature plate must have the CE mark. AERMEC chiller unit, NRL range, is in compliance with the following Harmonised Standards:

- IEC EN 60335-2-40 (Safety standard regarding electrical heat pumps, air conditioners and dehumidifiers);
- IEC EN 61000-6-1 and IEC EN 61000-6-3 (Immunity and electromagnetic emission for residential environments);
- IEC EN 61000-6-2 and IEC EN 61000-6-4 (Immunity and electromagnetic emission for industrial environments);
- EN378 (Refrigerating system and heat pumps - safety and environmental requirements);
- UNI EN 12735 (Seamless, round copper tubes for air conditioning and refrigeration);
- UNI EN 14276 (Pressure equipment for cooling systems and heat pumps).

Therefore complying with the essential requirements of the following directives:

- LVD Directive: 2006/95/CE
- Electromagnetic Compatibility Directive 2004/108/CE
- Machinery Directive 98/37/CE
- PED Directive regarding pressurised equipment 97/23/CE

The product, in agreement with Directive 97/23/CE, satisfies the Total quality Guarantee procedure (form H) with certificate n.06/270-QT3664 Rev.0 issued by the notified body n.1131: CEC via Pisacane 46 Legnano (MI) - Italy.