

APPLICATION GUIDE



PROVIDING **GLOBAL SYSTEM** SOLUTIONS





APPLICATION GUIDE

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Our company is a member of the Eurovent Certification Programme, The ECOLOGIC™ LENNOX chillers are tested and rated in accordance with Eurovent certification program,

Our products comply with the European standards,

Product designed and manufactured under a quality management system certified to AFAQ ISO 9001 by AFAQ,



LENNOX have been providing environmental solutions since 1895, our range of ECOLOGIC™ chillers continues to meet the standards that have made LENNOX a household name. Flexible design solutions to meet YOUR needs and uncompromising attention to detail. Engineered to last, simple to maintain and Quality that comes as standard. Information on local contacts at www.lennox europe.com.

All the technical and technological information contained in this manual, including any drawing and technical descriptions provided by us, remain the property of Lennox and must not be utilised (except in operation of this product), reproduced, issued to or made available to third parties without the prior written agreement of Lennox.

The ECOLOGIC™ Chillers and condensing units and condensing units range from 145 to 386 kW has been engineered and designed to meet the needs of our customers while minimising the Environmental impact.

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

LENNOX ECOLOGIC™ Chillers and condensing units 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 and condensing units are semi-customized so you purchase what you need for your application.

LENNOX engineers have designed the ECOLOGIC™ Chillers and condensing units 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 and condensing units 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 condensing units and the development of the ECOLOGIC™ line.

These Chillers and condensing units maximize opportunities to reduce negative environmental impacts while maintaining exceptional performance :

Efficiency

LENNOX ECOLOGIC™ Chillers and condensing units 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 and condensing units 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 and condensing units 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™ 50).

With its predictive control logic, CLIMATIC™ 50 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 and condensing units. 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.

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 (not available in condensing unit).

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).

The LENNOX ECOLOGIC™ chiller range is made up of Chillers and condensing units packaged to meet the different market needs, flexibility, performance and quality From LENNOX.

All the Chillers and condensing units 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 (not in condensing unit case).

ECOLOGIC™ Chillers and condensing units are built using C E guidelines to minimise refrigerant leakage potential and are part of the Eurovent chiller testing program.

- The standard unit is a range of Chillers and condensing units that provides cooling at the lowest first cost
- 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 used 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 and condensing units 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.

FOUNDATION

The unit must be set on a flat and level foundation. On ground level installations, the unit should be mounted on a single piece concrete slab and not tied to the building structure. Footings should extend below the frost line.

Roof installations require adequate structural beams to support the weight of the unit and service personnel. The design of the beams/supports must minimize deflection and attendant vibration transmission. Also, for sound sensitive applications, unit vibration isolators should be used.

SPACE AND LOCATION REQUIREMENTS

The location of the air cooled chiller must provide for a sufficient supply of ambient air to the condenser and adequate removal of heated air from the condensing unit or remote condenser area. Inadequate air circulation will result in higher head pressures which will cause poor operation and potential failure of equipment. Units must not be located in the vicinity of steam, hot air or fume exhausts. Corrosive atmospheres require custom designed condensers.

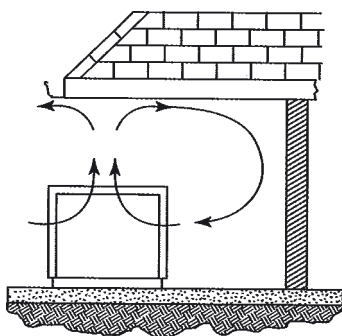
Units should be mounted away from noise sensitive spaces whenever possible and must have adequate support to avoid vibration and noise transmission into the building. Units should be mounted over corridors, utility areas, restrooms and other auxiliary areas where elevated levels of sound are not an important factor. Sound and structural consultants should be retained for recommendations.

CLEARANCE

Always provide sufficient clearance room for unit maintenance and service. Minimum clearances are listed in the dimensional data section.

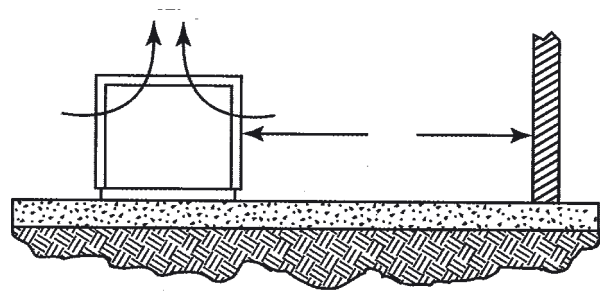
Additional clearance considerations are detailed below :

Vertical Clearance :



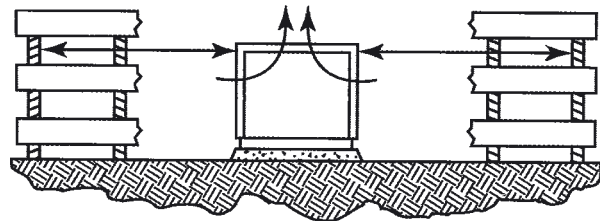
Overhead obstructions are not permitted. Vertical air discharge from the condenser must have no obstructions which can cause the discharge air to be recirculated back to the inlet side of the unit. Recirculation will adversely affect the performance of the unit.

Lateral Clearance (Walls or Obstructions) :



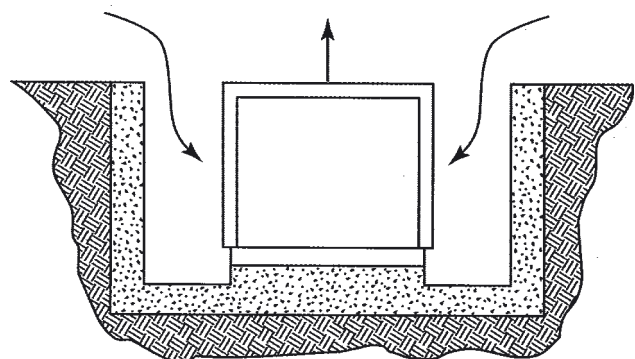
The unit should be located so that air may circulate freely and not be recirculated. For proper air flow and access all sides of the unit should be a minimum of 1,5 meters away from any wall or obstruction. It is preferred that this distance be increased whenever possible. Care should be taken to see that ample room is left for maintenance work through access doors and panels. When the unit is in an area where it is enclosed by three walls the unit must be installed under the guidelines for unit installation in pits.

Decorative Fences :



Fences may be installed closer than the 1,5 meter lateral minimum requirement whenever fences permit sufficient free area to allow adequate air flow to the unit. Once again, care should be taken to leave ample room for unit service. Minimum clearances are listed in the dimensional data section.

Units in Pits :

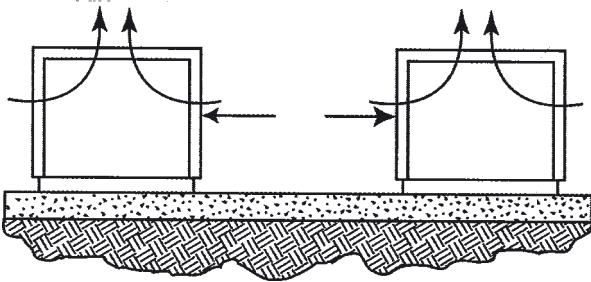


The top of the unit should be level with the top of the pit. If the top of the unit is not level with the top of the pit, a wider pit or discharge stacks must be used to raise discharge air to the top of the pit. This is a minimum requirement. These applications should be reviewed by an Application engineer. For proper air

flow and access all sides of the unit should be a minimum of 1,5 meters away from any wall or obstruction.

Multiple Units (Unit-to-Unit Clearance) :

For units placed side by side, the minimum distance between units is 3 meters to prevent air recirculation.



ALTITUDE CORRECTION FACTORS

All LENNOX Ecologic™ Chiller performance data is calculated at sea level. Higher altitudes result in decreased air density. This will have a negative effect on the heat transfer capabilities of the condenser which will reduce the overall system performance. These factors can be applied to the rated performance to determine system capacity.

AMBIENT RESTRICTIONS

LENNOX Ecologic™ Chillers offer year-round operations under a wide variety of ambient conditions :

- Standard equipment allows for operation in an ambient range from 0°C through 43°C,
- Optional low ambient controls allow for operation down to -10°C,
- Options for operation at high ambient temperatures are also available,
- Please consult us for higher or lower ambient conditions.

COOLER FREEZE PROTECTION

The cooler heater cable is designed to protect the cooler to -20°C ambient. However there is no freeze protection in the event of a power failure or a heater cable failure.

Therefore, one of the following additional measures will provide added protection : add the appropriate percentage of ethylene glycol and/or drain the cooler and piping if the chiller is not operated during the winter months.

STANDARD (STD)

The ECOLOGIC Standard range of Air cooled helical rotary scroll chillers from LENNOX bring to specifies, owners and operators performance and reliability in a compact package. The ECOLOGIC standard range consists of 6 units with a capacity from 145 to 386kW. 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 40°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 (not available on condensing unit range),
- Cu/Al air cooled condenser,
- Mechanical thermal expansion valve (not available on condensing unit range),
- Solenoid stop valve,
- Brazed refrigerant drier and liquid line isolation and charging valve,
- CLIMATIC™ 30 controller as standard.

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 is provided with our basic microprocessor controller as 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 (not applicable on condensing unit range).

This unit is intended to be used in Central and Northern European applications.

ECOLOGIC standard range has a large number of customer configurable options to meet the local legislative requirements and specific customer needs.

LOW NOISE (LN)

The ECOLOGIC Low Noise range uses the same range of Quality components that are utilised in the Standard range previously detailed.

CLIMATIC™ 30 controller is fitted as standard.

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 of 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 jacket 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 6 units and capacity range 140 to 371 kW. This version is positioned to give an alternative to the Super Low Noise units. It has a lower sound level than the Standard 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 (SLN)

The SUPER LOW NOISE version is the leading low noise chiller in Europe of those listed in the Eurovent directory.

It has a range of 6 units with capacities from 150 to 375 kW. 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 CLIMATIC™ 50 controller with a DC 50 user interface.

The super low noise version uses very low noise condensing fans and more efficiency compressor jackets, compared to low noise version.

These machines are built and tested according to the same famous LENNOX requirements for quality.

HIGH EFFICIENCY (HE) (NOT AVAILABLE ON CONDENSING UNIT RANGE)

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 HIGH EFFICIENCY range is made up of 6 units capacity from 150 to 355 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 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™ 50 controller is supplied with DC 50 display screen.

The unit is fitted with the very latest in Electronic expansion valve technology that is controlled by the CLIMATIC 50 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™ 50 controller checks at different operating parameters every minute and makes adjustments to ensure the efficient and safe operation of the chiller.

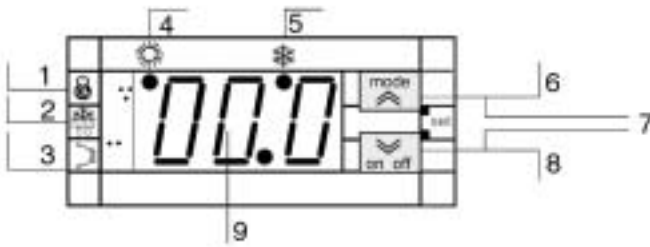
The ECOLOGIC uses the same range of components as the ECOLOGIC Standard range of chillers and is also fully factory tested to insure trouble free start up.

CLIMATIC™ 30

As standard on STD and LN versions

The STD, LN 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.



1. Compressor led

2. Defrost led

3. Electrical heater led

4. Heating mode led

5. Cooling mode led

6. ON/OFF - Reset button :

Turns the unit on and off. Resets all manually reset alarms not currently active

7. Reach to menu mode

8. Mode button :

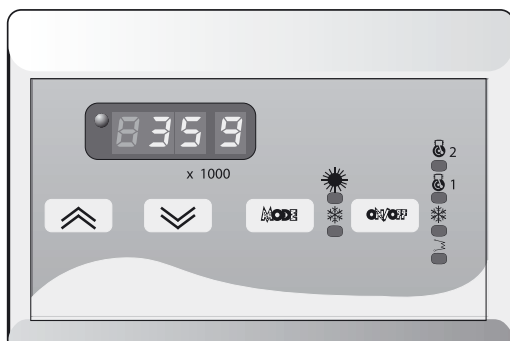
Selects operating mode

9. INTERFACE 3 DIGITS :

The display shows :

- Inlet water temperature
- Regulation parameters
- Alarm codes
- Status of the unit resources (operating hours, temporize, etc...)

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



CLIMATIC™ 50 SOFTWARE

The new generation of microprocessor based control, CLIMATIC™ 50 will equip the EcoLogic chiller range, It inherits 15 years of technology and field operating experience from its predecessors the CLIMATIC™1 and CLIMATIC™ 2,

LENNOX has found the latest hardware technology available on the market place and developed a software specifically designed for rooftop applications, maximising the LENNOX rooftops efficiency and performance,

CLIMATIC™ 50 has been thought to be more user-friendly than CLIMATIC™ 2 and easier to understand, However CLIMATIC™ 50 has been designed to be as powerful and even more flexible,

CLIMATIC™ 50 provides flexibility and the ability to control multiple chillers on a single job site.

Enhanced with a 16 bit processor at 14 MHz and a 2 Megabytes flash memory. CLIMATIC™ 50 has been designed to save energy and to extend the operational life of the EcoLogic product range. It will, for example, optimise the running time of each compressor, automatically switch between compressors from those that start first and have an anti short-cycle program. It is able to control 34 fault signals and manage security algorithms generating various fault signals.

In terms of comfort, CLIMATIC™ 50 provides an innovative PI control.

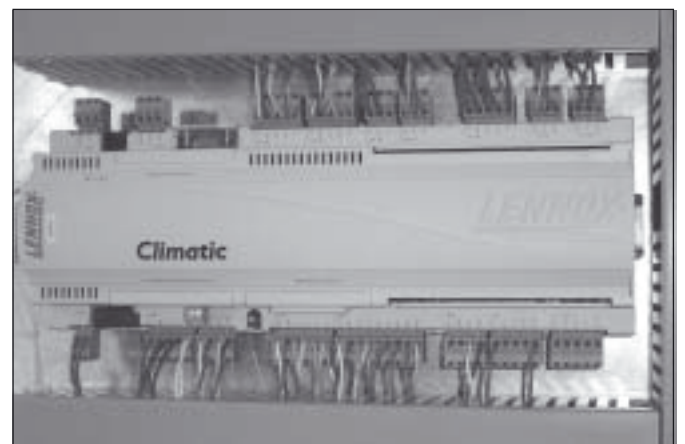
CLIMATIC™ 50 looks at difference between set point and actual water temperature and calculates the time needed to reach the set point and determines the capacity required.

This innovative control, will guaranty a better temperature accuracy, while saving energy in not bringing the full capacity when not needed.

As cooling is often not the only requirement, heat pump with multi step regulation can be available with WAH.

As a standard feature, CLIMATIC™50 provides 4 scheduling time zones per day on 7 days. This allows energy consumption management according to the building use.

On each of the 4 time zones, heating set point (WAH), cooling set point and the different authorisations for cooling and heating can be adjusted. CLIMATIC™ 50 provides a choice of different remote displays depending on customer requirement and application of the system.



CONSTRUCTION

The LENNOX ECOLOGIC™ Chillers and condensing units are 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 galvanized steel, permit easy access to all maintenance and service components.

COMPRESSORS

LENNOX ECOLOGIC™ Chillers and condensing units are fitted with a scroll compressor.

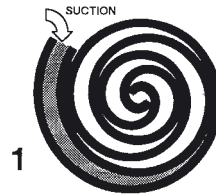
SCROLL COMPRESSOR :

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.

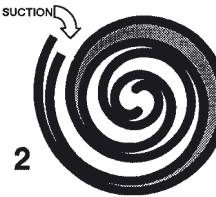
During a single orbit, several pockets of gas are compressed simultaneously providing smooth, continuous compression. Precisely designed, manufactured and balanced scrolls ensure high efficiency, no wasted motion and long term optimal performance. Scroll compressors are simple, efficient, durable and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



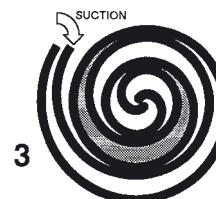
SCROLL GAS FLOW



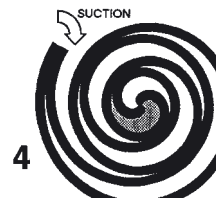
Compression in the scroll is created by the interaction of an orbiting scroll and a stationary scroll. Gas enters and exits as one of the scrolls orbit.



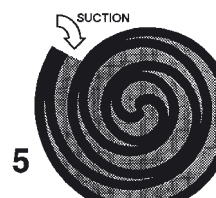
The open volume is sealed off as the gas is drawn into the scroll.



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.

ALUCOAT Coils treated

This is a anti corrosion sprayed coating that offers additional protection to the condenser fins for salt laden atmospheres such as seashores and in areas of industrial pollution. This is not suitable for heavy industrial pollution, strong alkalis, oxidizers, wet bromine and chlorine and fluorine in heavy concentrations. www.altena.com for additional data.

Antifreeze protection

Resistance heating tape is wrapped around the evaporator barrel to help protect the evaporator from freezing down to -20°C. Controlled by a thermostat mounted in the main panel, this requires an electrical supply during winter operation. If mains switch is off then there is no supply to the anti freeze heater. A separate supply is recommended under these circumstances. This device will not protect external water pipework connected to the unit and additional frost protection measures are required.

Anti-vibration mounts rubber

Elastic supports (Rubber) made of 2 flat and parallel frames, connected together via a rubber ring, fixed under the unit at the points specified by our technical drawings. Reduces the transmission of vibration to the ground and the general sound level. The diameter and strength vary in accordance with the model. Delivered loose not fitted. This type of mounts is not adapted to concrete slabs. Supplied loose.

Anti-vibration mounts spring

Spring and cage type isolators with a 30 mm deflection for mounting under the unit. Recommended for rooftop installations and any vibration sensitive applications. Deflection and level is site adjustable and deflection may vary according to unit size. Anti-vibration mounts are coded and the correct anti-vibration mount should be positioned in accordance with the IOM data. Supplied loose.

Buffer tank 200 litres

The tank shall be manufactured from carbon steel and insulated with 13 mm thick closed neoprene elastomer foam. Capacity of buffer tank is 200 litres.

Buffer tank 500 litres

The tank shall be manufactured from carbon steel and insulated with 13 mm thick closed neoprene elastomer foam. Capacity of buffer tank is 500 litres.

Coils protection Guards

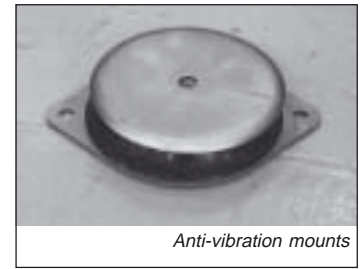
Removable polyester coated metal guards that protect the entire condenser coil outer surface from light accidental damage during shipping and on site. Also prevents direct contact by hand of the condenser coil sharp edges. The condenser coil guard is removable for cleaning of the condenser coil. The condenser coils guard's acts as a deterrent but do not offer total protection.

Compressor noise insulation

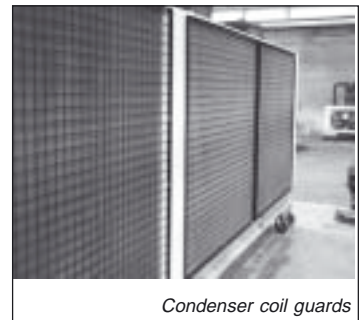
This option consists of a high efficiency jacket especially designed for the scroll compressors. It allows an increased output of the acoustic performances and gives good access to the compressors for maintenance.

Cu / Cu Condenser coils

The condenser is constructed with copper fins and copper tubes for resistance to most industrial and heavy salt laden conditions. This is not advised for use areas exposed to acid rain. This option adds weight to the unit and care should be taken when selecting the correct unit weights and point loads to ensure this is allowed for.



Anti-vibration mounts



Condenser coil guards

DC 50 Comfort display

This is a local or remote controller for non-technical customer. This display gives information such as flow or pump status, set point and outside air temperature. It can be used to set or change the scheduling of the different time zones, the temperature set point for each zone. It also has the capacity to force any of the different time zones for up to 7 days.

This new display controller is usually mounted on the electrical panel door.



DC 50 comfort display

DS 50 display

This display is only for maintenance people and is a plug and play feature.

Double pump

Centrifugal monocellular pump, made of a body with internal none return valve, and 2 class F motors.

Electronic expansion valve

On HE unit's electronic expansion valves are fitted as standard.

There is the option to fit electronic expansion valve(s) (EEV). With this option the liquid line solenoid valve is not required as the EEV acts as a isolation valve. When selecting the option of electronic expansion valve it is also necessary to select the CLIMATIC™ 50 controller.

Epoxy coated condenser fins

Condenser coils constructed with epoxy coated aluminium condenser fin stock for corrosion protection resistance comparable to Cu/Cu coils in salt laden conditions. The pre-coated fins are assembled onto copper tubes with full form collars to enhance heat transfer and reduce corrosion.

Expansion vessel 25 litres

Important element of the hydraulic system, it allows the compensation for over-pressures of the network. It consists of a tank of 25 litres out of steel and on the third of the volume of a membrane under Nitrogen pressure.

Expansion vessel 50 litres

Important element of the hydraulic system, it allows the compensation for over-pressures of the network. It consists of a tank of 50 litres out of steel and on the third of the volume of a membrane under Nitrogen pressure.

Flow switch (a paddle)

The paddle switch is supplied loose for fitting in the chilled water line by the customer. It is also required that the customer wires the flow switch directly back to the control panel terminals provided. If a chiller is operated without a flow switch then freezing of the evaporator will occur. If the chiller is operated with no water flow, warranty will be voided if no flow switch is present in the chilled water system.

Flow switch (pressure drop control)

In the case when a differential flow switch has been selected and the option «antifreeze heater» is selected the lines to the flow switch are protected from freezing. This switch comes piped and fitted on the evaporator and is tested by the factory. If a chiller is operated without a flow switch then Freezing of the evaporator will occur. If the chiller is operated with no water flow warranty will be voided if no flow switch is present in the chilled water system.



DS 50 display



Paddle Flow switch

Full panels around the unit

This option provides a full panel enclosure on the STD, and LN 100E to 150D versions. The side of the unit which contains the compressors is fully enclosed from the base to the top of the unit with painted RAL 9002 removable sheet metal panels.



Service Panels

Heat recovery

This option is available only on the standard version. It makes it possible to recover the totality of the calorific power through exchanger with brazed plates with double refrigerating circuit and only one hydraulic system equipped with a controller with flow to pallet and a valve with safety with dimensions water. This exchanger is assembled in series and upstream of the air condenser, a tank of liquid to compensate for the difference in load between the two exchangers and to allow a constant power supply of the evaporator.

The principle of operation is the following : once the flow is established, the capacity is transferred to the heat recovery exchanger without any ventilation on the condenser. This configuration will be maintained until obtaining the set point. Once this point is reached, it will be maintained by the adjustment of the ventilation.

HP&LP pressure gauges

Liquid filled gauges that measures the evaporating Low pressure (LP) and condensing high pressure (HP) on each refrigerant circuit. Gauges are « glycerin » filled to damp gas pulsation and are mounted externally. The gauges are compound gauges that display the saturated refrigerant temperature for the various refrigerants available. The same information is available on the CLIMATIC™ 50 controller. Be careful not to duplicate functions. Display of High and low pressure is available from the CLIMATIC™ 50 controller and it is not necessary to add gauges.



HP/LP gauge set

Hydraulic anti-freeze protection

Tracing by heating resistance on the pump housing and pipings.

Hydronic anti-freeze protection

Tracing by heating resistance on the pump housing, pipings and tank.

Kit for groove lock coupling

The chilled water connections on all units are Victaulic connections. Each unit is supplied with a Victaulic connector and seal for the chilled water connections as standard. In the event the customer needs to have a grooved Victaulic pipe stub, which he can weld, screw or fit flanges too. This option provides the two additional pipe stubs sections groove at one end for the Victaulic connector and unfinished at the other end for the customer to make the connection of his choice.

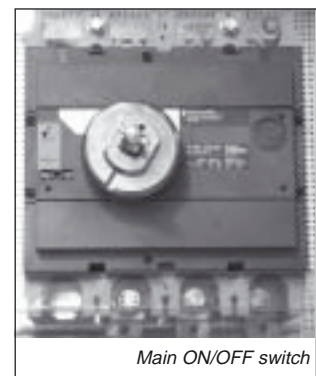
Low Ambient kit

Allows start-up and operation of the unit up to outside temperature down to -10°C (recommended for outside temperatures below +6°C). The unit is generally equipped with a low pressure switch and an antifreeze thermostatic function. This option includes the antifreeze protection for the evaporator.

Main ON/OFF switch

It allows the general cut-off and isolation of the mains 3 phase power supply, when the machine is running or stopped. The mains switch is interlocked so that the panel can not be opened until the power has been turned off. This ensures that the unit cannot be accessed until power has been isolated. If the mains transformer is fitted, this switch will also cut power from the control and anti freeze Heaters.

CAUTION : If the mains switch is in the off position and a separate power supply is NOT provided to the anti freeze heaters, freezing can occur. The mains switch is supplied with covers on the connections. The mains switch is used to isolate power from the unit for safe working on the electrical components.



Main ON/OFF switch

Mod-Bus interface

This is an additional microprocessor board that is able to provide information using JBUS protocol to allow exchanges between the CLIMATIC™ control system and an external BMS system. LENNOX have existing protocols in place with most BMS companies but this option can require additional support above the basic costs of the interface module.

Power Factor Correction

This option consists in reducing the excessive consumption of reactive energy and to decrease the losses joules by the addition of capacitor batteries for a cos phi 0,95.

R22

The units are supplied with HCFC22 as the refrigerant. This is only available as an option outside of the EEC. When specified with R22, the unit is supplied with operational set points and components that are suitable for operation with the refrigerant.

Reinforced evaporator insulation

One additional layer of thermal insulation of the evaporator increases the insulation from 12,7mm to 26mm closed cell foam that is resistant to water. Classification for fire: M1.

Removable Cartridge filter drier

Installed after the condensers, allows the replacement of the hygroscopic cores without having to remove the body of the core filter.

Sight Glass

A sight glass is provided for determining refrigerant condition if on the liquid line, one sight glass per circuit is provided.

Simple pump

Pump centrifugal monocellulaire a body and one motor of class F.

Soft Starter

This option available on all models is to provide for the lowest starting current on the compressors. The overall starting current is reduced by 15% to 30% depending on the number of compressors and model selected.

Suction and discharge isolation valves on refrigerant circuit

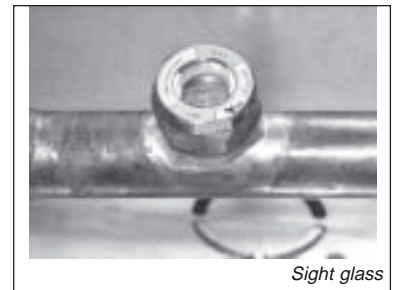
The supply and fitting of manual suction and discharge isolation valves on either side of each circuit to allow service on the compressors with out removal of the full refrigerant charge.

Water filter

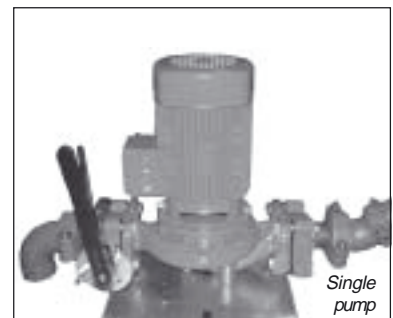
Water strainer/filter is to be installed upstream on the water inlet to protect the evaporator from any possible impurities (900 microns efficiency). It is recommended for shell and tube heat exchangers and must be fitted on units with plate heat exchangers. Supplied loose.



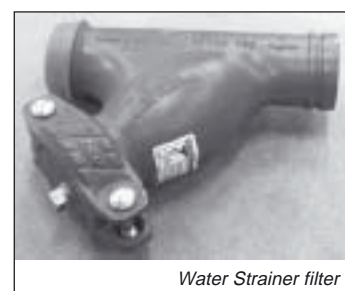
Replaceable core filter drier



Sight glass



Single pump



Water Strainer filter

Water inlet/outlet manometer

Pressure gauges with oil bath with a posting of the pressure in bars. They are assembled directly on the inlet/outlet water connections or supplied loose.

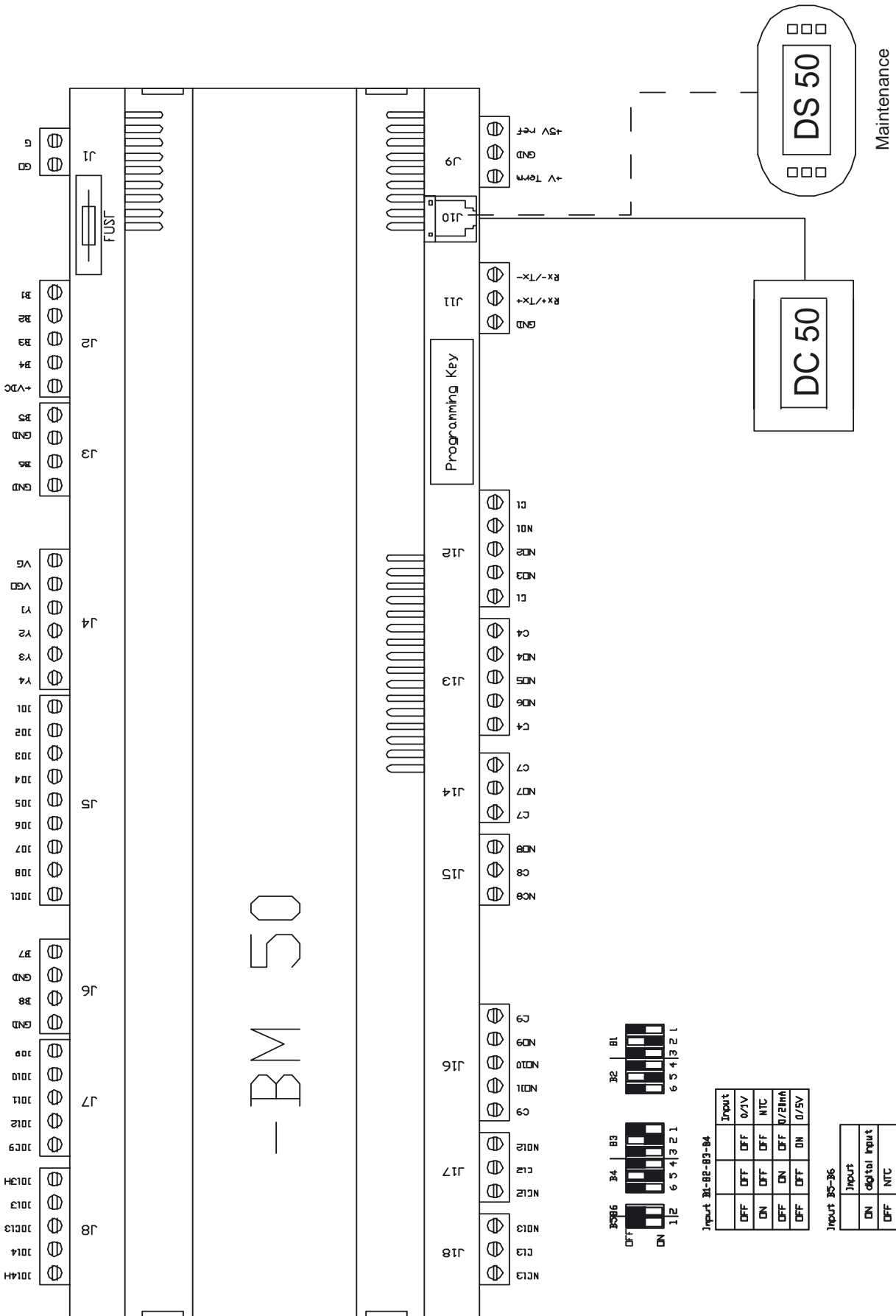
Water inlet/outlet valves

Two valves with 1/4 turn, will allow isolation of the chiller from the hydraulic system. Supplied loose.

Free cooling

Free cooling offers exceptional energy saving in all conditions in which the ambient temperature is lower than the designed temperature of the system in industrial processes, Close control application etc. The Free cooling capacity depends directly from the temperature difference of the ambient temperature and the water temperature of the system. The compressors intervene in case the capacity in Free cooling mode is not sufficient. The modulating 3 way valve guarantees a maximum utilization of the Free cooling potential of the environment. Return of investments can be achieved in shortest terms, depending on the climatic conditions of the place of installation. The units with Free cooling option are provided with a 3 way valve in order to divert the water flow directly to the Free cooling coils and to take advantage of the low ambient temperature. The valve is controlled by a Microprocessor control which is constantly monitoring the temperature difference between return water temperature and ambient temperature.

CLIMATIC 50 CONTROLLER



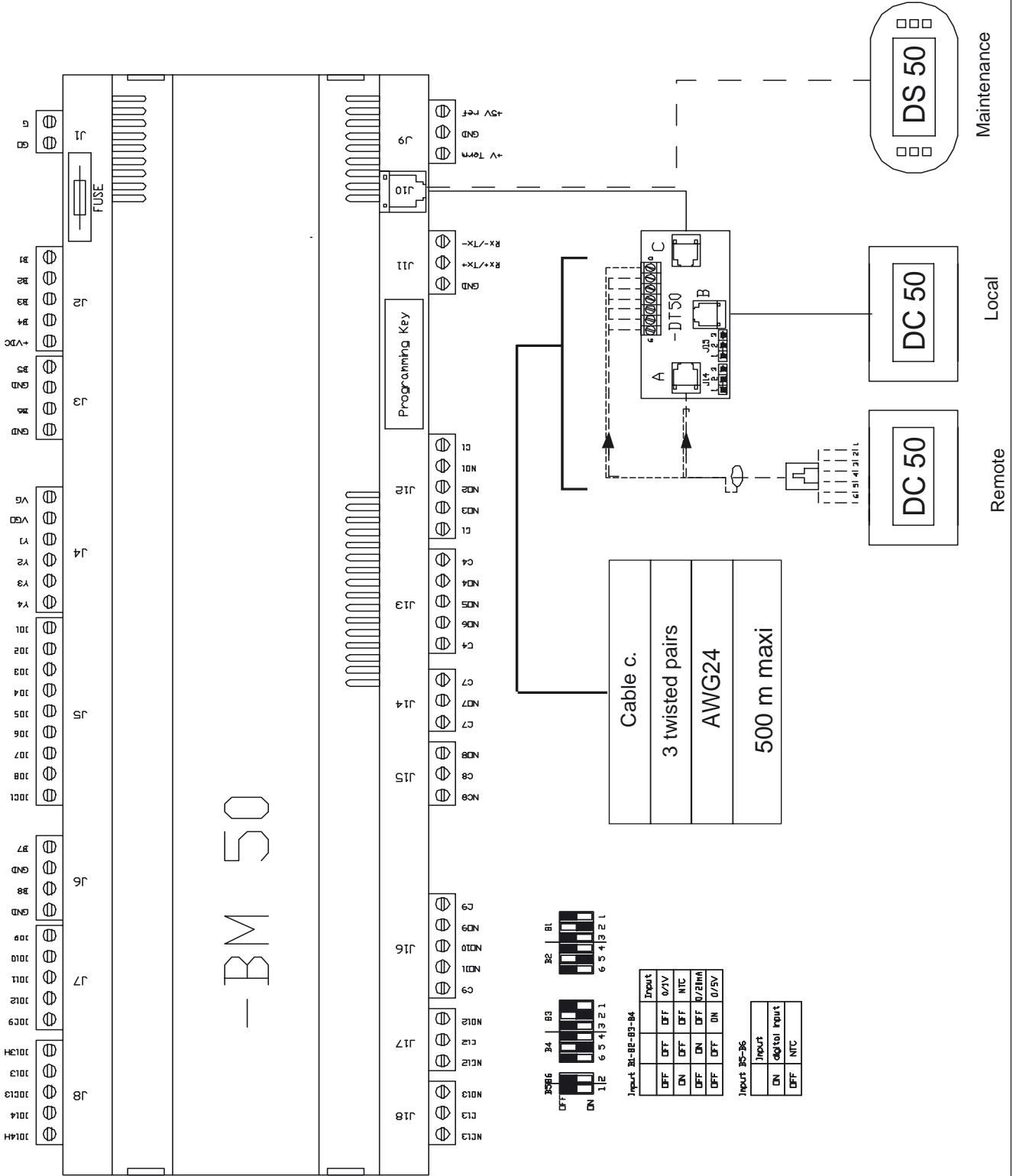
Input 34-35-36-38

Input	0/VV	NTC	0/2InA	0/5V
OFF	OFF	OFF	OFF	ON
ON	ON	ON	ON	OFF

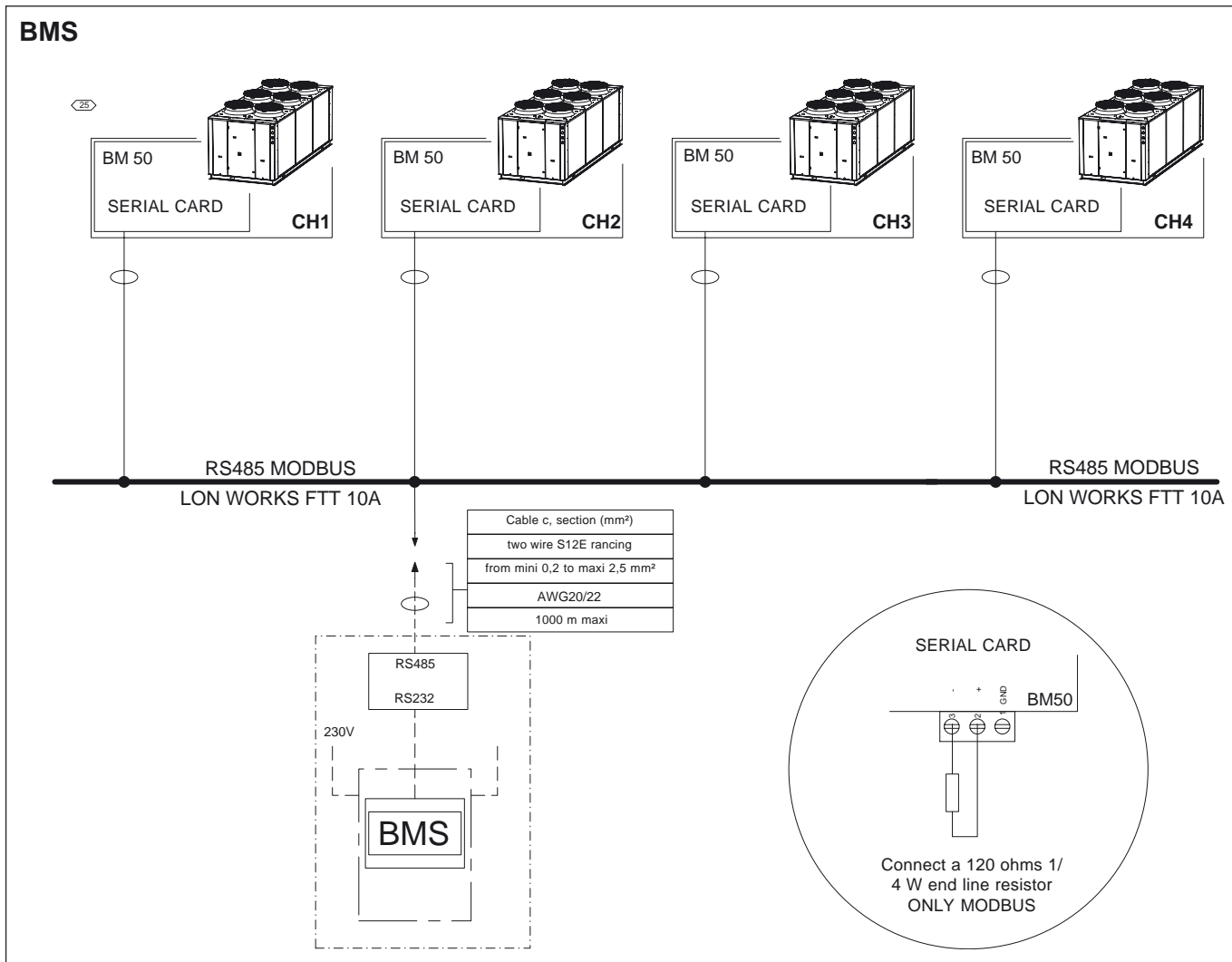
Input 36-38

Input	digital input	NTC
ON	ON	OFF
OFF	OFF	NTC

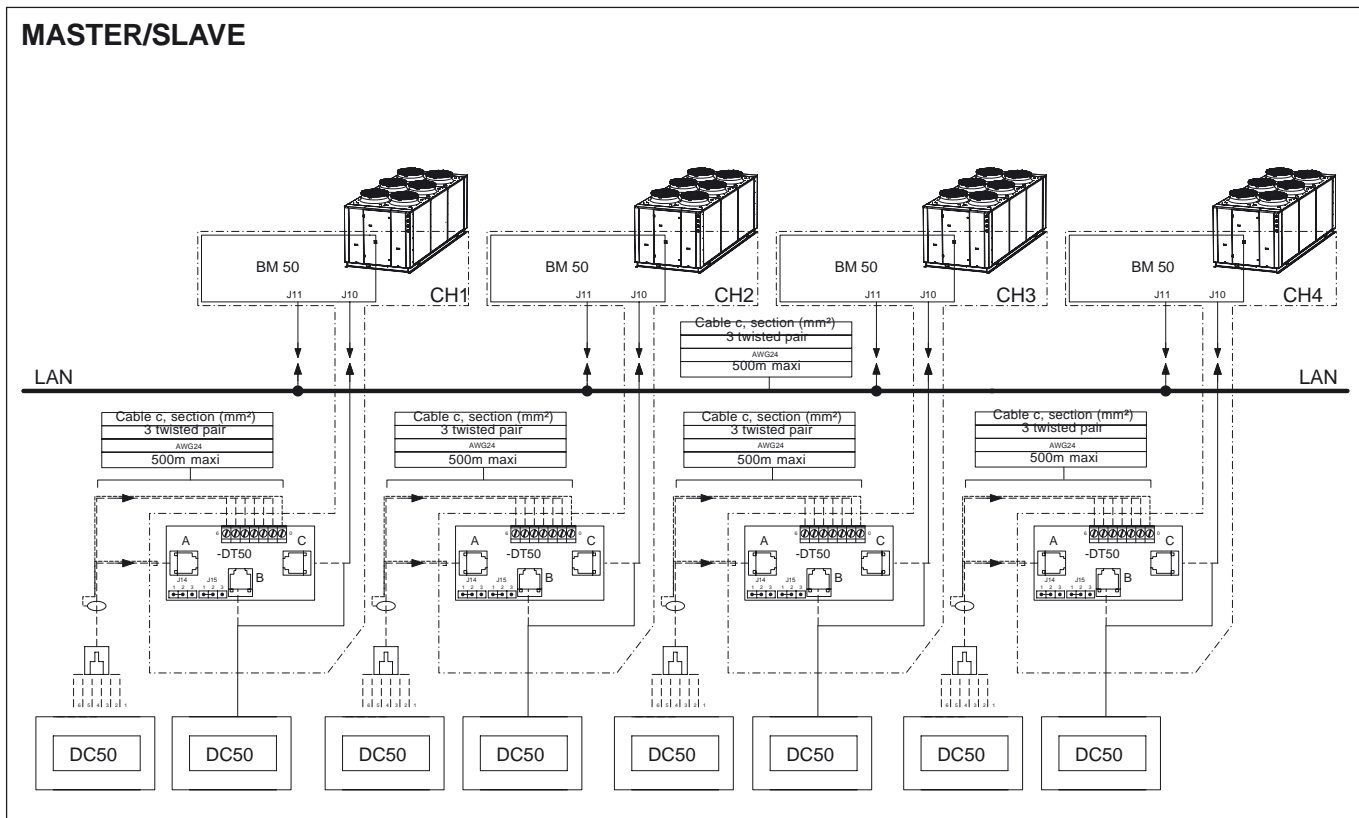
CLIMATIC 50 CONTROLLER - OPTION DC50 REMOTE CONNECTION

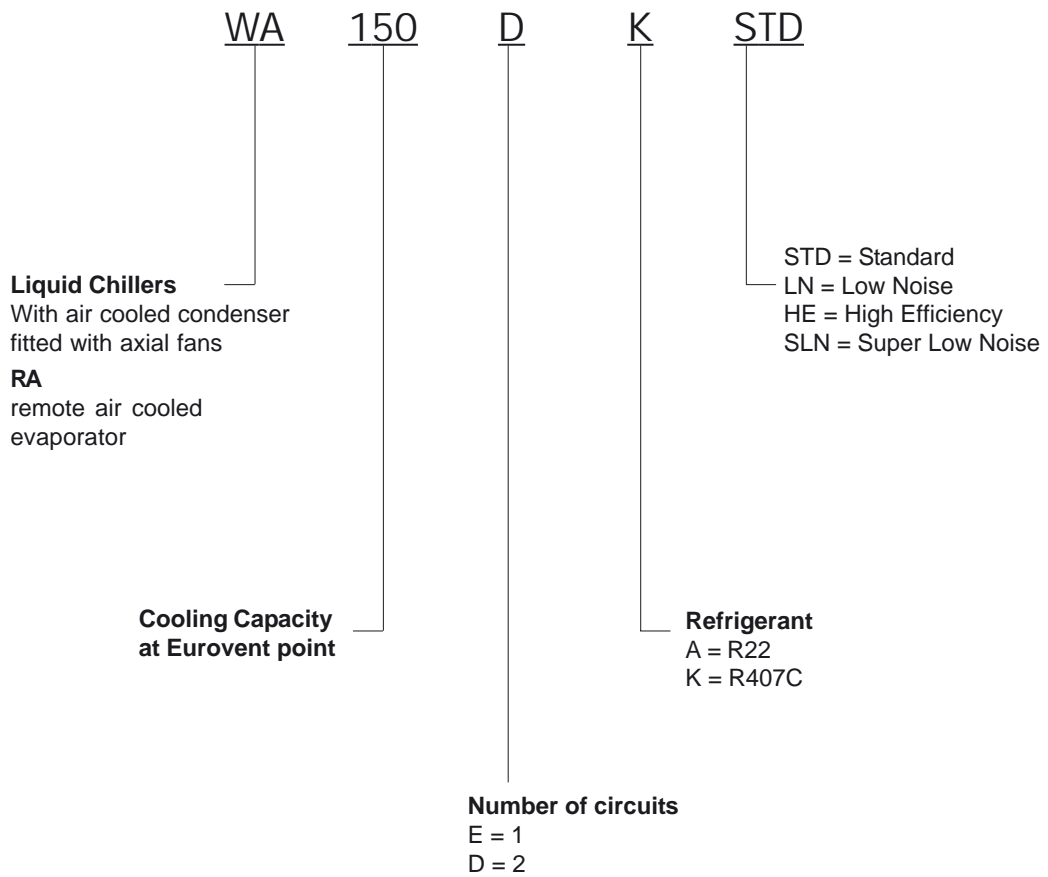


BMS



MASTER/SLAVE





ECOLOGIC	WA	150	200	230	270	300	370
Cooling mode							
Cooling capacity ⁽¹⁾	kW	144,6	184,7	220,8	266,7	283,4	350,9
Power input ⁽¹⁾	kW	68,4	79,5	95,3	118,8	134,2	157,1
Full load amps ⁽¹⁾	A	114,0	137,8	166,1	206,3	231,6	273,2
EER ⁽²⁾		2,4	2,7	2,6	2,6	2,4	2,5
EER global ⁽³⁾		2,1	2,3	2,3	2,2	2,1	2,2
Compressor							
Scroll - hermetic							
Number of compressor	nr	4	4	4	4	4	6
Capacity steps	%	0-25-50-75-100	0-17-33-50-67-83-100	0-17-33-50-67-83-100	0-22-28-50-55-78-100	0-25-50-75-100	0-17-33-50-67-83-100
Oil charge per compressor	l	4,1	6,3 & 4,1	5,9 & 4,1	5,9 & 6,3	5,9	6,3
Oil type	type	MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF					
Refrigerant							
R407C							
Expansion	type	Thermostatic expansion valve					
Number of circuit	nr	2	2	2	2	2	2
Charge per circuit	kg	19,8	18,6	28,2	28,2	28,2	42,6
Condenser							
Copper tube - Aluminium fin - Air cooled							
Face area	m ²	5,85	8,4	8,4	12,6	12,6	12,6
Number of rows	nr	3	2	3	2	2	3
Fin per inch	mm	2	1,8	2	1,8	1,8	2
Fan & Motor							
Axial fan							
Number of fan	nr	3	4	4	6	6	6
Diameter	mm	710	710	710	710	710	710
Maximum speed	RPM	1350	1350	1350	1350	1350	1350
Nominal air flow	m ³ /h	57 500	78 000	75 400	117 000	117 000	113 600
External static pressure	Pa	0	0	0	0	0	0
Total motor power input	kW	7,5	10	10	15	15	15
Evaporator							
AISI 316 stainless steel plate brazed with copper heat exchanger							
Water flow ⁽¹⁾	m ³ /h	24,4	31,1	37,2	44,9	47,7	59,1
Water volume	l	12,4	19,1	19,1	23,9	23,9	31,5
Pressure drop ⁽¹⁾	kPa	38,6	31,6	44,4	36,3	41	39
Water operating pressure	kPa	600	600	600	600	600	600
Hydraulic connections							
Victaulic							
Water inlet/outlet with Hydro	Inches	2"1/2	2"1/2	2"1/2	4	4	4
Water inlet/outlet without Hydro	Inches	2"	2"	2"	2"1/2	2"1/2	2"1/2
Acoustic							
Global sound power level ⁽¹⁾	dB(A)	92	94	95	96	97	97
Electrical data							
400V/3/50Hz							
Start-up intensity	A	299,1	385,8	456,6	500,9	524,8	536,3
Maximum current	A	129,7	160,4	195,2	239,5	263,3	310,9
Operating limits							
Min. outlet water temperature	°C	5	5	5	5	5	5
Max. inlet water temperature	°C	20	20	20	20	20	20
Min. difference water inlet/outlet	°C	3	3	3	3	3	3
Max. difference water inlet/outlet	°C	8	8	8	8	8	8
Min. outside air temperature	°C	6	6	6	6	6	6
Max. outside air temperature ⁽⁴⁾	°C	51	49	49	51	51	48
Dimensions							
Length	mm	4704	3304	3304	4704	4704	4704
Width	mm	1054	1904	1904	1904	1904	1904
Height	mm	1940	1959	1959	1961	1961	1961
Footprint	m ²	4,9	6,2	6,2	8,9	8,9	8,9
Operating weight	kg	1480	1860	2019	2559	2627	2986
Shipping weight	kg	1468	1841	2000	2535	2603	2954
Construction							
Frame		Galvanised steel base					
Casing		ALUZINC					
Painting		Polyester - RAL 9002					
Insulation class		M1					

(1) All data are at Eurovent condition, Gross cooling capacity with 12/7°C water temperature and 35°C air ambient, Gross heating capacity with 7°C air inlet temperature and 40/45°C water temperature,

(2) EER and COP compressors only,

(3) EER and COP with fans,

(4) Normal cooling operation with CLIMATIC™ 50, 12°C/7°C water and one compressor unloaded

(NA) Not available,

wa - ek - dk

LOW NOISE

ECOLOGIC	WA	150	200	230	270	300	370
Cooling mode							
Cooling capacity ⁽¹⁾	kW	140,9	180,4	214,3	259,9	275,3	339
Power input ⁽¹⁾	kW	68,2	78,7	96,3	117,9	134,4	159,4
Full load amps ⁽¹⁾	A	111,7	134,1	163,8	201,2	228,0	272,8
EER ⁽²⁾		2,2	2,5	2,4	2,4	2,2	2,3
EER global ⁽³⁾		2,1	2,3	2,2	2,2	2,0	2,1
Compressor Scroll - hermetic							
Number of compressor	nr	4	4	4	4	4	6
Capacity steps	%	0-25-50-75-100	0-17-33-50-67-83-100	0-17-33-50-67-83-100	0-22-28-50-55-78-100	0-25-50-75-100	0-17-33-50-67-83-100
Oil charge per compressor	l	4,1	6,3 & 4,1	5,9 & 4,1	5,9 & 6,3	5,9	6,3
Oil type	type	MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF					
Refrigerant R407C							
Expansion	type	Thermostatic expansion valve					
Number of circuit	nr	2	2	2	2	2	2
Charge per circuit	kg	19,8	18,6	28,2	28,2	28,2	42,6
Condenser Copper tube - Aluminium fin - Air cooled							
Face area	m ²	5,85	8,4	8,4	12,6	12,6	12,6
Number of rows	nr	3	2	3	2	2	3
Fin per inch	mm	2	1,8	2	1,8	1,8	2
Fan & Motor Axial fan							
Number of fan	nr	3	4	4	6	6	6
Diameter	mm	710	710	710	710	710	710
Maximum speed	RPM	1090	1090	1090	1090	1090	1090
Nominal air flow	m ³ /h	47 000	64 200	61 850	96 000	96 000	92 700
External static pressure	Pa	0	0	0	0	0	0
Total motor power input	kW	5,1	6,8	6,8	10,2	10,2	10,2
Evaporator AISI 316 stainless steel plate brazed with copper heat exchanger							
Water flow ⁽¹⁾	m ³ /h	23,8	30,4	36,2	43,8	46,4	57,2
Water volume	l	12,4	19,1	19,1	23,9	23,9	31,5
Pressure drop ⁽¹⁾	kPa	36,9	30,3	42,1	34,7	38,8	36,6
Water operating pressure	kPa	600	600	600	600	600	600
Hydraulic connections Victaulic							
Water inlet/outlet with Hydro	Inches	2"1/2	2"1/2	2"1/2	4	4	4
Water inlet/outlet without Hydro	Inches	2"	2"	2"	2"1/2	2"1/2	2"1/2
Acoustic							
Global sound power level ⁽¹⁾	dB(A)	88	89	90	91	91	91
Electrical data 400V/3/50Hz							
Start-up intensity	A	293,7	378,6	449,4	490,1	514,0	525,5
Maximum current	A	124,3	153,2	188,0	228,7	252,5	300,1
Operating limits							
Min. outlet water temperature	°C	5	5	5	5	5	5
Max. inlet water temperature	°C	20	20	20	20	20	20
Min. difference water inlet/outlet	°C	3	3	3	3	3	3
Max. difference water inlet/outlet	°C	8	8	8	8	8	8
Min. outside air temperature	°C	6	6	6	6	6	6
Max. outside air temperature ⁽⁴⁾	°C	50	48	47	50	50	47
Dimensions							
Length	mm	4704	3304	3304	4704	4704	4704
Width	mm	1054	1904	1904	1904	1904	1904
Height	mm	1940	1959	1959	1961	1961	1961
Footprint	m ²	4,9	6,2	6,2	8,9	8,9	8,9
Operating weight	kg	1480	1860	2019	2559	2627	2986
Shipping weight	kg	1468	1841	2000	2535	2603	2954
Construction							
Frame		Galvanised steel base					
Casing		ALUZINC					
Painting		Polyester - RAL 9002					
Insulation class		M1					

(1) All data are at Eurovent condition.
 Gross cooling capacity with 12/7°C water temperature and 35°C air ambient.
 Gross heating capacity with 7°C air inlet temperature and 40/45°C water temperature.

(2) EER and COP compressors only.
 (3) EER and COP with fans.
 (4) Normal cooling operation with CLIMATIC™ 50, 12°C/7°C water and one compressor unloaded
 (NA) Not available.

ECOLOGIC	WA	150	200	230	270	300	370
Cooling mode							
Cooling capacity ⁽¹⁾	kW	151,8	190,3	226,9	273,6	299,7	354,9
Power input ⁽¹⁾	kW	59,9	71,5	86,7	106,9	116,0	146,7
Full load amps ⁽¹⁾	A	100,3	124,3	151,7	185,3	201,5	254,4
EER ⁽²⁾		2,7	2,9	2,8	2,8	2,8	2,6
EER global ⁽³⁾		2,5	2,7	2,6	2,6	2,6	2,4
Compressor							
Scroll - hermetic							
Number of compressor	nr	4	4	4	4	4	6
Capacity steps	%	0-25-50-75-100	0-17-33-50-67-83-100	0-17-33-50-67-83-100	0-22-28-50-55-78-100	0-25-50-75-100	0-17-33-50-67-83-100
Oil charge per compressor	l	4,1	6,3 & 4,1	5,9 & 4,1	5,9 & 6,3	5,9	6,3
Oil type	type	MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF					
Refrigerant							
R407C							
Expansion	type	Thermostatic expansion valve					
Number of circuit	nr	2	2	2	2	2	2
Charge per circuit	kg	28,2	28,2	42,6	37,2	56,4	56,4
Condenser							
Copper tube - Aluminium fin - Air cooled							
Face area	m ²	8,4	12,6	12,6	16,8	16,8	16,8
Number of rows	nr	3	2	3	2	3	3
Fin per inch	mm	2	1,8	2	1,8	2	2
Fan & Motor							
Axial fan							
Number of fan	nr	4	6	6	8	8	8
Diameter	mm	710	710	710	710	710	710
Maximum speed	RPM	900	900	900	900	900	900
Nominal air flow	m ³ /h	51300	79 200	77 000	105 600	102 600	102 600
External static pressure	Pa	0	0	0	0	0	0
Total motor power input	kW	3,92	5,88	5,88	7,84	7,84	7,84
Evaporator							
AISI 316 stainless steel plate brazed with copper heat exchanger							
Water flow ⁽¹⁾	m ³ /h	25,6	32,1	38,3	46,2	50,6	59,9
Water volume	l	12,4	19,1	19,1	23,9	23,9	31,5
Pressure drop ⁽¹⁾	kPa	42,5	33,6	47	38,5	46,1	40
Water operating pressure	kPa	600	600	600	600	600	600
Hydraulic connections							
Victaulic							
Water inlet/outlet with Hydro	Inches	2" 1/2	2" 1/2	2" 1/2	4	4	4
Water inlet/outlet without Hydro	Inches	2"	2"	2"	2" 1/2	2" 1/2	2" 1/2
Acoustic							
Global sound power level ⁽¹⁾	dB(A)	88	91	92	93	94	94
Electrical data							
400V/3/50Hz							
Start-up intensity	A	292,0	377,5	448,3	486,7	510,6	522,0
Maximum current	A	122,6	152,1	186,9	225,3	249,1	296,7
Operating limits							
Min. outlet water temperature	°C	5	5	5	5	5	5
Max. inlet water temperature	°C	20	20	20	20	20	20
Min. difference water inlet/outlet	°C	3	3	3	3	3	3
Max. difference water inlet/outlet	°C	8	8	8	8	8	8
Min. outside air temperature	°C	6	6	6	6	6	6
Max. outside air temperature ⁽⁴⁾	°C	53	51	51	52	53	49
Dimensions							
Length	mm	3304	4704	4704	6404	6404	6404
Width	mm	1904	1904	1087	1087	1904	1904
Height	mm	1959	1961	1961	2001	2001	2001
Footprint	m ²	6,2	8,9	8,9	12,1	12,1	12,1
Operating weight	kg	1636	2034	2225	2800	2986	3255
Shipping weight	kg	1623	2015	2205	2776	2962	3224
Construction							
Frame		Galvanised steel base					
Casing		ALUZINC					
Painting		Polyester - RAL 9002					
Insulation class		M1					

(1) All data are at Eurovent condition.
 Gross cooling capacity with 12/7°C water temperature and 35°C air ambient.
 Gross heating capacity with 7°C air inlet temperature and 40/45°C water temperature.

(2) EER and COP compressors only.
 (3) EER and COP with fans.
 (4) Normal cooling operation with CLIMATIC™ 50, 12°C/7°C water and one compressor unloaded
 (NA) Not available.

Wa - ek - dk

super
low noise

ECOLOGIC	WA	150	200	230	270	300	370
Cooling mode							
Cooling capacity ⁽¹⁾	kW	147,3	185,5	219,9	268,5	291,2	341,9
Power input ⁽¹⁾	kW	60,6	71,1	88,0	105,6	117,0	150,6
Full load amps ⁽¹⁾	A	100,9	123,5	153,2	183,3	202,8	260,0
EER ⁽²⁾		2,4	2,7	2,6	2,6	2,6	2,3
EER global ⁽³⁾		2,5	2,6	2,5	2,5	2,5	2,3
Compressor							
Scroll - hermetic							
Number of compressor	nr	4	4	4	4	4	6
Capacity steps	%	0-25-50-75-100	0-17-33-50-67-83-100	0-17-33-50-67-83-100	0-22-28-50-55-78-100	0-25-50-75-100	0-17-33-50-67-83-100
Oil charge per compressor	l	4,1	6,3 & 4,1	5,9 & 4,1	5,9 & 6,3	5,9	6,3
Oil type	type	MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF					
Refrigerant							
R407C							
Expansion	type	Thermostatic expansion valve					
Number of circuit	nr	2	2	3	2	3	2
Charge per circuit	kg	28,2	28,2	42,6	37,2	56,4	56,4
Condenser							
Copper tube - Aluminium fin - Air cooled							
Face area	m ²	8,4	12,6	12,6	16,8	16,8	16,8
Number of rows	nr	3	2	3	2	3	3
Fin per inch	mm	2	1,8	2	1,8	2	2
Fan & Motor							
Axial fan							
Number of fan	nr	4	6	6	8	8	8
Diameter	mm	710	710	710	710	710	710
Maximum speed	RPM	680	680	680	680	680	680
Nominal air flow	m ³ /h	41 300	64 300	62 000	85 900	82 700	82 700
External static pressure	Pa	0	0	0	0	0	0
Total motor power input	kW	1,68	2,52	2,52	3,36	3,36	3,36
Evaporator							
AISI 316 stainless steel plate brazed with copper heat exchanger							
Water flow ⁽¹⁾	m ³ /h	24,9	31,3	37,1	45,3	49,2	57,7
Water volume	l	12,4	19,1	19,1	23,9	23,9	31,5
Pressure drop ⁽¹⁾	kPa	40,2	32	44,3	37	43,5	37,3
Water operating pressure	kPa	600	600	600	600	600	600
Hydraulic connections							
Victaulic							
Water inlet/outlet with Hydro	Inches	2" 1/2	2" 1/2	2" 1/2	4	4	4
Water inlet/outlet without Hydro	Inches	2"	2"	2"	2" 1/2	2" 1/2	2" 1/2
Acoustic							
Global sound power level ⁽¹⁾	dB(A)	79	82	83	85	86	85
Electrical data							
400V/3/50Hz							
Start-up intensity	A	288,7	372,6	443,5	480,3	504,1	515,6
Maximum current	A	199,4	147,2	182,0	218,8	242,6	290,2
Operating limits							
Min. outlet water temperature	°C	5	5	5	5	5	5
Max. inlet water temperature	°C	20	20	20	20	20	20
Min. difference water inlet/outlet	°C	3	3	3	3	3	3
Max. difference water inlet/outlet	°C	8	8	8	8	8	8
Min. outside air temperature	°C	6	6	6	6	6	6
Max. outside air temperature ⁽⁴⁾	°C	52	50	49,5	51,5	52,3	47,1
Dimensions							
Length	mm	3304	4704	4704	6404	6404	6404
Width	mm	1904	1904	1087	1087	1904	1904
Height	mm	1959	1961	1961	2001	2001	2001
Footprint	m ²	6,2	8,9	8,9	12,1	12,1	12,1
Operating weight	kg	1656	2054	2245	2820	3006	3285
Shipping weight	kg	1643	2035	2225	2796	2982	3254
Construction							
Frame		Galvanised steel base					
Casing		ALUZINC					
Painting		Polyester - RAL 9002					
Insulation class		M1					

(1) All data are at Eurovent condition.
Gross cooling capacity with 12/7°C water temperature and 35°C air ambient.
Gross heating capacity with 7°C air inlet temperature and 40/45°C water temperature.

(2) EER and COP compressors only.
(3) EER and COP with fans.
(4) Normal cooling operation with CLIMATIC™ 50, 12°C/7°C water and one compressor unloaded
(NA) Not available.

ECOLOGIC	WAH	150	200	230
Cooling mode				
Cooling capacity ⁽¹⁾	kW	135,2	173,2	203,9
Power input ⁽¹⁾	kW	68,5	76,1	93,5
Full load amps ⁽¹⁾	A	115,4	133,2	163,7
EER ⁽²⁾		2,3	2,6	2,4
EER global ⁽³⁾		2,0	2,3	2,2
Heating mode				
Heating capacity ⁽¹⁾	kW	165,7	201,7	246
Power input ⁽¹⁾	kW	68,7	77,1	94,9
Full load amps ⁽¹⁾	A	115,5	134,7	165,4
COP ⁽²⁾		2,8	3,0	2,9
COP global ⁽³⁾		2,4	2,6	2,6
Compressor				
Scroll - hermetic				
Number of compressor	nr	4	4	4
Capacity steps	%	0-25-50-75-100	0-17-33-50-67-83-100	0-17-33-50-67-83-100
Oil charge per compressor	l	4,1	6,3 & 4,1	5,9 & 4,1
Oil type	type	MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF		
Refrigerant				
R407C				
Expansion	type	Thermostatic expansion valve		
Number of circuit	nr	2	2	2
Charge per circuit	kg	15	21,6	28,8
Condenser				
Copper tube - Aluminium fin - Air cooled				
Face area	m ²	5,85	8,4	8,4
Number of rows	nr	3	3	4
Fin per inch	mm	1,8	1,6	1,8
Fan & Motor				
Axial fan				
Number of fan	nr	4	4	4
Diameter	mm	710	710	710
Maximum speed	RPM	1350	1350	1350
Nominal air flow	m ³ /h	35 900	38 200	37 200
External static pressure	Pa	0	0	0
Total motor power input	kW	10	10	10
Evaporator				
AISI 316 stainless steel plate brazed with copper heat exchanger				
Water flow ⁽¹⁾	m ³ /h	23,3	29,8	35,1
Water volume	l	12,4	19,1	19,1
Pressure drop ⁽¹⁾	kPa	35,5	29,2	39,8
Water operating pressure	kPa	600	600	600
Hydraulic connections				
Victaulic				
Water inlet/outlet with Hydro	Inches	2" 1/2	2" 1/2	2" 1/2
Water inlet/outlet without Hydro	Inches	2"	2"	2"
Acoustic				
Global sound power level ⁽¹⁾	dB(A)	92	94	95
Electrical data				
400V/3/50Hz				
Start-up intensity	A	303,8	445,7	456,6
Maximum current	A	134,4	184,2	195,2
Operating limits				
Min. outlet water temperature	°C	5	5	5
Max. inlet water temperature	°C	20	20	20
Min. difference water inlet/outlet	°C	3	3	3
Max. difference water inlet/outlet	°C	8	8	8
Min. outside air temperature	°C	6	6	6
Max. outside air temperature ⁽⁴⁾	°C	51	50	49
Dimensions				
Length	mm	4704	3304	3304
Width	mm	1054	1904	1904
Height	mm	1940	1959	1959
Footprint	m ²	4,9	6,2	6,2
Operating weight	kg	1479	1924	2075
Shipping weight	kg	1467	1905	2056
Construction				
Frame		Galvanised steel base		
Casing		ALUZINC		
Painting		Polyester - RAL 9002		
Insulation class		M1		

(1) All data are at Eurovent condition.
 Gross cooling capacity with 12/7°C water temperature and 35°C air ambient.
 Gross heating capacity with 7°C air inlet temperature and 40/45°C water temperature.

(2) EER and COP compressors only.
 (3) EER and COP with fans.
 (4) Normal cooling operation with CLIMATIC™ 50, 12°C/7°C water and one compressor unloaded
 (NA) Not available.

reminder :RA=condensing unit

RA - dk

standard

ECOLOGIC	RA	150	200	230	270	300	370
Cooling mode							
Cooling capacity (1)	kW	158,2	199,2	243,9	293	313,4	386,2
Power input (1)	kW	70,2	81,4	98,3	122,7	139,3	162,7
Full load amps (1)	A	116,6	139,5	165,6	206,3	229,8	278,5
EER (2)		2,5	2,8	2,8	2,7	2,5	2,6
EER global (3)		2,3	2,4	2,5	2,4	2,2	2,4
Compressor Scroll - Hermetic							
Number of compressor	nb	4	4	4	4	4	6
Capacity steps	%	0-25-50-75-100	0-17-33-50-67-83-100	0-17-33-50-67-83-100	0-22-28-50-55-78-100	0-25-50-75-100	0-17-33-50-67-83-100
Oil charge per compressor	l	4,1	6,3 & 4,1	5,9 & 4,1	5,9 & 6,3	5,9	6,3
Oil type	type	MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF					
Refrigerant R 407 C							
Expansion	type	Thermostatic expansion valve					
Number of circuit	nb	2	2	2	2	2	2
Charge per circuit	kg	0	0	0	0	0	0
Condenser Copper tube - Aluminium fin - Air cooled							
Face area	m ²	5,85	8,4	8,4	12,6	12,6	12,6
Number of rows	nb	3	2	3	2	2	3
Fin Spacing	mm	2	1,8	2	1,8	1,8	2
Fan&Motor Axial fan							
Number of fan	nb	3	4	4	6	6	6
Diameter	mm	710	710	710	710	710	710
Maximum speed	rpm	1350	1350	1350	1350	1350	1350
Nominal air flow	m ³ /h	57 500	78 000	75 400	117 000	117 000	113 600
External static pressure	Pa	0	0	0	0	0	0
Total motor power input	kW	7,5	10	10	15	15	15
Evaporator							
Water flow	m ³ /h	N/A	N/A	N/A	N/A	N/A	N/A
Water volume	l	N/A	N/A	N/A	N/A	N/A	N/A
Pressure drop	kPa	N/A	N/A	N/A	N/A	N/A	N/A
Water operating pressure	kPa	N/A	N/A	N/A	N/A	N/A	N/A
Hydraulic connections							
Water inlet / outlet	Inches	N/A	N/A	N/A	N/A	N/A	N/A
Water drain / bleed	Inches	N/A	N/A	N/A	N/A	N/A	N/A
Acoustic							
Global sound power level (1)	dB(A)	95	99	99	101	101	101
Electrical data 400V/III/50Hz							
Start-up intensity	A	299,1	385,8	456,6	500,9	524,8	536,3
Maximum current	A	129,7	160,4	195,2	239,5	263,3	310,9
Operating limits							
Min. inlet evap temperature	°C	-5	-5	-5	-5	-5	-5
Max. inlet evap temperature	°C	15	15	15	15	15	15
Min. difference water inlet/outlet	°C	N/A	N/A	N/A	N/A	N/A	N/A
Max. difference water inlet/outlet	°C	N/A	N/A	N/A	N/A	N/A	N/A
Min. outside air temperature	°C	6	6	6	6	6	6
Max. outside air temperature (4)	°C	51	49	49	51	51	48
Dimensions							
Length	mm	4704	3304	3304	4704	4704	4704
Width	mm	1054	1904	1904	1904	1904	1904
Height	mm	1940	1959	1959	1961	1961	1961
Footprint	m ²	4,9	6,2	6,2	8,9	8,9	8,9
Operating Weight	kg	1480	1860	2019	2559	2627	2986
Shipping Weight	kg	1468	1841	2000	2535	2603	2954
Construction							
Frame		typeSteel base with galvanised					
Casing	type	Aluzinc					
Painting	type	Polyester - RAL 9002					
Insulation class	type	M1					

- (1) All data are at Eurovent condition.
Gross cooling capacity with 12/7°C water temperature and 35°C air ambient.
Gross heating capacity with 7°C air inlet temperature and 40/45°C water temperature.
- (2) EER and COP compressors only.
- (3) EER and COP with fans.
- (4) Normal cooling operation with CLIMATIC™ 50, 12°C/7°C water and one compressor unloaded
- (NA) Not available.

reminder :RA=condensing unit

RA EK- dk

low noise

ECOLOGIC	RA	150	200	230	270	300	370
Cooling mode							
Cooling capacity (1)	kW	153,5	193,9	235,4	284,3	302,9	370,6
Power input (1)	kW	70,1	80,8	99,4	121,9	139,7	165,3
Full load amps (1)	A	114,5	136,0	164,6	201,6	226,7	278,9
EER (2)		2,4	2,6	2,5	2,5	2,3	2,4
EER global (3)		2,2	2,4	2,4	2,3	2,2	2,2
Compressor							
Scroll - Hermetic							
Number of compressor	nb	4	4	4	4	4	6
Capacity steps	%	0-25-50-75-100	0-17-33-50-67-83-100	0-17-33-50-67-83-100	0-22-28-50-55-78-100	0-25-50-75-100	0-17-33-50-67-83-100
Oil charge per compressor	l	4,1	6,3 & 4,1	5,9 & 4,1	5,9 & 6,3	5,9	6,3
Oil type	type	MOBILEAL Arctic 22CC or ICI EMKARATE RL32CF					
Refrigerant							
R 407 C							
Expansion	type	Thermostatic expansion valve					
Number of circuit	nb	2	2	2	2	2	2
Charge per circuit	kg	0	0	0	0	0	0
Condenser							
Copper tube - Aluminium fin - Air cooled							
Face area	m ²	5,85	8,4	8,4	12,6	12,6	12,6
Number of rows	nb	3	2	3	2	2	3
Fin Spacing	mm	2	1,8	2	1,8	1,8	2
Fan&Motor							
Axial fan							
Number of fan	nb	3	4	4	6	6	6
Diameter	mm	710	710	710	710	710	710
Maximum speed	rpm	1090	1090	1090	1090	1090	1090
Nominal air flow	m ³ /h	47000	64200	61850	96000	96000	92700
External static pressure	Pa	0	0	0	0	0	0
Total motor power input	kW	5,1	6,8	6,8	10,2	10,2	10,2
Evaporator							
Water flow	m ³ /h	N/A	N/A	N/A	N/A	N/A	N/A
Water volume	l	N/A	N/A	N/A	N/A	N/A	N/A
Pressure drop	kPa	N/A	N/A	N/A	N/A	N/A	N/A
Water operating pressure	kPa	N/A	N/A	N/A	N/A	N/A	N/A
Hydraulic connections							
Water inlet / outlet	Inches	N/A	N/A	N/A	N/A	N/A	N/A
Water drain / bleed	Inches	N/A	N/A	N/A	N/A	N/A	N/A
Acoustic							
Global sound power level (1)	dB(A)	89	90	90	92	92	92
Electrical data							
400V/III/50Hz							
Start-up intensity	A	293,7	378,6	449,4	490,1	514,0	525,5
Maximum current	A	124,3	153,2	188,0	228,7	252,5	300,1
Operating limits							
Min. inlet evap temperature	°C	-5	-5	-5	-5	-5	-5
Max. inlet evap temperature	°C	15	15	15	15	15	15
Min. difference water inlet/outlet	°C	N/A	N/A	N/A	N/A	N/A	N/A
Max. difference water inlet/outlet	°C	N/A	N/A	N/A	N/A	N/A	N/A
Min. outside air temperature	°C	6	6	6	6	6	6
Max. outside air temperature (4)	°C	50	48	47	50	50	47
Dimensions							
Length	mm	4704	3304	3304	4704	4704	4704
Width	mm	1054	1904	1904	1904	1904	1904
Height	mm	1940	1959	1959	1961	1961	1961
Footprint	m ²	4,9	6,2	6,2	8,9	8,9	8,9
Operating Weight	kg	1480	1860	2019	2559	2627	2986
Shipping Weight	kg	1468	1841	2000	2535	2603	2954
Construction							
Frame		typeSteel base with galvanised					
Casing	type	Aluzinc					
Painting	type	Polyester - RAL 9002					
Insulation class	type	M1					

- (1) All data are at Eurovent condition.
Gross cooling capacity with 12/7°C water temperature and 35°C air ambient.
Gross heating capacity with 7°C air inlet temperature and 40/45°C water temperature.
- (2) EER and COP compressors only.
- (3) EER and COP with fans.
- (4) Normal cooling operation with CLIMATIC™ 50, 12°C/7°C water and one compressor unloaded
- (NA) Not available.

reminder : RA=condensing unit

RA EK- dk super low noise

ECOLOGIC	RA	150	200	230	270	300	370
Cooling mode							
Cooling capacity (1)	kW	162	200,1	242,6	295,9	324,7	375,1
Power input (1)	kW	62,2	73,1	91,2	109,2	121,5	156,0
Full load amps (1)	A	103,3	125,3	153,0	182,9	199,9	265,3
EER (2)		2,7	2,8	2,7	2,8	2,7	2,5
EER global (3)		2,6	2,7	2,7	2,7	2,7	2,4
Compressor Scroll - Hermetic							
Number of compressor	nb	4	4	4	4	4	6
Capacity steps	%	0-25-50-75-100	0-17-33-50-67-83-100	0-17-33-50-67-83-100	0-22-28-50-55-78-100	0-25-50-75-100	0-17-33-50-67-83-100
Oil charge per compressor	l	4,1	6,3 & 4,1	5,9 & 4,1	5,9 & 6,3	5,9	6,3
Oil type	type	MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF					
Refrigerant R 407 C							
Expansion	type	Thermostatic expansion valve					
Number of circuit	nb	2	2	2	2	2	2
Charge per circuit	kg	0	0	0	0	0	0
Condenser Copper tube - Aluminium fin - Air cooled							
Face area	m ²	8,4	12,6	12,6	16,8	16,8	16,8
Number of rows	nb	3	2	3	2	3	3
Fin Spacing	mm	2	1,8	2	1,8	2	2
Fan&Motor Axial fan							
Number of fan	nb	4	6	6	8	8	8
Diameter	mm	710	710	710	710	710	710
Maximum speed	rpm	680	680	680	680	680	680
Nominal air flow	m ³ /h	41300	64300	62000	85900	82700	82700
External static pressure	Pa	0	0	0	0	0	0
Total motor power input	kW	1,68	2,52	2,52	3,36	3,36	3,36
Evaporator							
Water flow	m ³ /h	N/A	N/A	N/A	N/A	N/A	N/A
Water volume	l	N/A	N/A	N/A	N/A	N/A	N/A
Pressure drop	kPa	N/A	N/A	N/A	N/A	N/A	N/A
Water operating pressure	kPa	N/A	N/A	N/A	N/A	N/A	N/A
Hydraulic connections							
Water inlet / outlet	Inches	N/A	N/A	N/A	N/A	N/A	N/A
Water drain / bleed	Inches	N/A	N/A	N/A	N/A	N/A	N/A
Acoustic							
Global sound power level (1)	dB(A)	82	83	84	85	86	86
Electrical data 400V/III/50Hz							
Start-up intensity	A	288,7	372,6	443,5	480,3	504,1	515,6
Maximum current	A	119,4	147,2	182,0	218,8	242,6	290,2
Operating limits							
Min. inlet evap temperature	°C	-5	-5	-5	-5	-5	-5
Max. inlet evap temperature	°C	15	15	15	15	15	15
Min. difference water inlet/outlet	°C	N/A	N/A	N/A	N/A	N/A	N/A
Max. difference water inlet/outlet	°C	N/A	N/A	N/A	N/A	N/A	N/A
Min. outside air temperature	°C	6	6	6	6	6	6
Max. outside air temperature (4)	°C	52	50	50	52	52	47
Dimensions							
Length	mm	3304	4704	4704	6404	6404	6404
Width	mm	1904	1904	1904	1904	1904	1904
Height	mm	1959	1961	1961	2001	2001	2001
Footprint	m ²	6,2	8,9	8,9	12,1	12,1	12,1
Operating Weight	kg	1656	2054	2245	2820	3006	3285
Shipping Weight	kg	1643	2035	2225	2796	2982	3254
Construction							
Frame		typeSteel base with galvanised					
Casing	type	Aluzinc					
Painting	type	Polyester - RAL 9002					
Insulation class	type	M1					

- (1) All data are at Eurovent condition.
Gross cooling capacity with 12/7°C water temperature and 35°C air ambient.
Gross heating capacity with 7°C air inlet temperature and 40/45°C water temperature.
- (2) EER and COP compressors only.
- (3) EER and COP with fans.
- (4) Normal cooling operation with CLIMATIC™ 50, 12°C/7°C water and one compressor unloaded
- (NA) Not available.

all units wa

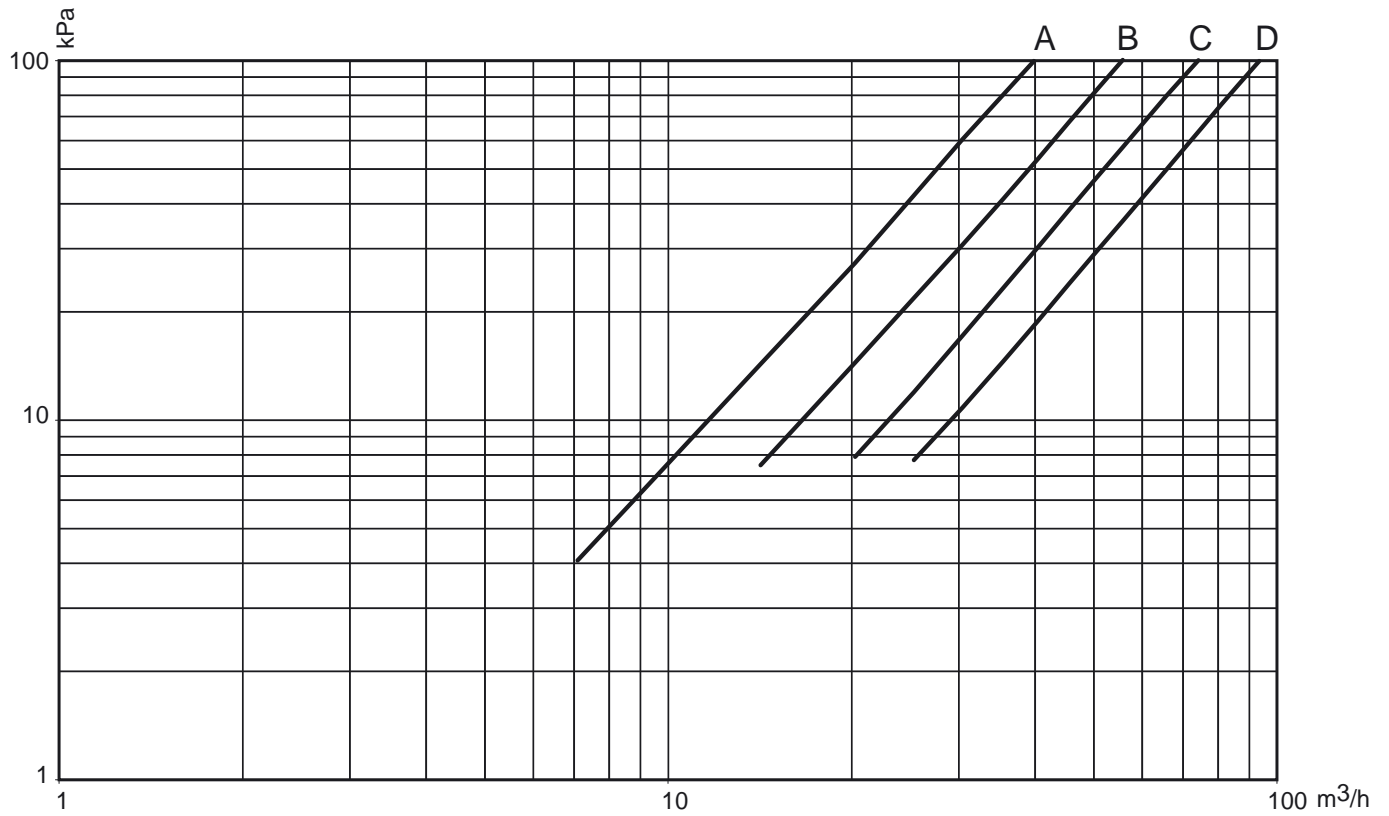
ESEER - Calculations

ESEER	
WA 150 STD	2,48
WA 200 STD	2,67
WA 230 STD	2,75
WA 270 STD	2,55
WA 300 STD	2,46
WA 370 STD	2,68
WA 150 LN	2,57
WA 200 LN	2,83
WA 230 LN	2,82
WA 270 LN	2,68
WA 300 LN	2,55
WA 370 LN	2,72
WA 150 HE	3,22
WA 200 HE	3,27
WA 230 HE	3,30
WA 270 HE	3,20
WA 300 HE	3,26
WA 370 HE	3,15
WA 150 SLN	3,36
WA 200 SLN	3,55
WA 230 SLN	3,45
WA 270 SLN	3,49
WA 300 SLN	3,44
WA 370 SLN	3,21
WAH 150 cooling	2,22
WAH 200 cooling	2,61
WAH 230 cooling	2,62

Water cooled chillers		
Part load ratio	Cond Water (Entering °C)	Weighting coeff
100%	35°C	3%
75%	30°C	33%
50%	25°C	41%
25%	19°C	23%

- + For evaporator side, the water is 12°C entry, 7°C leaving.
- + For water cooled unit, consider 5° delta T on the condenser.
- + Fouling factor equal to 0,004403 m²C/W".
- + For water keep the flow defined at full load as constant at all capacity reduction.

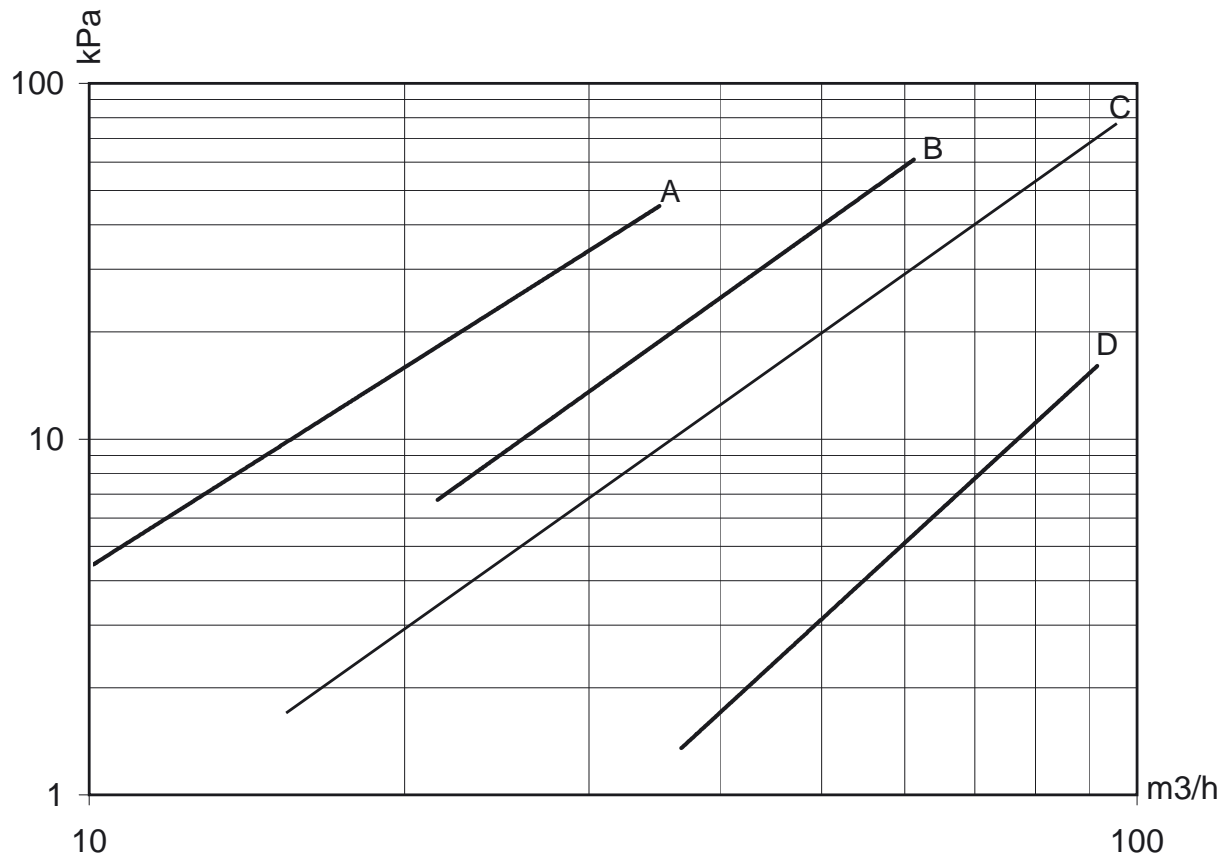
EVAPORATORS CURVE



ECOLOGIC	WA	150	200	230	270	300	370
Evaporators curve		A	B	B	C	C	D

Pressure drops are given for informations only, A tolerance of +/- 20kPa must be considered when selecting water pumps,

FILTER CURVE



Size of the filter mesh: A = 0,8 mm
 B = 0,8 mm
 C = 0,8 mm
 D = 1,0 mm

ECOLOGIC	WA	150	200	230	270	300	370
Filter curve without hydraulic module		A	B	B	C	C	C
Connect. size after Filter Without Hydraulic module		DN50	DN50	DN50	DN65	DN65	DN65
Filter curve with hydraulic module		B	B	B	D	D	D
Connect. size after Filter With Hydraulic module		DN65	DN65	DN65	DN100	DN100	DN100

Pressure drops are given for informations only, A tolerance of +/- 20kPa must be considered when selecting water pumps,

wa - ek - dk

std/ln/he/sln

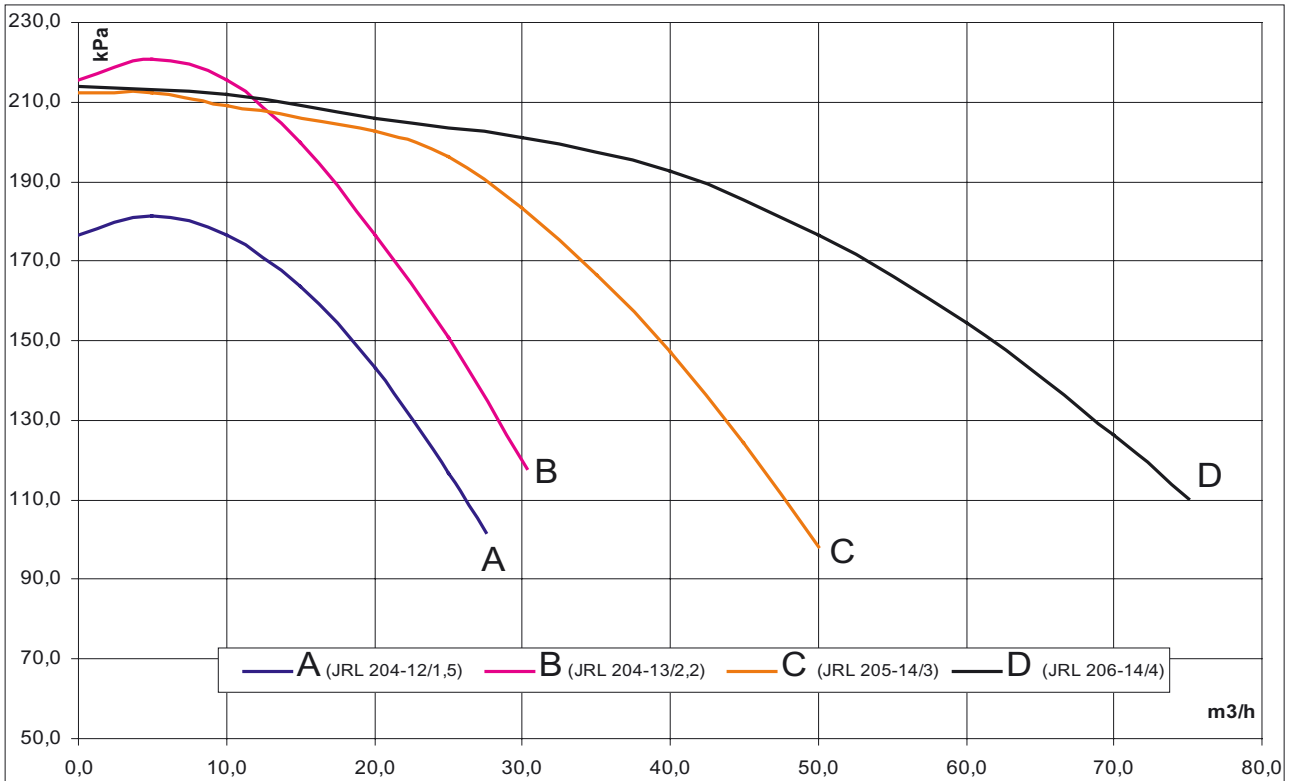
WA		150	200	230	270	300	370
Single pump		SHC 20-134	LRL 205-14/3		LRL 206-14/4		
Curve		A	B		C		
Nominal water flow	m ³ /h	26	33	39	46	51	62
Available static pressure	kPa	117	147	113	147	129	108
Double pump		JLR 204-13/2,2	JRL 205-14/3		JRL 206-14/4		
Curve		D	E		F		
Nominal water flow	m ³ /h	26	33	39	46	51	62
Available static pressure	kPa	102	147	113	147	129	108
Expansion vessel							
Volume		25	25	25	25	25	25
Maximum pressure	kPa	400	400	400	400	400	400
Gross Weight	kg	6,9	6,9	6,9	6,9	6,9	6,9
Buffer tank							
Volume	l	200/500 ⁽²⁾	NA	NA	NA	NA	NA
Weight	kg	50,7/85,8 ⁽²⁾	NA	NA	NA	NA	NA
Anti-freeze heater (option)	kW	130	NA	NA	NA	NA	NA

(1) : Pump external static pressure - Evaporator pressure drop

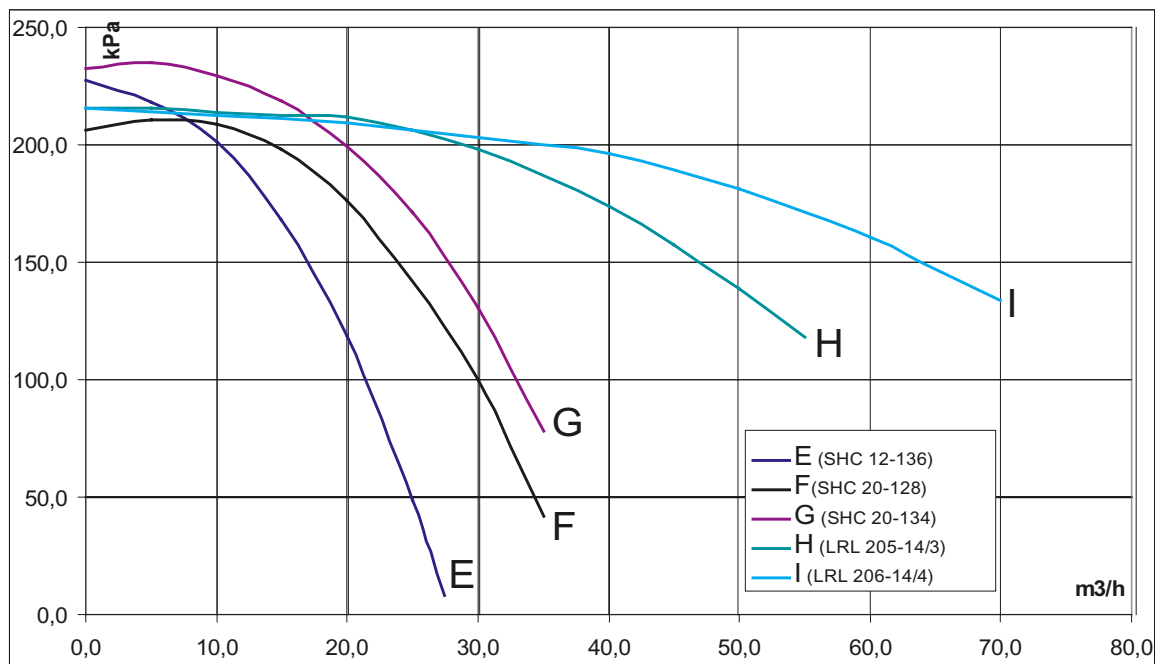
(2) : WA 150 STD and LN only

NA : Not available

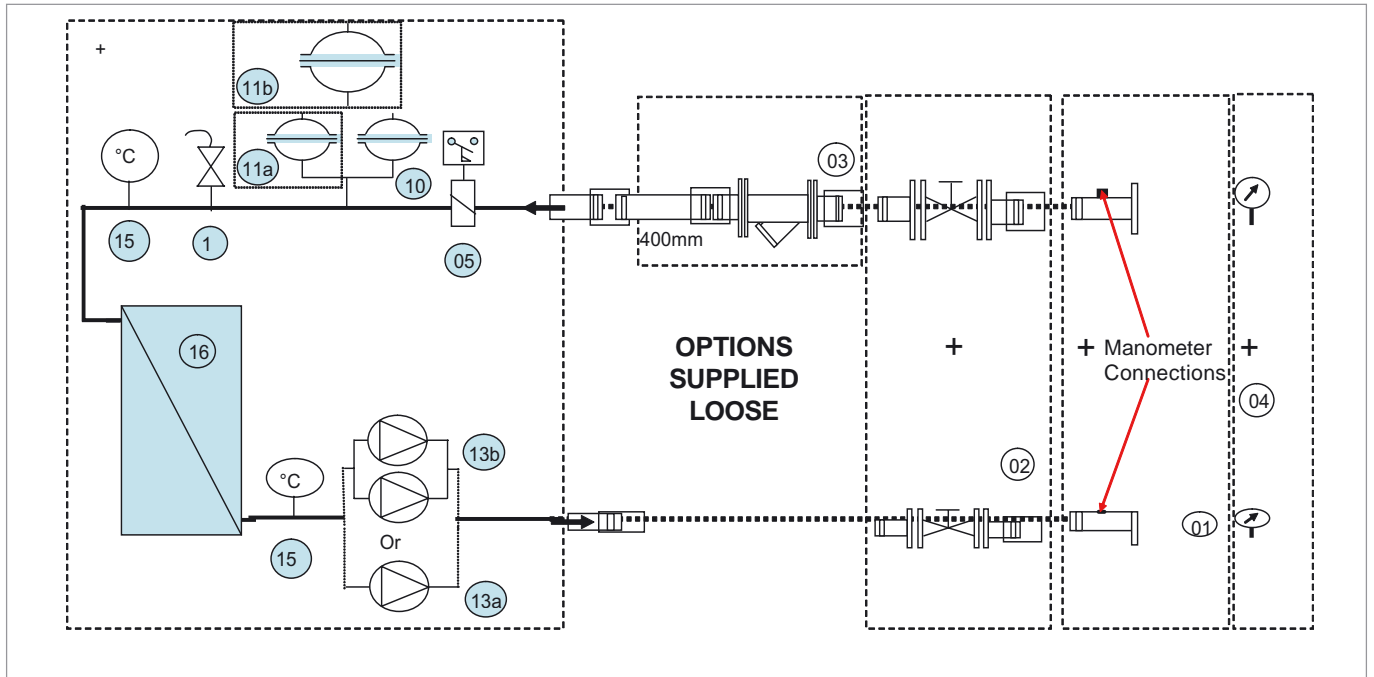
WA DOUBLE PUMP ESP



WA SINGLE PUMP ESP



UNIT WITH HYDRAULIC MODULE AND WATER TANK



COMPONENTS SUPPLIED LOOSE

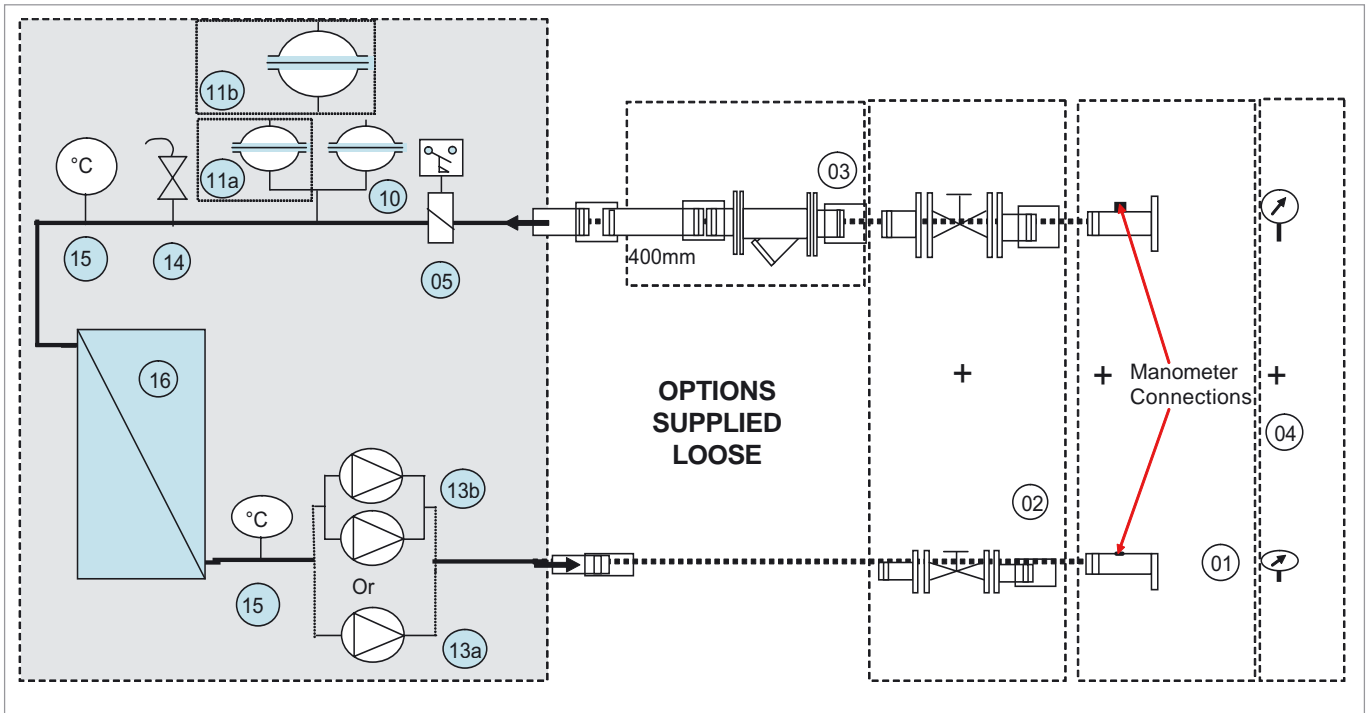
- 01 Kit for Groove lock coupling
- 02 Unit isolation valve
- 03 Inlet Water filter
- 04 Inlet /Outlet manometers

COMPONENTS MOUNTED INSIDE THE UNIT

- 05 Paddle flow switch
- 06 200L or 500L Tank
- 07 Discharge
- 08 Water Tank air vent.
- 09 Water Tank drain port.
- 10 Expansion vessel 25L
- 11 Single 50L expansion vessel (WA1L)
- 12 Pump isolation Valve
- 13 Single or Double Pump
- 14 Air Vent.
- 15 Temperature Probe
- 16 Heat Exchanger

Basic Unit 200/500L tank and Single or Double Pump	OPTIONS										
	Flow Switch (Paddle) Mounted	Water Inlet Filter	Exp vessel 25L	Exp vessel 50L for WA 150STD	Exp vessel 50L for all other units	Pump Isolation Valve	Unit Isolation Valve	Pump + Unit Isolation Valve	Kit for Groove Lock Coupling	Inlet / Outlet Manometer	Inlet / Outlet Manometer + Kit for Groove Lock Coupling
SPUM or DPUM	FLSP	HFIL	EX25	EX50	EX50	PISV	UISV	PISV + IISV	HGRL	HINO	HINO + HGRL
6 / 7 / 8 / 9 13 / 14 / 15a / 15b / 16	Add 05	Add 03	Add 10	Add 11b	Add 10 / 11a	Add 12 + 02	Add 02 In/Outlet	Add 12+ 02 In/Outlet	Add 01	Add 04	Add 01 /04

UNIT WITH HYDRAULIC MODULE



COMPONENTS SUPPLIED LOOSE

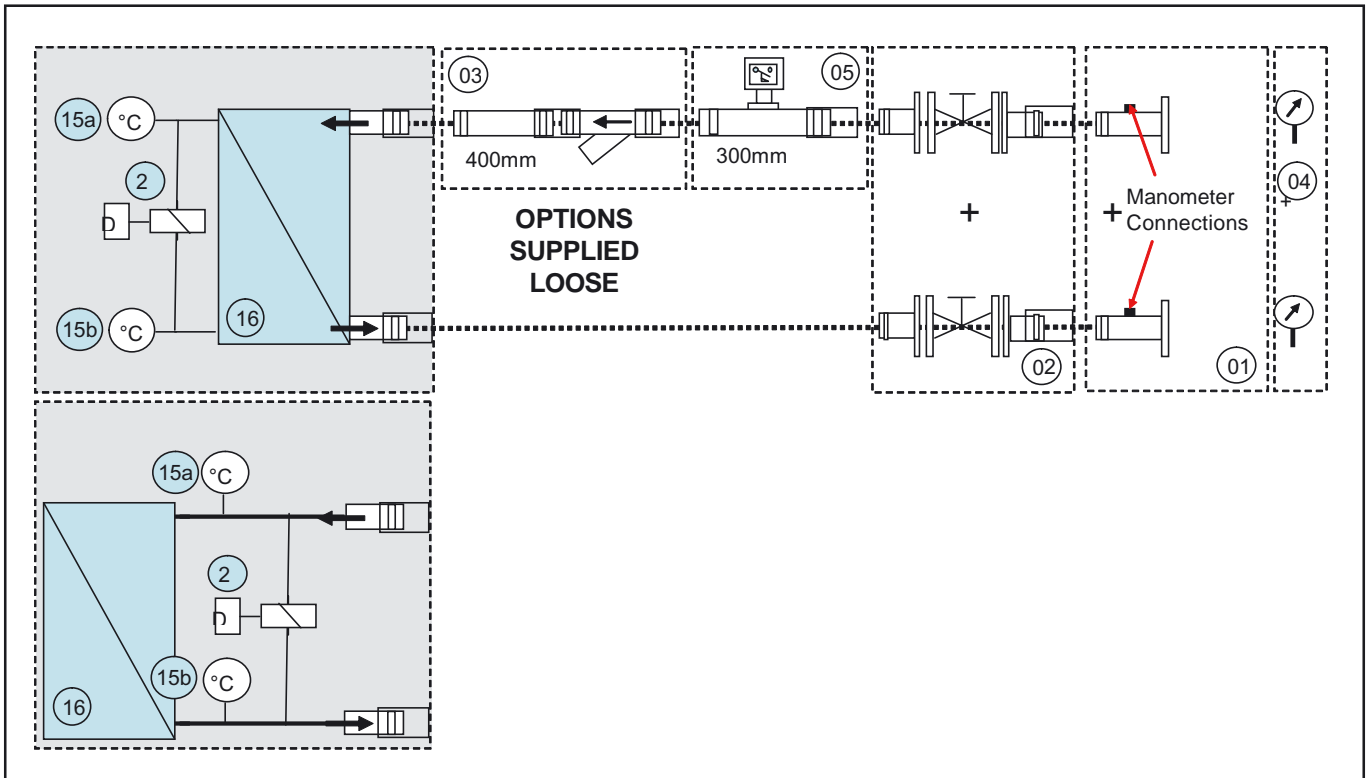
- 01 Kit for Groove lock coupling
- 02 Unit isolation valve
- 03 Inlet Water filter
- 04 Inlet /Outlet manometers

COMPONENTS MOUNTED INSIDE THE UNIT

- 05 Paddle flow switch
- 10 Expansion vessel 25L
- 11a Second Expansion vessel 25L (WA2L)
- 11b Single Expansion vessel 50L (WA2L)
- 13 Single / Double Pump
- 14 Air Vent.
- 15 Temperature Probe
- 16 Heat Exchanger

	OPTIONS								
Basic Unit + Single or Double Pump	Flow Switch (Paddle) Mounted	Water Inlet Filter	Exp vessel 25L	Exp vessel 50L for WA 150STD	Exp vessel 50L for All other WA units	Unit Isolation Valve	Kit for Groove Lock Coupling	Inlet / Outlet Manometer	Inlet / Outlet Manometer + Kit for Groove Lock Coupling
SPUM or DPUM	FLSP	HFIL	EX25	EX50	EX50	UISV	HGRL	HINO	HINO + HGRL
14 / 15a / 15b / 16 / 13a or 13b	Add 05	Add 03	Add 10	Add 11b	Add 10 / 11a	Add 02	Add 01	Add 04	Add 04 /01

UNIT WITHOUT HYDRAULIC MODULE



COMPONENTS SUPPLIED LOOSE

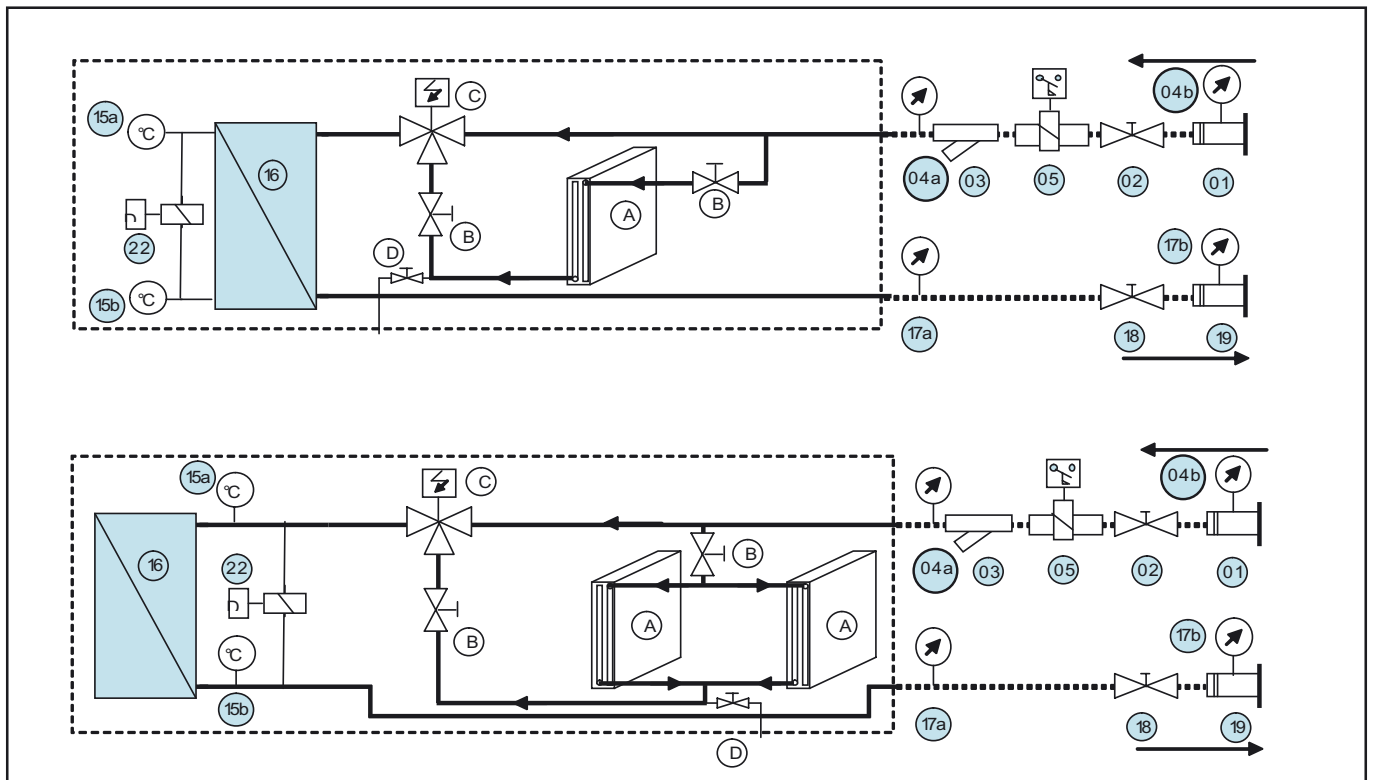
- 01 Kit for Groove lock coupling
- 02 Unit isolation valve
- 03 Inlet Water filter
- 04 Inlet /Outlet manometers

COMPONENTS MOUNTED INSIDE THE UNIT

- 05 Paddle flow switch
- 15 Temperature Probe
- 16 Heat Exchanger
- 22 Differential Pressure switch

Basic Unit	OPTIONS						
	Water inlet Filter	Flow Switch (Paddle) Supplied loose	Flow Switch (Differential) Supplied	Unit Isolation Valve	Kit for Groove Lock Coupling	Inlet / Outlet Manometer	Inlet / Outlet Manometer + Kit for Groove Lock Coupling
No	HFIL	FLSP	FLSD	UISV	HGRL	HINO	HINO + HGRL
16 15a / 15b	Add 03	Add 05	Add 22	Add 02	Add 01	Add 04	Add 04 / 01

UNIT WITH FREE COOLING OPTION



COMPONENTS SUPPLIED LOOSE

- 01 19 Kit for Groove lock coupling
- 02 18 Unit isolation valve
- 03 Inlet Water filter
- 04a 17a Inlet /Outlet manometers without groove lock coupling Option

COMPONENTS MOUNTED INSIDE THE UNIT

- 05 Paddle flow switch mounted on tube
- 16 Plate Heat exchanger
- 15a 15b Temperature sensors
- 22 Flow switch / Differential
- A Free cooling coil
- B Isolating valves
- C Three way valves
- D Drain

	OPTIONS						
Basic Unit	Water inlet Filter	Flow Sw itch (Paddle) Supplied loose	Flow Sw itch (Differential) Supplied Mounted	Unit Isolation Valve	Kit for Groove Lock Coupling	Inlet / Outlet Manometer	Inlet / Outlet Manometer + Kit for Groove Lock Coupling
No Options	HFIL	FLSP	FLSD	UISV	HGRL	HINO	HINO + HGRL
16 15a / 15b	Add 03	Add 05	Add 22	Add 02 / 18	Add 01 / 19	Add 04a / 17a	Add 04b / 17b and 01 / 19

GLYCOL CORRECTION FACTOR

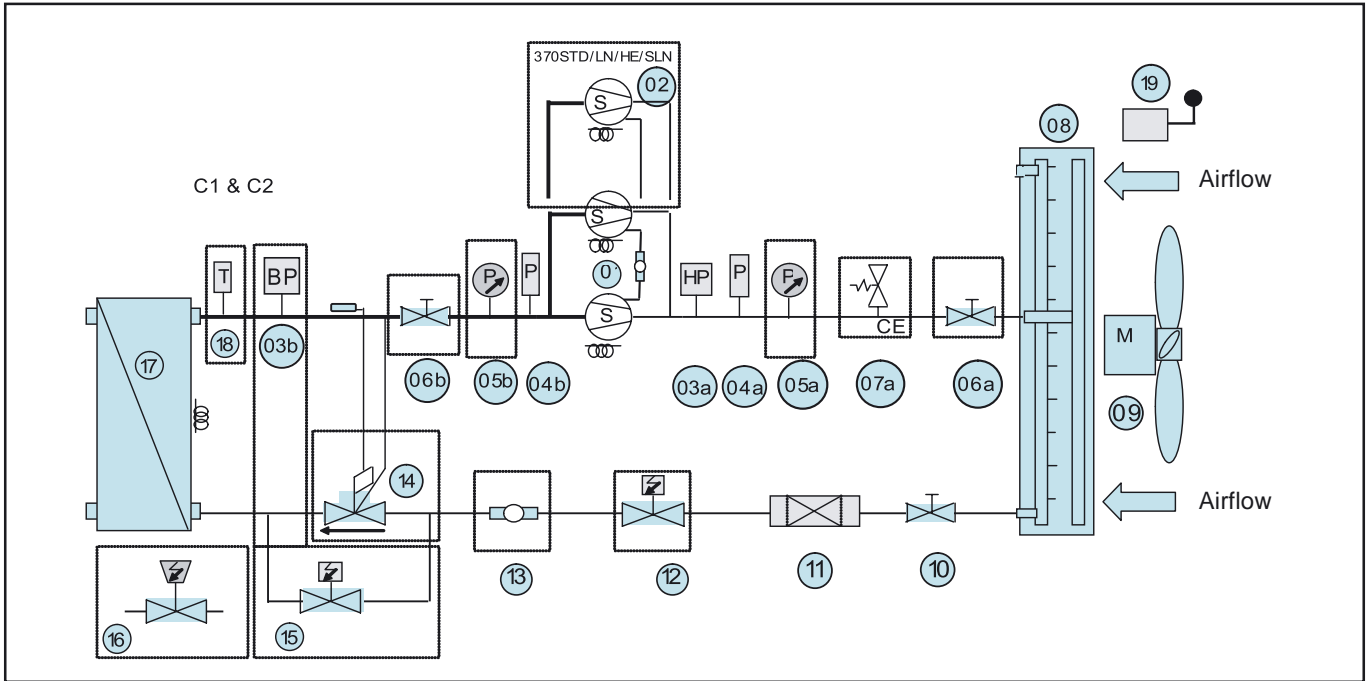
Minimum Ambient Temperature or Water Outlet Temperature	Ethylene Glycol	Pressure Drop	Water Flow	CAPACITIES	
				Cool	Heat
FROM +5°C TO 0°C	10%	1,05	1,02	0,99	0,994
FROM 0°C TO -5°C	20%	1,10	1,05	0,98	0,993
FROM -5°C TO -10°C	30%	1,15	1,08	0,97	0,99
FROM -10°C TO -15°C	35%	1,18	1,10	0,96	0,987

Example : 10% glycol
 Minimum flow : 1,19 m³/h x 1,02
 Pressure drop x 1,07
 System capacity x 0,99

ALTITUDE <i>sea level</i>	CORRECTION 1000
300	0,996
600	0,992
900	0,988
1200	0,984
1500	0,980

wa - ek - dk std/ln/he/sln

REFRIGERANT DRAWING



REFRIGERATION CIRCUIT COMPONENTS

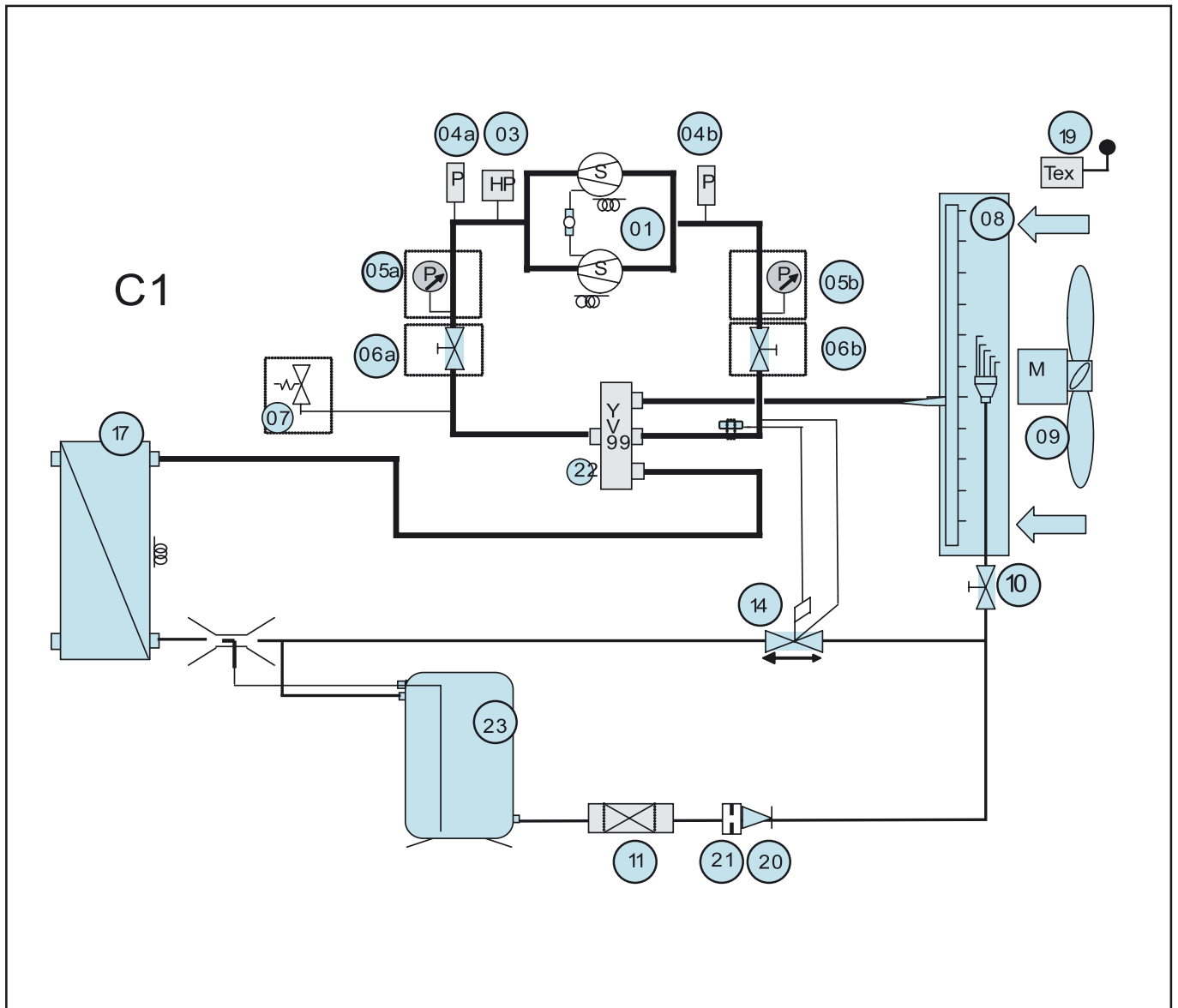
- | | | |
|--|--|--|
| <p>01 1st & 2nd scroll compressors</p> <p>02 3rd scroll compressor on size 370 STD/LN/HE & SLN</p> <p>03a 03b High / Low pressure switch</p> <p>04a 04b Pressure transducers HP & BP</p> <p>05a 05b Low and High pressure manometer</p> <p>06a 06b Suction and discharge isolation valves</p> <p>07a Safety valve CE</p> | <p>08 Air cooled condenser</p> <p>09 Fan motor</p> <p>10 Manual isolating valve</p> <p>11 Filter drier</p> <p>12 Solenoid valve</p> <p>13 Sight glass</p> <p>14 Thermostatic expansion valve</p> | <p>15 Expansion valve bypass for low ambient operations</p> <p>16 Electronic expansion valve</p> <p>17 Evaporator heat exchanger</p> <p>18 Suction temperature sensor</p> <p>19 External temperature sensor</p> <p>☉ Heating resistance (option)</p> |
|--|--|--|

VARIANTS			EXPANSION DEVICES			OPTIONS		
BASIC UNIT	Size 370 STD LN HE SLN	WA unit CE or UDT	Thermostatic Expansion Valve	Thermostatic Expansion + Low Ambient	Electronic Expansion Valve	HP LP Pressure Gauges	Suction and Discharge Isolating Valves	Sight Glass
WA	WA370		NO EEVA	NO EEVA + LAKT	EEVA	HPLP	SUDI	SIGL
01 03a 04a 04b 08 09 10 11 17 19	Add 02	07a	Add 14 & 12	Add 14 12 and 15 + 3b if Clim atic 30	Add 16 and 18	Add 05a 05b	Add 06a 06b	Add 13

waH

std

REFRIGERANT DRAWING



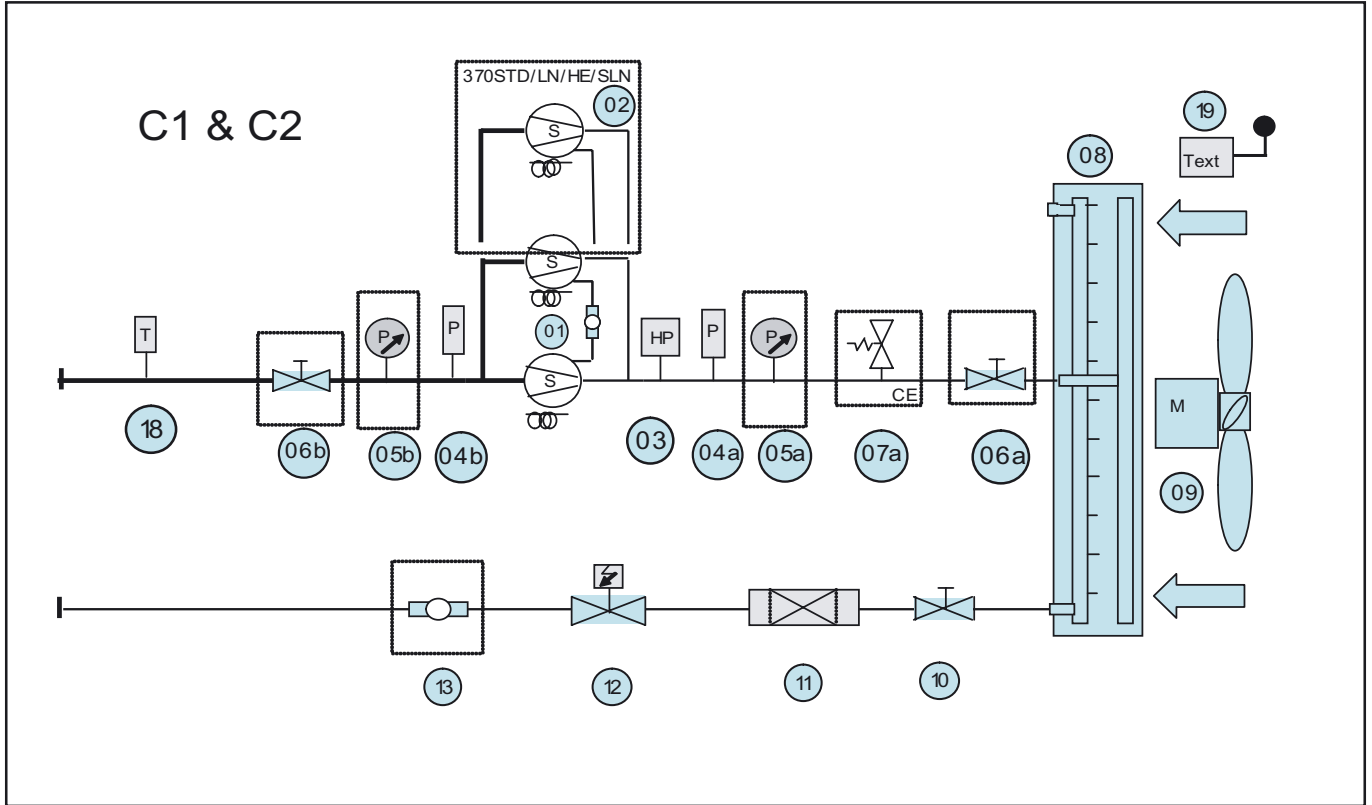
REFRIGERATION CIRCUIT COMPONENTS

- | | | |
|---|--|--|
| <p>01 1st & 2nd scroll compressors</p> <p>03 High pressure switch</p> <p>04a 04b Pressure transducers HP & BP</p> <p>05a 05b Low and High pressure manometer</p> <p>06a 06b Suction and discharge isolation valves</p> <p>07a 07b Safety valve CE</p> | <p>08 Air cooled condenser/Evaporator</p> <p>09 Fan motor</p> <p>10 Manual isolating valve</p> <p>11 Filter drier</p> <p>14 Thermostatic expansion valve</p> <p>17 Evaporator/Condenser heat exchanger</p> | <p>19 External temperature sensor</p> <p>20 Check valve</p> <p>21 Restrictor</p> <p>22 4-way inverting valve</p> <p>23 Liquid receiver</p> <p> Venturi</p> |
|---|--|--|

Ra

std/LN/SLN

REFRIGERANT DRAWING



REFRIGERATION CIRCUIT COMPONENTS

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> 01 1st & 2nd scroll compressors 02 3rd scroll compressor on size 370 STD/LN & SLN 03a 03b High / Low pressure switch 04a 04b Pressure transducers HP & BP 05a 05b Low and High pressure manometer 06a 06b Suction and discharge isolation valves 07a 07b Safety valve CE | <ul style="list-style-type: none"> 08 Air cooled condenser 09 Fan motor 10 Manual isolating valve 11 Filter drier 12 Solenoid valve 13 Sight glass 14 Thermostatic expansion valve | <ul style="list-style-type: none"> 15 Expansion valve bypass for low ambient operations 16 Electronic expansion valve 17 Evaporator heat exchanger 18 Suction temperature sensor 19 External temperature sensor Heating resistance (option) |
|--|---|---|

VARIANTS			OPTIONS		
BASIC UNIT	Size 370 STD LN HE SLN	WA unit CE or UDT	HP LP Pressure Gauges	Suction and Discharge Isolating Valves	Sight Glass
WA	WA370		HPLP	SUDI	SIGL
01 03 04a 04b 08 09 10 11 12 18 19	Add 02	07a	Add 05a 05b	Add 06a 06b	Add 13

wa / RA STD

Spectrum per octave band (dBA)									Global sound power Lw dB(A)	Sound pressure at 10 meters (1) Pw dB(A)	Sound pressure at 10 meters envelopping surface (2) Pw dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			
150	51	74	78	84	86	88	84	75	92	64	61
200	55	79	83	87	91	93	88	79	94	66	63
230	55	79	83	87	91	93	88	79	95	67	64
270	57	81	84	89	93	95	90	80	96	68	65
300	57	81	84	89	93	95	90	80	97	69	65
370	57	81	84	89	93	95	90	80	97	69	65

wa / RA LN

Spectrum per octave band dB(A)									Global sound power Lw dB(A)	Sound pressure at 10 meters (1) Pw dB(A)	Sound pressure at 10 meters envelopping surface (2) Pw dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			
150	49	70	76	80	82	83	78	69	88	60	57
200	50	71	77	81	84	85	80	71	89	61	58
230	50	71	77	82	84	85	80	71	90	62	58
270	52	73	79	83	86	87	82	72	91	63	60
300	52	73	79	83	86	87	82	72	91	64	60
370	52	73	79	83	86	87	82	72	91	63	60

wa HE

Spectrum per octave band dB(A)									Global sound power Lw dB(A)	Sound pressure at 10 meters (1) Lw dB(A)	Sound pressure at 10 meters envelopping surface (2) Pw dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			
150	47	72	74	79	81	84	78	68	88	60	56
200	52	77	78	81	86	88	83	70	91	63	59
230	52	77	78	82	87	89	82	68	92	64	60
270	53	78	79	83	88	91	84	69	93	65	62
300	53	78	79	84	89	91	84	69	94	66	62
370	53	78	79	83	89	91	85	71	94	66	62

(1) : Only for information. Data are calculated by semi spheric method in free open field.
 (2) : Only for information. Data are calculated by envelopping surface method in free open field.

wa HE

Unit with compressor acoustic enclosure (option)

Spectrum per octave band (dBa)									Global sound power Lw dB(A)	Sound pressure at 10 meters (1) Lw dB(A)	Sound pressure at 10 meters envelopping surface (2) Pw dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			
150	47	72	73	78	78	78	73	58	84	56	53
200	49	74	75	78	81	81	75	60	86	58	55
230	49	74	75	80	81	82	75	59	87	59	55
270	50	75	77	80	83	83	77	60	88	60	56
300	50	75	77	81	83	84	77	60	88	60	57
370	50	75	77	81	83	84	77	61	88	60	57

wa / RA sln

Unit with compressor acoustic enclosure (option)

Spectrum per octave band dB(A)									Global sound power Lw dB(A)	Sound pressure at 10 meters (1) Lw dB(A)	Sound pressure at 10 meters envelopping surface (2) Pw dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			
150	52	59	64	76	73	73	68	56	79	51	48
200	54	61	67	76	77	77	72	59	82	54	51
230	54	61	68	78	78	79	72	57	83	55	52
270	55	62	70	78	80	80	74	58	85	57	53
300	55	62	70	79	80	81	74	58	86	58	54
370	55	62	70	79	80	81	75	59	85	57	54

wah STd

Unit with compressor acoustic enclosure (option)

Spectrum per octave band dB(A)									Global sound power Lw dB(A)	Sound pressure at 10 meters (1) Lw dB(A)	Sound pressure at 10 meters envelopping surface (2) Pw dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			
150	52	76	80	85	87	89	85	76	93	65	62
200	55	79	83	87	91	93	88	79	94	66	63
230	55	79	83	87	91	93	88	79	95	67	64

(1) : Only for information. Data are calculated by semi spheric method in free open field.
 (2) : Only for information. Data are calculated by envelopping surface method in free open field.

wa - ek - dk	STANDar d
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ECOLOGIC WA

WA		150	200	230	270	300	370
Minimum outlet water temperature	°C	5					
Maximum inlet water temperature	°C	20					
Minimum difference water inlet/outlet	°C	3					
Maximum difference water inlet/outlet	°C	8					
Minimum outside air temperature	°C	6					
Minimum outside air temperature with low ambient kit	°C	-10					
Maximum outside air temperature :							
• Normal operation with CLIMATIC™ 30 12°C water inlet/7°C water outlet	°C	43	44	44	44	43	43
• Normal operation with CLIMATIC™ 50 12°C/7°C water + one compressor unloaded	°C	51	49	49	51	51	48
• Start-up with CLIMATIC™ 30 + Thermostatic expansion valve and NO unloading	°C	37	39	39	38	36	37
• Start-up with CLIMATIC™ 50 + Thermostatic expansion valve and ONE compressor unloaded	°C	49	46	46	48	48	45
• Start-up with CLIMATIC™ 50 + Electronic expansion valve and ONE compressor unloaded	°C	49	47	47	49	49	46

wa - ek - dk	low noise
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ECOLOGIC WA

WA		150	200	230	270	300	370
Minimum outlet water temperature	°C	5					
Maximum inlet water temperature	°C	20					
Minimum difference water inlet/outlet	°C	3					
Maximum difference water inlet/outlet	°C	8					
Minimum outside air temperature	°C	6					
Minimum outside air temperature with low ambient kit	°C	-10					
Maximum outside air temperature :							
• Normal operation with CLIMATIC™ 30 12°C water inlet/7°C water outlet	°C	41	43	42	42	41	41
• Normal operation with CLIMATIC™ 50 12°C/7°C water + one compressor unloaded	°C	50	48	47	50	50	47
• Start-up with CLIMATIC™ 30 + Thermostatic expansion valve and NO unloading	°C	35	37	36	36	33	33
• Start-up with CLIMATIC™ 50 + Thermostatic expansion valve and ONE compressor unloaded	°C	47	45	44	47	47	43
• Start-up with CLIMATIC™ 50 + Electronic expansion valve and ONE compressor unloaded	°C	48	46	45	48	48	44

Wa - ek - dk	HIGH EFFICIENCY
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ECOLOGIC WA

WA		150	200	230	270	300	370	
Minimum outlet water temperature	°C	5						
Maximum inlet water temperature	°C	20						
Minimum difference water inlet/outlet	°C	3						
Maximum difference water inlet/outlet	°C	8						
Minimum outside air temperature	°C	6						
Minimum outside air temperature with low ambient kit	°C	-10						
Maximum outside air temperature :								
• Normal operation with CLIMATIC™ 50 12°C/7°C water + one compressor unloaded	°C	53	51	51	52	53	49	
• Start-up with CLIMATIC™ 50 + Electronic expansion valve and ONE compressor unloaded	°C	52	49	49	50	52	46	

Wa - ek - dk	super low noise
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WA		150	200	230	270	300	370	
Minimum outlet water temperature	°C	5						
Maximum inlet water temperature	°C	20						
Minimum difference water inlet/outlet	°C	3						
Maximum difference water inlet/outlet	°C	8						
Minimum outside air temperature	°C	6						
Minimum outside air temperature with low ambient kit	°C	-10						
Maximum outside air temperature :								
• Normal operation with CLIMATIC™ 50 12°C/7°C water + one compressor unloaded	°C	52	50	49,5	51,5	52,3	47,1	
• Start-up with CLIMATIC™ 50 + Thermostatic expansion valve and ONE compressor unloaded	°C	49	47	46	48	49	43	
• Start-up with CLIMATIC™ 50 + Electronic expansion valve and ONE compressor unloaded	°C	50	48	47	49	50	44	

waH	STANDARD
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ECOLOGIC WAH - COOLING MODE

WAH		150	200	230
Minimum outlet water temperature	°C		5	
Maximum inlet water temperature	°C		20	
Minimum difference water inlet/outlet	°C		3	
Maximum difference water inlet/outlet	°C		8	
Minimum outside air temperature	°C		6	
Maximum outside air temperature :				
<ul style="list-style-type: none"> • Normal operation with CLIMATIC™ 50 12°C/7°C water + one compressor unloaded 	°C	51	50	49
<ul style="list-style-type: none"> • Start-up with CLIMATIC™ 50 + Thermostatic expansion valve and ONE compressor unloaded 	°C	49	47	46

ECOLOGIC WAH - HEATING MODE

WAH		150	200	230
Minimum inlet water temperature	°C		10	
Maximum outlet water temperature	°C		50	
Minimum difference water inlet/outlet	°C		3	
Maximum difference water inlet/outlet	°C		8	
Minimum outside air temperature with water outlet 35°C	°C		-10	
Maximum outside air temperature	°C		30	

OPERATING LIMITS



wa - dk

std

RA		150	200	230	270	300	370
Operating limits							
Min. inlet evaporating temperature	°C	-5	-5	-5	-5	-5	-5
Max. inlet evaporating temperature	°C	15	15	15	15	15	15
Min. outside air temperature	°C	6	6	6	6	6	6
Max. outdoor air temperature							
Normal operation with Climatic 50 12°/7°C Water + One Compressor Unloaded	°C	51	49	49	51	51	48
Start up with Climatic 50 + TXV and One compressor Unloaded	°C	49	46	46	48	48	45
Operating limits for Pressure gauge control							
Safety Cut of low pressure	Bar	0,7	0,7	0,7	0,7	0,7	0,7
Safety Interlocking of low pressure	Bar	2,2	2,2	2,2	2,2	2,2	2,2
Safety Cut of high pressure	Bar	29	29	29	29	29	29
Safety Interlocking of high pressure	Bar	20	20	20	20	20	20

wa - dk

low noise

RA		150	200	230	270	300	370
Operating limits							
Min. inlet evaporating temperature	°C	-5	-5	-5	-5	-5	-5
Max. inlet evaporating temperature	°C	15	15	15	15	15	15
Min. outside air temperature	°C	6	6	6	6	6	6
Max. outdoor air temperature							
Normal operation with Climatic 50 12°/7°C Water + One Compressor Unloaded	°C	50	48	47	50	50	47
Start up with Climatic 50 + TXV and One compressor Unloaded	°C	47	45	44	47	47	43
Operating limits for Pressure gauge control							
Safety Cut of low pressure	Bar	0,7	0,7	0,7	0,7	0,7	0,7
Safety Interlocking of low pressure	Bar	2,2	2,2	2,2	2,2	2,2	2,2
Safety Cut of high pressure	Bar	29	29	29	29	29	29
Safety Interlocking of high pressure	Bar	20	20	20	20	20	20

wa -EK - dk super low noise

RA		150	200	230	270	300	370
Operating limits							
Min. inlet evaporating temperature	°C	-5	-5	-5	-5	-5	-5
Max. inlet evaporating temperature	°C	15	15	15	15	15	15
Min. outside air temperature	°C	6	6	6	6	6	6
Max. outdoor air temperature							
Normal operation with Climatic 50 12°/7°C Water + One Compressor Unloaded	°C	52	50	49,5	51,5	52,3	47,1
Start up with Climatic 50 + TXV and One compressor Unloaded	°C	49	47	46	48	49	43
Operating limits for Pressure gauge control							
Safety Cut of low pressure	Bar	0,7	0,7	0,7	0,7	0,7	0,7
Safety Interlocking of low pressure	Bar	2,2	2,2	2,2	2,2	2,2	2,2
Safety Cut of high pressure	Bar	29	29	29	29	29	29
Safety Interlocking of high pressure	Bar	20	20	20	20	20	20

ra -EK - dk all units

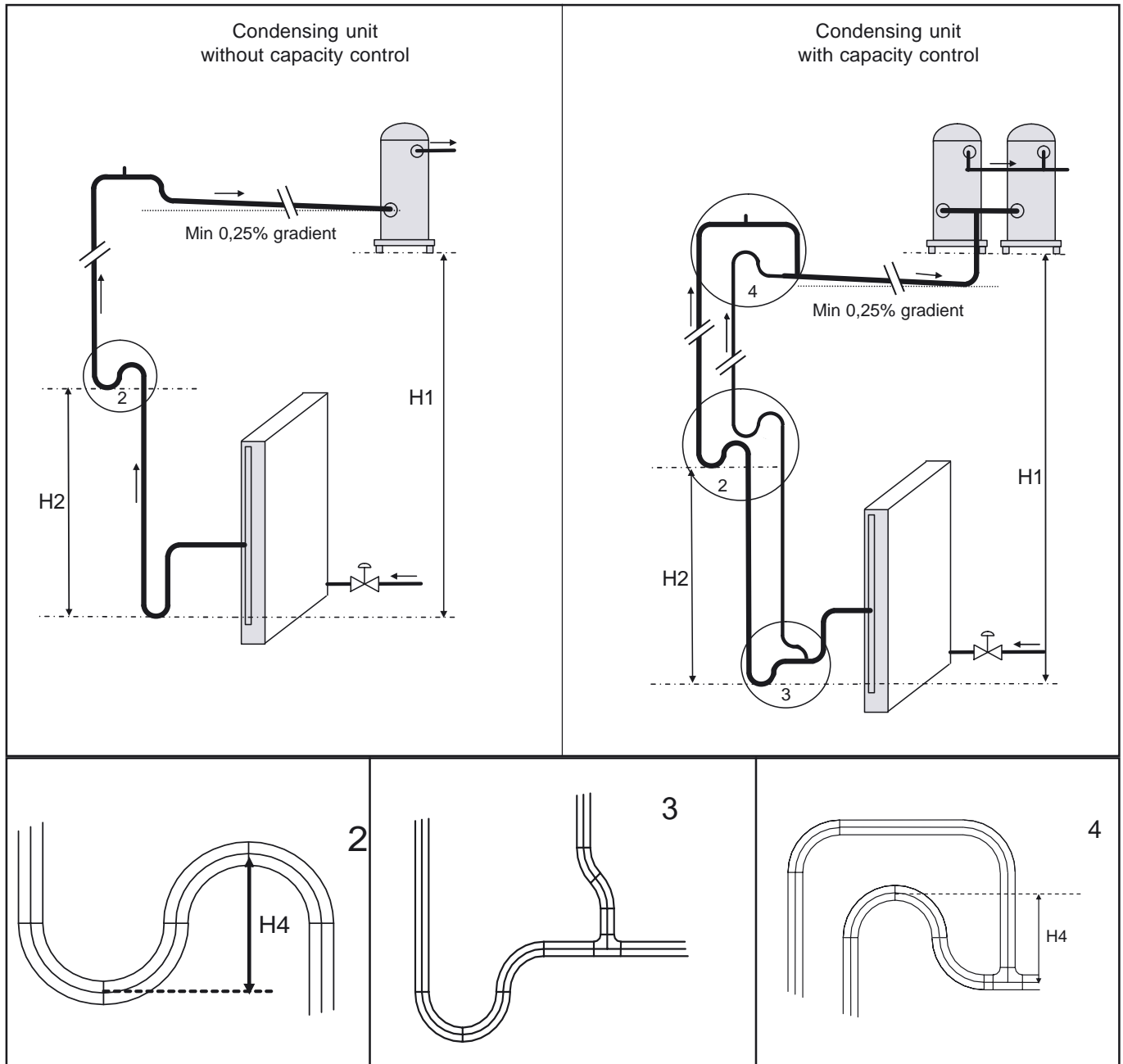
Refrigerant lines Operating Limits

SIZE	SUCTION LINE						LIQUID LINE		
	Connection	Refri. velocity (m/s)			Line length (m)		Connection	Refrigerant (m/s)	
	Diameter Inches	Min Velo. Horizontal Line	Min Velo. Vertical Line	Max Velocity	Max Vertical Height	TOTAL suction line length	Diameter Inches	Max Velocity	Minimum Subcooling °K
075E	2" 1/8	min 2,5	min 5	15	15 (x)	40	7/8"	Max 3	3 K
090D	1 " 5/8	min 2,5	min 5	15	15 (x)	40	7/8"	Max 3	3 K
100E	2" 1/8	min 2,5	min 5	15	15 (x)	40	1" 1/8	Max 3	3 K
110E	2" 1/8	min 2,5	min 5	15	15 (x)	40	1" 1/8	Max 3	3 K
130D	2" 1/8	min 2,5	min 5	15	15 (x)	40	7/8"	Max 3	3 K
150D	2" 1/8	min 2,5	min 5	15	15 (x)	40	7/8"	Max 3	3 K
200D	2" 1/8	min 2,5	min 5	15	15 (x)	40	7/8"	Max 3	3 K
230D	2" 1/8	min 2,5	min 5	15	15 (x)	40	7/8"	Max 3	3 K
270D	2" 5/8	min 2,5	min 5	15	15 (x)	40	1" 1/8	Max 3	3 K
300D	2" 5/8	min 2,5	min 5	15	15 (x)	40	1" 1/8	Max 3	3 K
370D	2" 5/8	min 2,5	min 5	15	15 (x)	40	1" 1/8	Max 3	3 K

(x) Oil traps must be installed every 5 meters (refer to the sketch below)

Delta A Gradient of X % must be installed for long horizontal sections of suction line.

CONDENSING UNITS



H1 : 15 m. maxi
H2 : 5 m. maxi
H4 : 0,15 m. maxi

- 1 - Lower trap with single tube
- 2 - Clode coupled trap
- 3 - Lower trap with double tubes
- 4 - Higher trap with double tubes

If receiver option : PED declaration class 3
If no receiver option : PED declaration class 1

ELECTRICAL DATA



wa - dk

STANdAr d

WA		150	200	230	270	300	370
UNITS - Electrical data		400V/3/50hZ					
Minimum and maximum voltage	V	360V/424V					
Maximum power	kW	78,5	97,0	116,3	143,1	156,2	187,7
Maximum current	A	129,7	160,4	195,2	239,5	263,3	310,9
Maximum current (with cos phi 0,95 option)	A	120,1	148,1	178,1	218,0	238,0	287,2
Start-up intensity	A	299,1	385,8	456,6	500,9	524,8	536,3
Start-up intensity (with sofstarter option)	A	219,9	277,0	328,6	372,9	396,8	427,5
Start-up intensity (with cos phi 0,95 option)	A	291,2	376,6	444,6	484,5	504,4	515,7
FANS - Electrical data							
Nominal air flow	m³/h	57 500	78 000	75 400	117 000	117 000	113 600
Available static pressure	kPa	0	0	0	0	0	0
Absorbed power	kW	7,5	10,0	10,0	15,0	15,0	15,0
OPTIONS - Electrical data							
Single pump	kW	1,85	3,0	3,0	4,0	4,0	4,0
Maximum current	A	4,61	6,0	6,0	7,5	7,5	7,5
Double pump	kW	2,2	3,0	3,0	4,0	4,0	4,0
Maximum current	A	5,2	6,0	6,0	7,5	7,5	7,5
Evaporator anti-freeze heater	kW	0,1	0,1	0,1	0,13	0,13	0,13
Maximum current	A	0,24	0,24	0,24	0,32	0,32	0,32
Hydraulic anti-freeze heater	kW	0,1	0,1	0,1	0,1	0,1	0,1
Maximum current	A	0,24	0,24	0,24	0,24	0,24	0,24
Hydronic anti-freeze heater	kW	0,13	NA	NA	NA	NA	NA
Maximum current	A	0,32	NA	NA	NA	NA	NA
Anti-freeze heater	kW	0,28	0,44	0,44	0,6	0,6	0,9
Maximum current	A	0,7	1,1	1,1	1,5	1,5	2,25

NA : Not available

waH

REVERSIBLE

WA		150	200	230
UNITS - Electrical data		400V/3/50hZ		
Minimum and maximum voltage	V	360V/424V		
Minimum power	kW	81,0	97,0	116,3
Maximum current	A	134,4	160,4	195,2
Maximum current (with cos phi 0,95 option)	A	123,9	148,1	178,1
Start-up intensity	A	303,8	385,8	364,5
Start-up intensity (with sofstarter option)	A	224,6	277,0	285,3
Start-up intensity (with cos phi 0,95 option)	A	295,0	376,6	349,2
FANS - Electrical data				
Nominal air flow	m³/h	57 500	57 500	78 000
Available static pressure	kPa	0	0	0
Absorbed power	kW	10,0	10,0	10,0
OPTIONS - Electrical data				
Single pump	kW	1,85	3,0	3,0
Maximum current	A	4,61	3,0	6,0
Double pump	kW	2,20	3,0	3,0
Maximum current	A	5,20	6,0	6,0
Evaporator anti-freeze heater	kW	0,1	0,1	0,1
Maximum current	A	0,24	0,24	0,24
Anti-freeze heater	kW	0,28	0,44	0,44
Maximum current	A	0,70	1,10	1,10

wa - dk

LOW NOISE

WA		150	200	230	270	300	370
UNITS - Electrical data		400V/3/50hZ					
Minimum and maximum voltage	V	360V/424V					
Maximum power	kW	76,1	93,8	113,1	138,3	151,4	182,9
Maximum current	A	124,3	153,2	188,0	228,7	252,5	300,1
Maximum current (with cos phi 0,95 option)	A	116,4	143,3	173,3	210,7	230,7	279,9
Start-up intensity	A	293,7	378,6	449,4	490,1	514,0	525,5
Start-up intensity (with sofstarter option)	A	214,5	269,8	321,4	362,1	386,0	416,7
start-up intensity (with cos phi 0,95 option)	A	287,5	371,7	439,7	477,2	497,1	508,4
FANS - Electrical data							
Nominal air flow	m ³ /h	47 000	64 200	61 850	96 000	96 000	92 700
Available static pressure	kPa	0	0	0	0	0	0
Absorbed power	kW	5,1	6,8	6,8	10,2	10,2	10,2
OPTIONS - Electrical data							
Single pump	kW	1,85	3,0	3,0	4,0	4,0	4,0
Maximum current	A	4,61	6,0	6,0	7,5	7,5	7,5
Double pump	kW	2,2	3,0	3,0	4,0	4,0	4,0
Maximum current	A	5,2	6,0	6,0	7,5	7,5	7,5
Evaporator anti-freeze heater	kW	0,1	0,1	0,1	0,13	0,13	0,13
Maximum current	A	0,24	0,24	0,24	0,32	0,32	0,32
Hydraulic anti-freeze heater	kW	0,1	0,1	0,1	0,1	0,1	0,1
Maximum current	A	0,24	0,24	0,24	0,24	0,24	0,24
Hydronic anti-freeze heater	kW	0,13	NA	NA	NA	NA	NA
Maximum current	A	0,32	NA	NA	NA	NA	NA
Anti-freeze heater	kW	0,28	0,44	0,44	0,6	0,6	0,9
Maximum current	A	0,7	1,1	1,1	1,5	1,5	2,25

NA : Not available

wa - ek - dk

HIGH
EFFICIENCY

WA		150	200	230	270	300	370
UNITS - Electrical data		400V/3/50Hz					
Minimum and maximum voltage	V	360V/424V					
Maximum power	kW	75,0	92,9	112,2	135,9	149,1	180,6
Maximum current	A	122,6	152,1	186,9	225,3	249,1	296,7
Maximum current (with cos phi 0,95 option)	A	114,6	141,9	171,9	207,1	227,1	276,4
Start-up intensity	A	292,0	377,5	448,3	486,7	510,6	522,0
Start-up intensity (with sofstarter option)	A	212,8	268,7	320,3	358,7	382,6	413,3
start-up intensity (with cos phi 0,95 option)	A	285,7	370,3	438,3	473,6	493,5	504,8
FANS - Electrical data							
Nominal air flow	m ³ /h	51 300	79 200	77 000	105 600	102 600	102 600
Available static pressure	kPa	0	0	0	0	0	0
Absorbed power	kW	3,92	5,88	5,88	7,84	7,84	7,84
OPTIONS - Electrical data							
Single pump	kW	1,85	3,0	3,0	4,0	4,0	4,0
Maximum current	A	4,61	6,0	6,0	7,5	7,5	7,5
Double pump	kW	2,2	3,0	3,0	4,0	4,0	4,0
Maximum current	A	5,2	6,0	6,0	7,5	7,5	7,5
Evaporator anti-freeze heater	kW	0,1	0,1	0,1	0,13	0,13	0,13
Maximum current	A	0,24	0,24	0,24	0,32	0,32	0,32
Hydraulic anti-freeze heater	kW	0,1	0,1	0,1	0,1	0,1	0,1
Maximum current	A	0,24	0,24	0,24	0,24	0,24	0,24
Hydronic anti-freeze heater	kW	0,13	NA	NA	NA	NA	NA
Maximum current	A	0,32	NA	NA	NA	NA	NA
Anti-freeze heater	kW	0,28	0,44	0,44	0,6	0,6	0,9
Maximum current	A	0,7	1,1	1,1	1,5	1,5	2,25

wa - ek - dk

SUPER
LOW NOISE

WA		150	200	230	270	300	370
UNITS - Electrical data		400v/3/50hZ					
Minimum and maximum voltage	V	360V/424V					
Maximum power	kW	72,7	89,5	108,8	131,4	144,6	176,1
Maximum current	A	119,4	147,2	182,0	218,8	242,6	290,2
Maximum current (with cos phi 0,95 option)	A	111,2	136,8	166,8	200,3	220,3	269,6
Start-up intensity	A	288,7	372,6	443,5	480,3	504,1	515,6
Start-up intensity (with sofstarter option)	A	209,5	263,8	315,5	352,3	376,1	406,8
start-up intensity (with cos phi 0,95 option)	A	282,3	365,2	433,2	466,8	486,7	498,0
FANS - Electrical data							
Nominal air flow	m ³ /h	41 300	64 300	62 000	85 900	82 700	82 700
Available static pressure	kPa	0	0	0	0	0	0
Absorbed power	kW	1,68	2,52	2,52	3,36	3,36	3,36
OPTIONS - Electrical data							
Single pump	kW	1,85	3,0	3,0	4,0	4,0	4,0
Maximum current	A	4,61	6,0	6,0	7,5	7,5	7,5
Double pump	kW	2,2	3,0	3,0	4,0	4,0	4,0
Maximum current	A	5,2	6,0	6,0	7,5	7,5	7,5
Evaporator anti-freeze heater	kW	0,1	0,1	0,1	0,13	0,13	0,13
Maximum current	A	0,24	0,24	0,24	0,32	0,32	0,32
Hydraulic anti-freeze heater	kW	0,1	0,1	0,1	0,1	0,1	0,1
Maximum current	A	0,24	0,24	0,24	0,24	0,24	0,24
Hydronic anti-freeze heater	kW	0,13	NA	NA	NA	NA	NA
Maximum current	A	0,32	NA	NA	NA	NA	NA
Anti-freeze heater	kW	0,28	0,44	0,44	0,6	0,6	0,9
Maximum current	A	0,7	1,1	1,1	1,5	1,5	2,25

Ra - dk

Standard

RA		150	200	230	270	300	370
Electrical Data Units		400V/III/50Hz					
Minimum and Maximum Voltage	V	360V / 424V					
Maximum power	kW	76,1	93,8	113,1	138,3	151,4	182,9
Maximum current	A	124,3	153,2	188,0	228,7	252,5	300,1
Maximum current (with cos phi 0,95 option)	A	116,4	143,3	173,3	210,7	230,7	279,9
Start-up intensity	A	293,7	378,6	449,4	490,1	514,0	525,5
Start-up intensity (with softstarter option)	A	214,5	269,8	321,4	362,1	386,0	416,7
Start-up intensity (with cos phi 0,95 option)	A	287,5	371,7	439,7	477,2	497,1	508,4
Electrical Data Fans							
Nominal air flow	m ³ /h	57 500	78 000	75 400	117 000	117 000	113 600
Available static pressure	kPa	0	0	0	0	0	0
Absorbed power	kW	7,5	10,0	10,0	15,0	15,0	15,0

Ra - dk

low noise

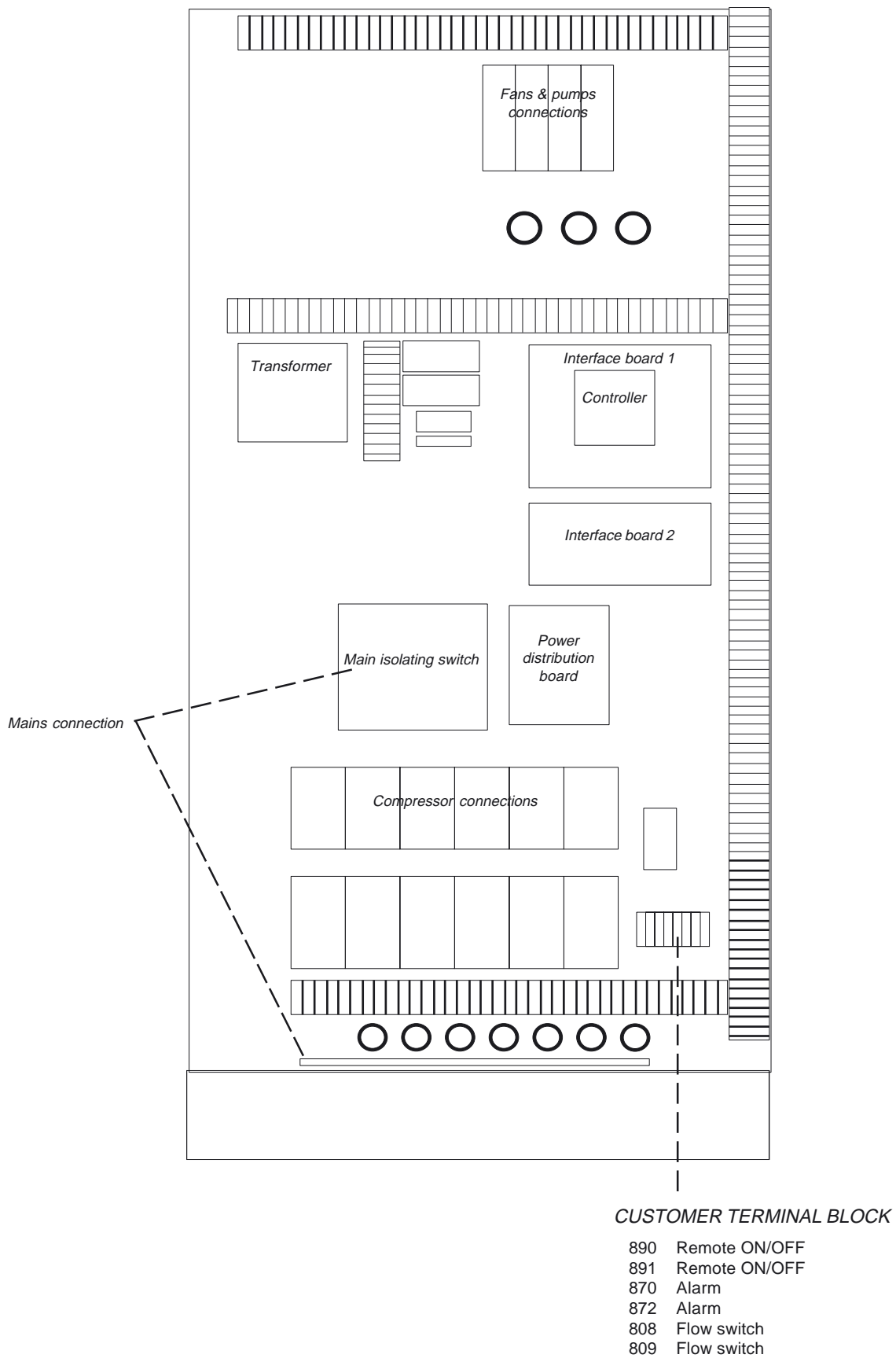
RA		150	200	230	270	300	370
Electrical Data Units		400V/III/50Hz					
Maximum power	kW	76,1	93,8	113,1	138,3	151,4	182,9
Maximum current	A	124,3	153,2	188,0	228,7	252,5	300,1
Maximum current (with cos phi 0,95 option)	A	116,4	143,3	173,3	210,7	230,7	279,9
Start-up intensity	A	293,7	378,6	449,4	490,1	514,0	525,5
Start-up intensity (with softstarter option)	A	214,5	269,8	321,4	362,1	386,0	416,7
Start-up intensity (with cos phi 0,95 option)	A	287,5	371,7	439,7	477,2	497,1	508,4
Electrical Data Fans							
Nominal air flow	m ³ /h	47000	64200	61850	96000	96000	92700
Available static pressure	kPa	0	0	0	0	0	0
Absorbed power	kW	5,1	6,8	6,8	10,2	10,2	10,2

Ra - dk

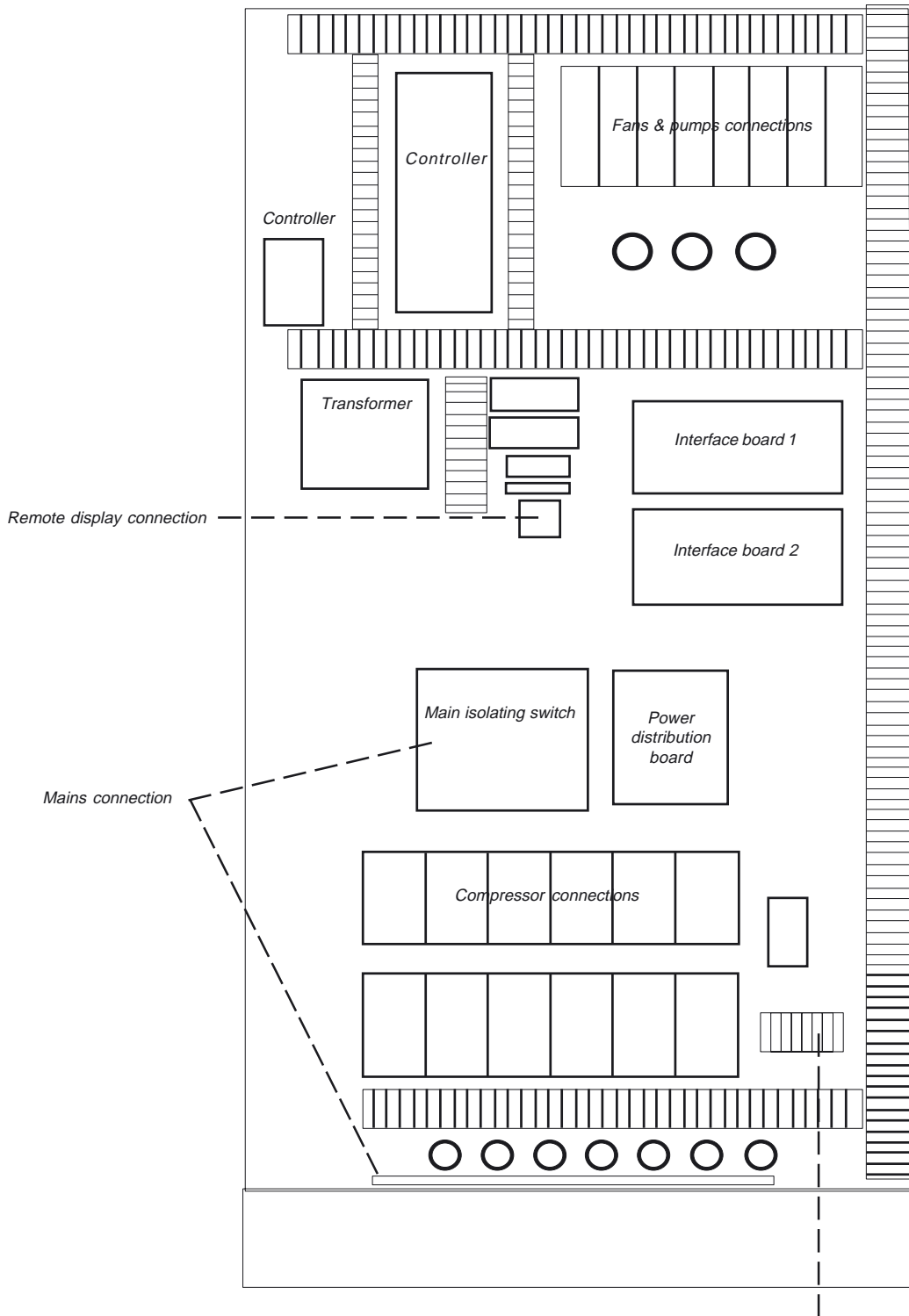
low noise

RA		150	200	230	270	300	370
Electrical Data Units		400V/III/50Hz					
Maximum power	kW	72,7	89,5	108,8	131,4	144,6	176,1
Maximum current	A	119,4	147,2	182,0	218,8	242,6	290,2
Maximum current (with cos phi 0,95 option)	A	111,2	136,8	166,8	200,3	220,3	269,6
Start-up intensity	A	288,7	372,6	443,5	480,3	504,1	515,6
Start-up intensity (with softstarter option)	A	209,5	263,8	315,5	352,3	376,1	406,8
Start-up intensity (with cos phi 0,95 option)	A	282,3	365,2	433,2	466,8	486,7	498,0
Electrical Data Fans							
Nominal air flow	m ³ /h	41300	64300	62000	85900	82700	82700
Available static pressure	kPa	0	0	0	0	0	0
Absorbed power	kW	1,68	2,52	2,52	3,36	3,36	3,36

CONNECTION DRAWING FOR UNIT WITH CLIMATIC™ 30



CONNECTION DRAWING FOR UNIT WITH CLIMATIC™ 50



CUSTOMER TERMINAL BLOCK

- 890 Remote ON/OFF
- 891 Remote ON/OFF
- 870 Alarm
- 872 Alarm
- 808 Flow switch
- 809 Flow switch
- 928 RESET
- 929 RESET

waH STANDARD COOLING MODE

WAH		Water outlet temperature																
		28°C				30°C				32°C				35°C				
		Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	
Air inlet temperature	5°C	150D	138,1	59,7	23,8	37,0	135,0	61,9	23,2	35,4	131,7	64,1	22,7	33,8	126,7	67,6	21,8	31,5
		200D	176,6	65,5	30,4	30,3	172,7	68,0	29,7	29,0	168,7	70,6	29,1	27,7	162,4	74,8	28,0	25,8
		230D	208,0	80,0	35,8	41,4	203,5	83,2	35,0	39,7	198,8	86,6	34,2	37,9	191,4	92,0	33,0	35,3
	6°C	150D	142,7	60,1	24,6	39,3	139,4	62,3	24,0	37,6	136,1	64,5	23,4	35,9	130,9	68,1	22,6	33,4
		200D	182,3	66,1	31,4	32,2	178,3	68,6	30,7	30,8	174,2	71,2	30,0	29,5	167,8	75,4	28,9	27,5
		230D	214,7	80,7	37,0	43,9	210,0	83,9	36,2	42,1	205,2	87,3	35,3	40,3	197,6	92,7	34,0	37,5
	7°C	150D	147,4	60,5	25,4	41,7	144,0	62,7	24,8	39,9	140,5	65,0	24,2	38,2	135,2	68,5	23,3	35,5
		200D	188,1	66,7	32,4	34,2	184,0	69,2	31,7	32,7	179,7	71,9	31,0	31,3	173,2	76,1	29,8	29,2
		230D	221,5	81,5	38,1	46,6	216,7	84,7	37,3	44,7	211,7	88,1	36,5	42,8	203,9	93,5	35,1	39,8
	8°C	150D	152,1	60,9	26,2	44,2	148,6	63,1	25,6	42,4	145,1	65,4	25,0	40,5	139,6	69,0	24,0	37,7
		200D	194,0	67,3	33,4	36,2	189,8	69,9	32,7	34,7	185,5	72,5	31,9	33,2	178,7	76,7	30,8	31,0
		230D	228,4	82,2	39,3	49,4	223,4	85,5	38,5	47,4	218,3	88,9	37,6	45,4	210,4	94,4	36,2	42,3
	9°C	150D	156,9	61,3	27,0	46,9	153,3	63,5	26,4	44,9	149,7	65,8	25,8	42,9	144,0	69,5	24,8	40,0
		200D	200,1	68,0	34,5	38,4	195,7	70,5	33,7	36,8	191,3	73,1	32,9	35,3	184,4	77,4	31,8	32,9
		230D	235,4	83,0	40,6	52,4	230,3	86,3	39,7	50,2	225,1	89,7	38,8	48,1	217,0	95,2	37,4	44,8
	10°C	150D	161,8	61,7	27,9	49,7	158,1	63,9	27,2	47,6	154,4	66,3	26,6	45,5	148,6	69,9	25,6	42,3
		200D	206,3	68,6	35,5	40,7	201,8	71,1	34,8	39,0	197,2	73,8	34,0	37,4	190,1	78,1	32,7	34,8
		230D	242,6	83,8	41,8	55,4	237,4	87,1	40,9	53,2	232,0	90,5	40,0	50,9	223,7	96,0	38,5	47,5
	11°C	150D	166,8	62,1	28,7	52,5	163,0	64,4	28,1	50,3	159,1	66,7	27,4	48,1	153,1	70,4	26,4	44,8
		200D	212,5	69,2	36,6	43,1	207,9	71,8	35,8	41,3	203,2	74,5	35,0	39,6	196,0	78,8	33,8	36,9
		230D	249,9	84,6	43,0	58,7	244,5	87,9	42,1	56,3	239,0	91,4	41,2	53,9	230,5	96,9	39,7	50,3
	12°C	150D	171,8	62,5	29,6	55,5	167,9	64,8	28,9	53,2	163,9	67,2	28,2	50,9	157,8	70,9	27,2	47,4
		200D	218,9	69,9	37,7	45,6	214,2	72,5	36,9	43,7	209,4	75,2	36,1	41,9	201,9	79,5	34,8	39,1
		230D	257,3	85,5	44,3	62,0	251,8	88,8	43,4	59,5	246,1	92,2	42,4	57,0	237,4	97,8	40,9	53,2

waH STANDARD COOLING MODE

WAH		Water outlet temperature																
		38°C				40°C				43°C				46°C				
		Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	
Air inlet temperature	5°C	150D	121,6	71,3	20,9	29,1	118,0	73,9	20,3	27,5	66,6	39,5	11,5	9,5	63,5	41,5	10,9	8,7
		200D	155,9	79,4	26,9	23,9	151,4	82,6	26,1	22,6	144,4	87,9	24,9	20,6	102,0	61,0	17,6	10,7
		230D	183,6	97,8	31,6	32,6	178,2	102,0	30,7	30,8	127,5	69,8	22,0	16,3	121,4	74,2	20,9	14,8
	6°C	150D	125,6	71,8	21,6	30,9	122,0	74,4	21,0	29,3	69,0	39,7	11,9	10,1	65,8	41,7	11,3	9,2
		200D	161,1	80,0	27,7	25,4	156,5	83,3	26,9	24,0	149,2	88,5	25,7	22,0	105,6	61,3	18,2	11,4
		230D	189,6	98,6	32,7	34,7	184,1	102,8	31,7	32,8	131,9	70,2	22,7	17,4	125,6	74,6	21,6	15,8
	7°C	150D	129,7	72,3	22,3	32,9	126,0	74,9	21,7	31,1	71,4	39,8	12,3	10,8	68,1	41,8	11,7	9,9
		200D	166,3	80,7	28,7	27,0	161,6	83,9	27,8	25,6	154,1	89,1	26,6	23,4	109,2	61,6	18,8	12,1
		230D	195,8	99,4	33,7	36,9	190,1	103,6	32,7	34,8	136,4	70,6	23,5	18,5	130,0	75,0	22,4	16,9
	8°C	150D	133,9	72,8	23,1	34,9	130,0	75,4	22,4	33,0	73,9	39,9	12,7	11,5	70,5	41,9	12,1	10,5
		200D	171,7	81,3	29,6	28,7	166,8	84,6	28,7	27,2	159,2	89,8	27,4	24,8	113,0	62,0	19,5	12,9
		230D	202,1	100,2	34,8	39,1	196,2	104,4	33,8	37,0	141,0	71,1	24,3	19,7	134,4	75,4	23,2	18,0
	9°C	150D	138,2	73,3	23,8	37,0	134,2	75,9	23,1	35,0	76,4	40,1	13,2	12,2	72,9	42,1	12,6	11,2
		200D	177,1	82,0	30,5	30,5	172,1	85,3	29,7	28,8	122,4	58,9	21,1	15,1	116,8	62,3	20,1	13,8
		230D	208,4	101,1	35,9	41,5	202,5	105,3	34,9	39,3	145,7	71,5	25,1	21,0	139,0	75,9	23,9	19,2
	10°C	150D	142,5	73,8	24,5	39,2	138,4	76,4	23,8	37,1	79,1	40,2	13,6	13,0	75,4	42,2	13,0	11,9
		200D	182,7	82,7	31,5	32,3	177,6	86,0	30,6	30,6	126,5	59,2	21,8	16,0	120,8	62,7	20,8	14,7
		230D	214,9	102,0	37,0	44,0	208,9	106,1	36,0	41,7	150,5	71,9	25,9	22,3	143,7	76,3	24,7	20,4
	11°C	150D	146,9	74,3	25,3	41,5	142,6	77,0	24,6	39,2	81,7	40,3	14,1	13,9	78,0	42,4	13,4	12,7
		200D	188,4	83,4	32,5	34,3	183,2	86,7	31,5	32,5	130,7	59,6	22,5	17,1	124,8	63,0	21,5	15,6
		230D	221,5	102,8	38,2	46,6	215,3	107,0	37,1	44,2	155,5	72,4	26,8	23,8	148,4	76,7	25,6	21,8
	12°C	150D	151,4	74,8	26,1	43,8	88,2	38,5	15,2	16,0	84,5	40,5	14,6	14,7	80,6	42,6	13,9	13,5
		200D	194,2	84,1	33,4	36,3	188,8	87,4	32,5	34,4	135,0	60,0	23,3	18,2	129,0	63,4	22,2	16,6
		230D	228,2	103,7	39,3	49,4	221,9	107,9	38,2	46,8	160,5	72,8	27,7	25,3	153,3	77,2	26,4	23,1

XXX : High pressure offloading operation	Pc : Net cooling capacity in kW	Pe(c) : Effective power input input in cooling mode	Wf : Water flow in m³ per hour	Dp : Water pressure drop in KPa
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waH

STANDARD

HEATING MODE

WAH		Water outlet temperature																
		30°C				35°C				38°C				40°C				
		Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	
Air inlet temperature	10°C	150D	184,2	53,1	31,7	63,3	182,3	58,0	31,4	62,0	181,2	61,1	31,2	61,3	180,5	63,3	31,1	60,9
		200D	225,0	59,2	38,7	48,0	222,6	64,7	38,3	47,0	221,2	68,3	38,1	46,5	220,4	70,9	38,0	46,2
		230D	272,4	71,7	46,9	69,1	270,0	78,7	46,5	68,0	268,7	83,4	46,3	67,3	267,8	86,8	46,1	66,9
	7°C	150D	169,6	52,9	29,2	54,2	168,1	57,7	29,0	53,3	167,4	60,8	28,8	52,9	166,9	62,9	28,7	52,6
		200D	206,4	58,5	35,5	40,7	204,5	63,9	35,2	40,0	203,5	67,5	35,1	39,7	202,9	70,1	35,0	39,5
		230D	250,2	70,8	43,1	58,8	248,7	77,8	42,8	58,1	247,8	82,5	42,7	57,7	247,3	85,8	42,6	57,5
	5°C	150D	160,6	52,8	27,7	48,9	159,3	57,5	27,4	48,2	158,7	60,5	27,3	47,9	158,4	62,7	27,3	47,7
		200D	194,9	58,1	33,6	36,6	193,3	63,4	33,3	36,0	192,5	66,9	33,2	35,7	192,0	69,5	33,1	35,5
		230D	236,5	70,2	40,7	52,8	235,4	77,2	40,6	52,4	234,9	81,9	40,5	52,1	234,6	85,3	40,4	52,0
	0°C	150D	140,0	52,3	24,1	37,9	139,3	56,8	24,0	37,5	139,0	59,7	23,9	37,4	138,9	61,8	23,9	37,3
		200D	169,4	57,0	29,2	28,0	168,1	62,1	29,0	27,6	167,4	65,6	28,8	27,3	167,1	68,1	28,8	27,3
		230D	205,3	68,7	35,4	40,3	205,5	75,8	35,4	40,4	205,7	80,5	35,4	40,5	205,8	83,9	35,5	40,5
	-2°C	150D	132,5	52,0	22,8	34,2	131,9	56,5	22,7	33,9	131,7	59,3	22,7	33,8	131,7	61,3	22,7	33,8
		200D	160,4	56,6	27,6	25,2	159,0	61,6	27,4	24,8	158,3	65,0	27,3	24,6	158,0	67,5	27,2	24,5
		230D	193,9	68,1	33,4	36,2	194,7	75,2	33,5	36,5	195,1	80,0	33,6	36,6	195,4	83,3	33,7	36,7
	-4°C	150D	125,4	51,7	21,6	30,9	124,9	56,1	21,5	30,6	124,8	58,9	21,5	30,6	124,8	60,8	21,5	30,6
		200D	152,1	56,3	26,2	22,8	150,5	61,2	25,9	22,3	149,6	64,5	25,8	22,1	149,3	67,0	25,7	22,0
		230D	183,2	67,4	31,6	32,5	184,4	74,6	31,8	32,9	185,2	79,4	31,9	33,1	185,6	82,8	32,0	33,3
	-6°C	150D	118,7	51,3	20,4	27,8	118,3	55,6	20,4	27,7	118,2	58,3	20,4	27,6	118,3	60,2	20,4	27,7
		200D	144,4	56,0	24,9	20,6	142,6	60,7	24,6	20,1	141,5	64,0	24,4	19,8	141,0	66,4	24,3	19,7
		230D	173,0	66,8	29,8	29,1	174,6	74,0	30,1	29,6	175,7	78,9	30,3	30,0	176,3	82,3	30,4	30,2
	-8°C	150D	112,3	50,9	19,3	25,1	111,9	55,1	19,3	24,9	111,9	57,7	19,3	24,9	-	-	-	-
		200D	137,3	55,7	23,7	18,8	135,1	60,3	23,3	18,2	133,7	63,5	23,0	17,8	-	-	-	-
		230D	163,3	66,1	28,1	26,1	165,3	73,4	28,5	26,7	-	-	-	-	-	-	-	-
-10°C	150D	106,2	50,4	18,3	22,6	105,8	54,5	18,2	22,5	-	-	-	-	-	-	-	-	
	200D	130,8	55,5	22,5	17,1	128,2	59,9	22,1	16,4	-	-	-	-	-	-	-	-	
	230D	154,0	65,4	26,5	23,3	156,5	72,8	27,0	24,0	-	-	-	-	-	-	-	-	

Ph : Net heating capacity in kW

Pe(c) : Effective power input in cooling mode

Wf : Water flow in m³ per Hour

Dp : Water pressure drop in KPa

waH

STANDARD

HEATING MODE

WAH		Water outlet temperature																
		42°C				45°C				48°C				50°C				
		Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	Pc (kW)	Pe (kW)	Wf (m³/h)	Dp (kPa)	
Air inlet temperature	10°C	150D	179,8	65,6	31,0	60,4	178,7	69,2	30,8	59,8	177,7	73,0	30,6	59,1	176,9	75,7	30,5	58,7
		200D	219,6	73,6	37,8	45,8	218,4	78,0	37,6	45,4	217,3	82,7	37,4	45,0	216,6	86,0	37,3	44,7
		230D	267,0	90,3	46,0	66,5	265,8	95,9	45,8	66,0	264,6	101,9	45,6	65,4	263,8	106,2	45,4	65,0
	7°C	150D	166,4	65,2	28,7	52,3	165,7	68,7	28,5	51,9	165,0	72,4	28,4	51,5	164,5	74,9	28,3	51,2
		200D	202,4	72,8	34,9	39,3	201,7	77,1	34,7	39,0	201,1	81,9	34,6	38,8	200,8	85,3	34,6	38,7
		230D	246,8	89,3	42,5	57,3	246,0	94,9	42,4	56,9	245,3	101,0	42,2	56,6	244,8	105,2	42,2	56,4
	5°C	150D	158,0	64,9	27,2	47,5	157,5	68,3	27,1	47,2	157,0	71,9	27,1	47,0	156,7	74,4	27,0	46,8
		200D	191,6	72,2	33,0	35,4	191,2	76,6	32,9	35,2	191,0	81,4	32,9	35,2	191,0	84,9	32,9	35,2
		230D	234,2	88,7	40,3	51,9	233,7	94,3	40,3	51,7	233,2	100,3	40,2	51,4	232,8	104,6	40,1	51,3
	0°C	150D	138,8	63,8	23,9	37,3	138,7	67,1	23,9	37,2	138,7	70,5	23,9	37,2	138,6	72,8	23,9	37,2
		200D	166,9	70,8	28,8	27,2	167,1	75,3	28,8	27,3	167,9	80,3	28,9	27,5	168,7	84,0	29,1	27,8
		230D	205,9	87,4	35,5	40,6	205,8	92,9	35,5	40,5	205,6	98,8	35,4	40,5	205,4	102,9	35,4	40,4
	-2°C	150D	131,7	63,3	22,7	33,8	131,7	66,5	22,7	33,8	-	-	-	-	-	-	-	-
		200D	157,9	70,2	27,2	24,5	158,2	74,8	27,3	24,6	159,3	79,9	27,4	24,9	-	-	-	-
		230D	195,6	86,8	33,7	36,8	195,7	92,4	33,7	36,8	-	-	-	-	-	-	-	-
	-4°C	150D	124,9	62,8	21,5	30,6	-	-	-	-	-	-	-	-	-	-	-	-
		200D	149,1	69,7	25,7	21,9	149,6	74,2	25,8	22,1	-	-	-	-	-	-	-	-
		230D	185,9	86,3	32,0	33,4	-	-	-	-	-	-	-	-	-	-	-	-
	-6°C	150D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		200D	140,8	69,1	24,3	19,7	-	-	-	-	-	-	-	-	-	-	-	-
		230D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-8°C	150D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		200D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		230D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-10°C	150D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	200D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	230D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

XXX : Data according to Eurovent standard conditions	Ph : Net heating capacity in kW	Pe(c) : Effective power input in cooling mode	Wf : Water flow in m³ per hour	Dp : Water pressure drop in kPa
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All units	standard	free cooling
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Air Inlet temperature		-15°C					-10°C				
Water temperature	size	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa
15°C	150D	156,6	7,66	9,5	24,4	26,4	130,7	7,66	10,4	24,4	26,4
	200D	238,0	10,16	8,4	31,1	45,2	198,0	10,16	9,5	31,1	45,2
	230D	222,0	10,4	9,8	37,2	61,7	185,6	10,4	10,7	37,2	61,7
	270D	362,0	15,25	8,1	44,9	104,5	302,0	15,25	9,2	44,9	104,5
	300D	366,0	15,25	8,4	47,7	116,7	306,0	15,25	9,5	47,7	116,7
	370D	344,0	15,63	10,0	59,1	171,8	286,0	15,63	10,8	59,1	171,8
13°C	150D	145,8	7,66	7,9	24,4	26,9	119,8	7,66	8,8	24,4	26,9
	200D	222,0	10,16	6,9	31,1	45,9	181,8	10,16	8,0	31,1	45,9
	230D	208,0	10,4	8,2	37,2	62,7	170,4	10,4	9,1	37,2	62,7
	270D	338,0	15,25	6,5	44,9	105,5	278,0	15,25	7,7	44,9	105,5
	300D	342,0	15,25	6,9	47,7	117,9	280,0	15,25	7,9	47,7	117,9
	370D	320,0	15,63	8,3	59,1	173,4	264,0	15,63	9,2	59,1	173,4

Air Inlet temperature		-5°C					0°C				
Water temperature	size	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa
15°C	150D	104,6	7,66	11,3	24,4	26,4	78,4	7,66	12,2	24,4	26,4
	200D	158,6	10,16	10,6	31,1	45,2	119,0	10,16	11,7	31,1	45,2
	230D	148,6	10,4	11,6	37,2	61,7	111,4	10,4	12,4	37,2	61,7
	270D	242,0	15,25	10,4	44,9	104,5	181,8	15,25	11,5	44,9	104,5
	300D	244,0	15,25	10,6	47,7	116,7	183,4	15,25	11,7	47,7	116,7
	370D	230,0	15,63	11,7	59,1	171,8	172,0	15,63	12,5	59,1	171,8
13°C	150D	93,8	7,66	9,7	24,4	26,9	67,8	7,66	10,6	24,4	26,9
	200D	142,4	10,16	9,0	31,1	45,9	102,8	10,16	10,1	31,1	45,9
	230D	133,4	10,4	9,9	37,2	62,7	96,4	10,4	10,8	37,2	62,7
	270D	218,0	15,25	8,9	44,9	105,5	157,2	15,25	10,0	44,9	105,5
	300D	220,0	15,25	9,0	47,7	117,9	158,6	15,25	10,1	47,7	117,9
	370D	206,0	15,63	10,0	59,1	173,4	149,0	15,63	10,8	59,1	173,4

All units	low noise	free cooling
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Air Inlet temperature		-15°C					-10°C				
Water temperature	size	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa
15°C	150D	142,0	5,26	9,9	23,8	25,3	118,4	5,26	10,7	23,8	25,3
	200D	216,0	6,96	8,9	30,4	43,7	180,0	6,96	9,9	30,4	43,7
	230D	202,0	7,2	10,2	36,2	58,9	167,8	7,2	11,0	36,2	58,9
	270D	328,0	10,45	8,6	43,8	99,5	274,0	10,45	9,6	43,8	99,5
	300D	332,0	10,45	8,9	46,4	110,6	276,0	10,45	9,9	46,4	110,6
	370D	310,0	10,83	10,3	57,2	162,3	258,0	10,83	11,1	57,2	162,3
13°C	150D	132,2	5,26	8,2	23,8	25,7	108,6	5,26	9,1	23,8	25,7
	200D	202,0	6,96	7,3	30,4	44,4	165,2	6,96	8,3	30,4	44,4
	230D	187,6	7,2	8,4	36,2	59,9	154,0	7,2	9,3	36,2	59,9
	270D	306,0	10,45	7,0	43,8	100,4	252,0	10,45	8,1	43,8	100,4
	300D	308,0	10,45	7,3	46,4	111,8	254,0	10,45	8,3	46,4	111,8
	370D	288,0	10,83	8,7	57,2	163,9	238,0	10,83	9,4	57,2	163,9

Air Inlet temperature		-5°C					0°C				
Water temperature	size	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa
15°C	150D	94,8	5,26	11,6	23,8	25,3	71,2	5,26	12,4	23,8	25,3
	200D	144,2	6,96	10,9	30,4	43,7	108,2	6,96	11,9	30,4	43,7
	230D	134,4	7,2	11,8	36,2	58,9	100,8	7,2	12,6	36,2	58,9
	270D	220,0	10,45	10,7	43,8	99,5	164,4	10,45	11,8	43,8	99,5
	300D	220,0	10,45	10,9	46,4	110,6	165,8	10,45	11,9	46,4	110,6
	370D	206,0	10,83	11,9	57,2	162,3	155,0	10,83	12,7	57,2	162,3
13°C	150D	85,2	5,26	9,9	23,8	25,7	61,6	5,26	10,8	23,8	25,7
	200D	129,4	6,96	9,3	30,4	44,4	93,6	6,96	10,4	30,4	44,4
	230D	120,6	7,2	10,1	36,2	59,9	87,2	7,2	10,9	36,2	59,9
	270D	197,0	10,45	9,1	43,8	100,4	142,4	10,45	10,2	43,8	100,4
	300D	198,6	10,45	9,3	46,4	111,8	143,4	10,45	10,3	46,4	111,8
	370D	185,6	10,83	10,2	57,2	163,9	134,0	10,83	11,0	57,2	163,9

All units high efficiency free cooling

Air Inlet temperature		-15°C					-10°C				
Water temperature	size	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa
15°C	150D	175,8	4,08	9,1	25,6	32,6	146,6	4,08	10,1	25,6	32,6
	200D	286,0	6,04	7,4	32,1	57,7	238,0	6,04	8,6	32,1	57,7
	230D	270,0	6,28	10,4	38,3	78,1	224,0	6,28	10,0	38,3	78,1
	270D	378,4	8,09	8,0	46,2	27,5	315,6	8,09	9,2	46,2	27,5
	300D	351,2	8,09	9,1	50,6	32,1	292,8	8,09	10,0	50,6	32,1
	370D	359,6	8,47	9,8	59,9	42,7	299,6	8,47	10,7	59,9	42,7
13°C	150D	163,6	4,08	7,5	25,6	33,1	134,6	4,08	8,5	25,6	33,1
	200D	266,0	6,04	5,9	32,1	58,7	220,0	6,04	7,1	32,1	58,7
	230D	252,0	6,28	7,4	38,3	79,3	206,0	6,28	8,4	38,3	79,3
	270D	352,4	8,09	6,5	46,2	28,0	289,6	8,09	7,6	46,2	28,0
	300D	326,8	8,09	7,5	50,6	32,6	268,8	8,09	8,4	50,6	32,6
	370D	334,8	8,47	8,2	59,9	43,4	275,2	8,47	9,0	59,9	43,4

Air Inlet temperature		-5°C					0°C				
Water temperature	size	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa
15°C	150D	117,4	4,08	11,1	25,6	32,6	88,0	4,08	12,0	25,6	32,6
	200D	191,2	6,04	9,9	32,1	57,7	143,4	6,04	11,2	32,1	57,7
	230D	179,8	6,28	11,0	38,3	78,1	134,8	6,28	12,0	38,3	78,1
	270D	252,8	8,09	10,3	46,2	27,5	189,6	8,09	11,5	46,2	27,5
	300D	234,4	8,09	11,0	50,6	32,1	176,0	8,09	12,0	50,6	32,1
	370D	240,0	8,47	11,6	59,9	42,7	180,0	8,47	12,4	59,9	42,7
13°C	150D	105,4	4,08	9,5	25,6	33,1	76,2	4,08	10,4	25,6	33,1
	200D	171,8	6,04	8,4	32,1	58,7	124,0	6,04	9,7	32,1	58,7
	230D	161,6	6,28	8,4	38,3	79,3	116,8	6,28	9,4	38,3	79,3
	270D	226,8	8,09	8,8	46,2	28,0	164,0	8,09	10,0	46,2	28,0
	300D	210,4	8,09	9,4	50,6	32,6	152,0	8,09	10,4	50,6	32,6
	370D	215,6	8,47	9,9	59,9	43,4	155,6	8,47	10,8	59,9	43,4

All units

super low noise

free cooling

Air Inlet temperature		-15°C					-10°C				
Water temperature	size	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa
15°C	150D	156,4	1,84	9,6	24,9	30,9	130,4	1,84	10,5	24,9	30,9
	200D	256,0	2,68	8,0	31,3	55,3	214,0	2,68	9,2	31,3	55,3
	230D	240,0	2,92	9,5	37,1	73,9	199,4	2,92	10,4	37,1	73,9
	270D	337,6	3,61	8,6	45,3	26,3	281,6	3,61	9,7	45,3	26,3
	300D	312,4	3,61	9,5	49,2	30,4	260,4	3,61	10,4	49,2	30,4
	370D	318,8	3,99	10,2	57,7	39,8	265,6	3,99	11,0	57,7	39,8
13°C	150D	145,6	1,84	7,9	24,9	31,4	119,6	1,84	8,8	24,9	31,4
	200D	238,0	2,68	6,5	31,3	56,2	196,0	2,68	7,6	31,3	56,2
	230D	222,0	2,92	7,8	37,1	75,1	183,2	2,92	8,8	37,1	75,1
	270D	314,4	3,61	7,0	45,3	26,8	258,4	3,61	8,1	45,3	26,8
	300D	291,2	3,61	7,9	49,2	30,9	239,2	3,61	8,8	49,2	30,9
	370D	297,2	3,99	8,6	57,7	40,5	244,0	3,99	9,4	57,7	40,5

Air Inlet temperature		-5°C					0°C				
Water temperature	size	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa	Q kW	Pe kW	Tout °C	Wf m3/h	Dp kPa
15°C	150D	104,4	1,84	11,4	24,9	30,9	78,2	1,84	12,3	24,9	30,9
	200D	170,8	2,68	10,3	31,3	55,3	128,2	2,68	11,5	31,3	55,3
	230D	159,6	2,92	11,3	37,1	73,9	119,6	2,92	12,2	37,1	73,9
	270D	225,2	3,61	10,7	45,3	26,3	169,2	3,61	11,8	45,3	26,3
	300D	208,4	3,61	11,3	49,2	30,4	156,4	3,61	12,3	49,2	30,4
	370D	212,8	3,99	11,8	57,7	39,8	159,6	3,99	12,6	57,7	39,8
13°C	150D	93,8	1,84	9,7	24,9	31,4	67,8	1,84	10,7	24,9	31,4
	200D	153,6	2,68	8,8	31,3	56,2	111,0	2,68	10,0	31,3	56,2
	230D	143,4	2,92	9,7	37,1	75,1	103,6	2,92	10,6	37,1	75,1
	270D	202,4	3,61	9,2	45,3	26,8	146,4	3,61	10,2	45,3	26,8
	300D	187,2	3,61	9,7	49,2	30,9	135,2	3,61	10,6	49,2	30,9
	370D	191,2	3,99	10,2	57,7	40,5	138,0	3,99	10,9	57,7	40,5

DIMENSIONAL DATA - CONTENTS OF THE DRAWINGS

WA	PAGE				
	STANDARD	LOW NOISE	HIGH EFFICIENCY	SUPER LOW NOISE	REVERSIBLE
	<i>STD</i>	<i>LN</i>	<i>HE</i>	<i>SLN</i>	<i>H</i>
150	66	66	67	67	70
200	67	67	68	68	67
230	67	67	68	68	67
270	68	68	69	69	-
300	68	68	69	69	-
370	68	68	69	69	-

**LOAD DISTRIBUTION
(KG - OPERATING WEIGHTS)**

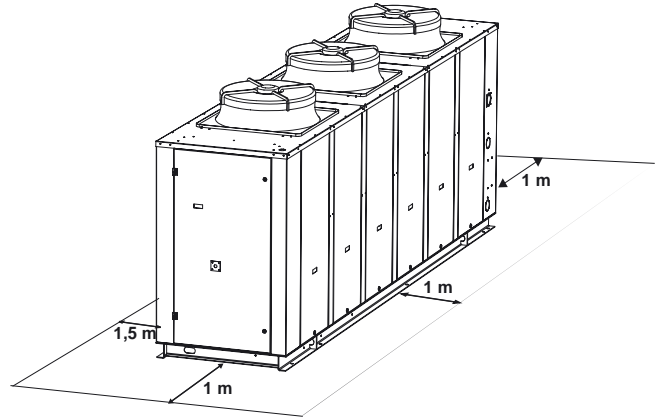
wa - RA 150

STD - LN

CLEARANCES

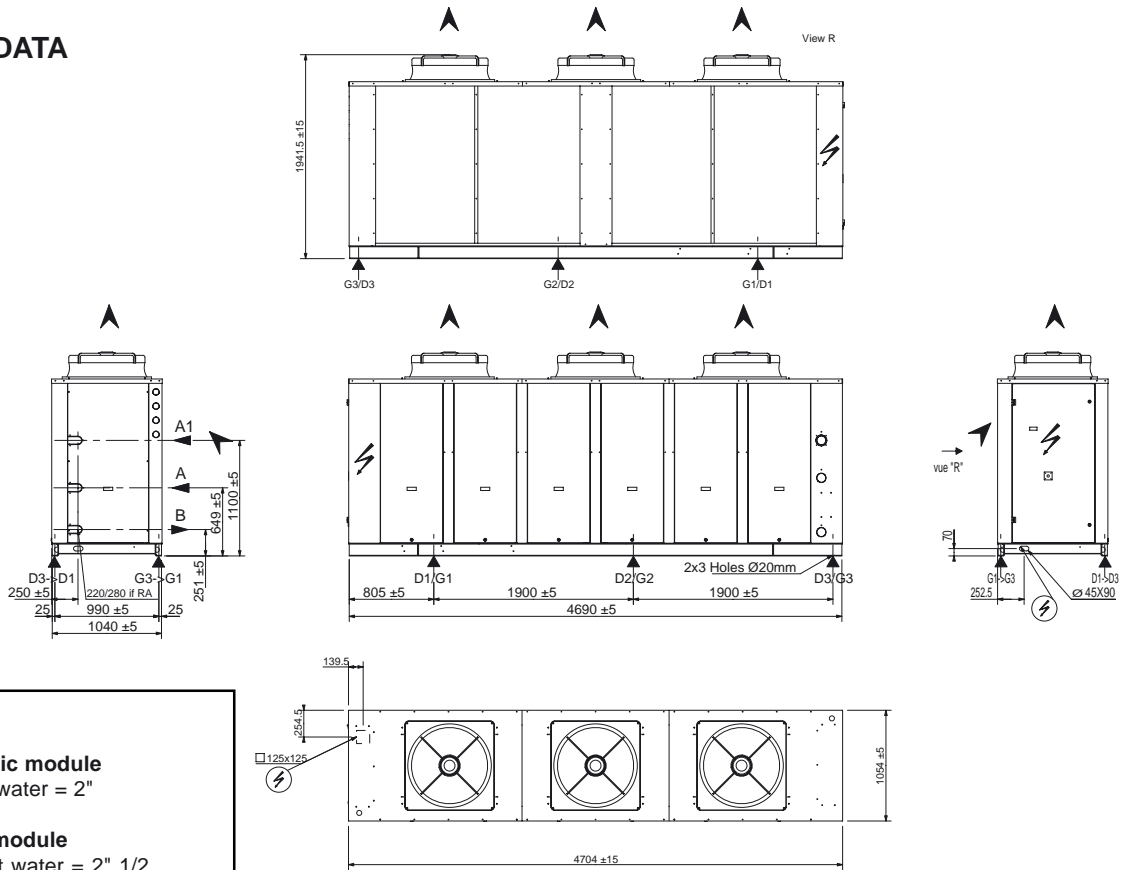
	G1	G2	G3	
WA 150 STD	252	264	168	
WA 150 LN	252	264	168	
	238	249	195	RA 150 STD
	238	249	195	RA 150 LN
	D1	D2	D3	
WA 150 STD	259	312	225	
WA 150 LN	259	312	225	
	245	295	195	RA 150 STD
	245	295	195	RA 150 LN

OVERHEAD OBSTRUCTIONS ARE NOT PERMITTED



Lennox recommend load distribution as detailed above,

DIMENSIONAL DATA



- WA 150 STD & LN**

 - **Without hydraulic module**
A/B : Inlet/outlet water = 2"
 - **With hydraulic module**
A1/B : Inlet/outlet water = 2" 1/2

RA 150 STD & LN

 - **Suction Line** : 2" 1/8
 - **Liquid Line** : 7/8"

**LOAD DISTRIBUTION
(KG - OPERATING WEIGHTS)**

wa RA 150	SLN
wa 150	HE
wa RA 200 / 230	STD - LN
wah 200 / 230	STD

	G1	G2	G3
WA150HE/SLN	261	348	257
WA200STD/LN	304	394	255
WA230STD/LN	305	449	344
WAH 200	315	408	264
WAH 230	313	461	354
	249	333	223
	291	377	244
	295	434	283

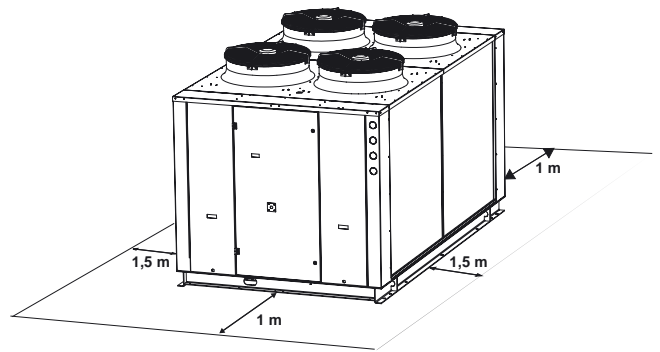
	G1	G2	G3
WA150HE/SLN	250	318	202
WA 200STD/LN	286	353	268
WA 230STD/LN	277	373	271
WAH 200	296	365	277
WAH 230	285	384	279
	273	304	223
	273	337	244
	269	362	283

RA 150 SLN
RA 200STD/LN
RA 230STD/LN

RA 150 SLN
RA 200STD/LN
RA 230STD/LN

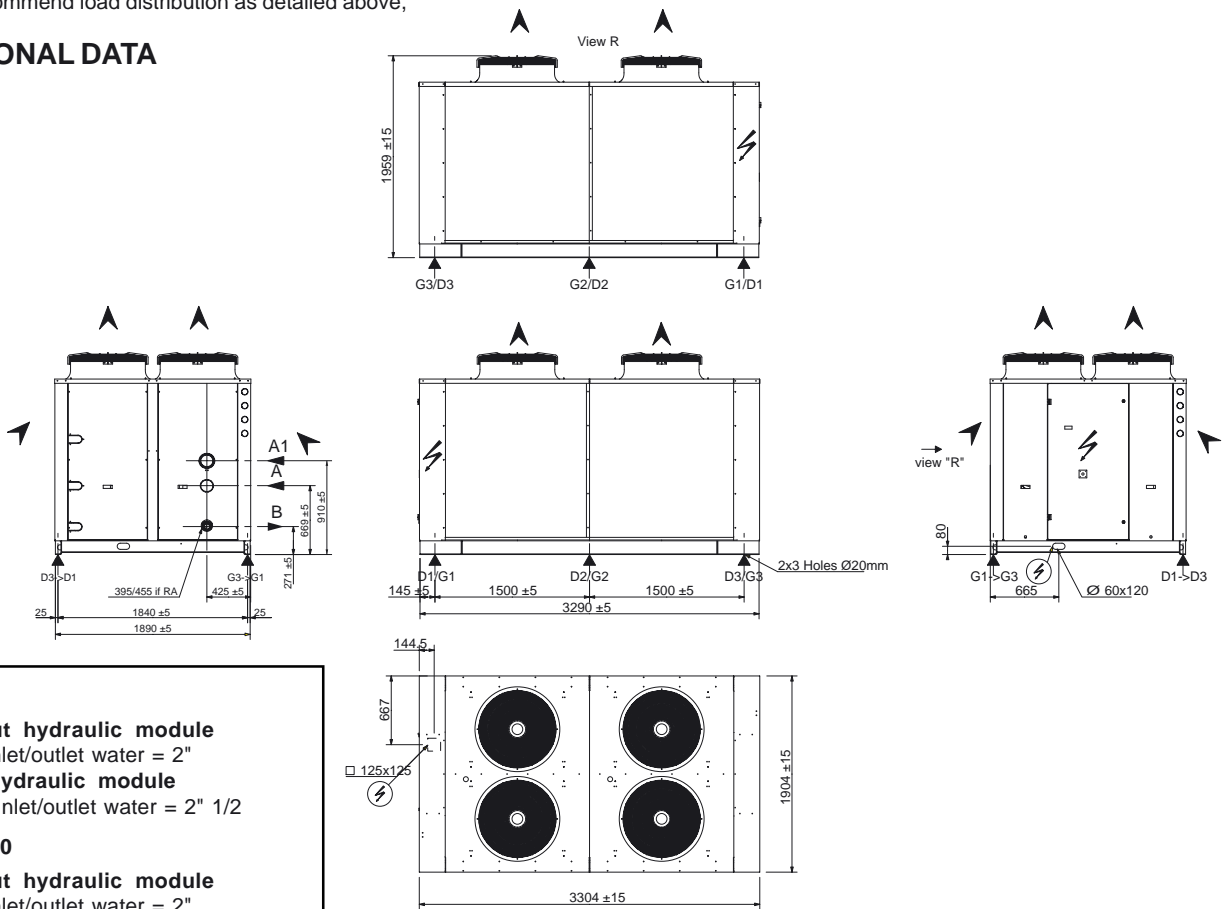
CLEARANCES

OVERHEAD OBSTRUCTIONS ARE NOT PERMITTED



Lennox recommend load distribution as detailed above,

DIMENSIONAL DATA



- WA 150**
- Without hydraulic module
A/B : Inlet/outlet water = 2"
 - With hydraulic module
A1/B : Inlet/outlet water = 2" 1/2
- WA 200/230**
- Without hydraulic module
A/B : Inlet/outlet water = 2"
 - With hydraulic module
A1/B : Inlet/outlet water = 2" 1/2
- RA 150/200/230 STD&LN&LN**
- Suction Line : 2" 1/8
 - Liquid Line : 7/8"

wa 200 / 230	HE - SLN
wa 270 / 300 / 370	STD - LN

**LOAD DISTRIBUTION
(KG - OPERATING WEIGHTS)**

	G1	G2	G3
200 HE/SLN	286	477	286
230 HE/SLN	301	540	309
270 STD/LN	352	590	384
300 STD/LN	362	605	394
370 STD/LN	372	734	512

	D1	D2	D3
200 HE/SLN	280	452	252
230 HE/SLN	296	509	269
270 STD/LN	346	554	332
300 STD/LN	356	569	341
370 STD/LN	359	635	374

	G1	G2	G3	
274	457	254		RA 200 SLN
290	521	272		RA 230 SLN
337	565	332		RA 270 STD / LN
347	581	341		RA 300 STD / LN
365	719	380		RA 370 STD / LN

	D1	D2	D3	
268	433	254		RA 200 SLN
156	491	272		RA 230 SLN
332	531	332		RA 270 STD / LN
341	546	341		RA 300 STD / LN
352	622	380		RA 370 STD / LN

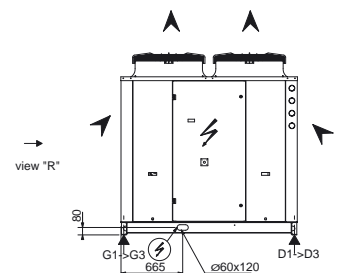
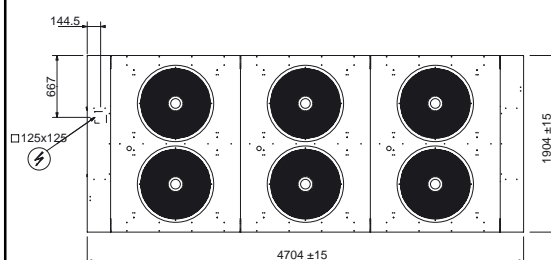
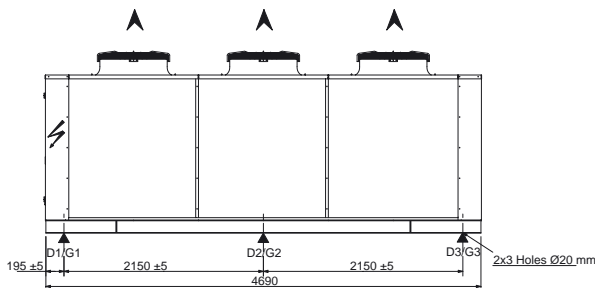
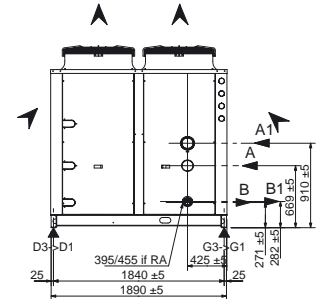
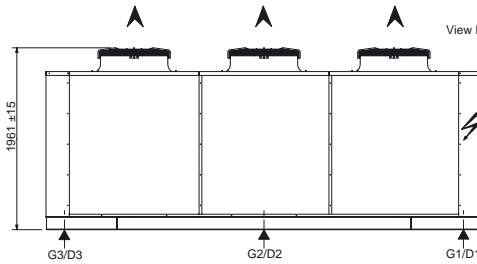
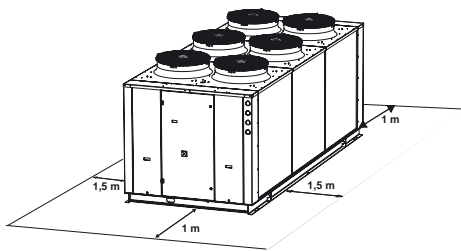
Lennox recommend load distribution as detailed above.

Lennox recommend load distribution as detailed above.

DIMENSIONAL DATA

CLEARANCES

OVERHEAD OBSTRUCTIONS ARE NOT PERMITTED



WA 200/230

- Without hydraulic module
A/B : Inlet/outlet water = 2"
- With hydraulic module
A1/B1 : Inlet/outlet water = 2" 1/2

RA 200/230

- Suction Line : 2" 1/8
- Liquid Line : 7/8"

WA 270/300/370

- Without hydraulic module
A1/B1 : Inlet/outlet water = 2" 1/2
- With hydraulic module
A1/B1 : Inlet/outlet water = 4"

RA 270/300/370

- Suction Line : 2" 5/8
- Liquid Line : 1" 1/8

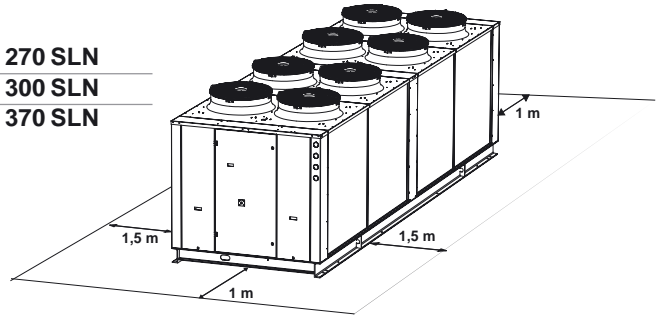
**LOAD DISTRIBUTION
(KG - OPERATING WEIGHTS)**

wa 270 / 300 / 370	HE
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wa RA 270 / 300 / 370	SLN
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CLEARANCES

OVERHEAD OBSTRUCTIONS ARE NOT PERMITTED



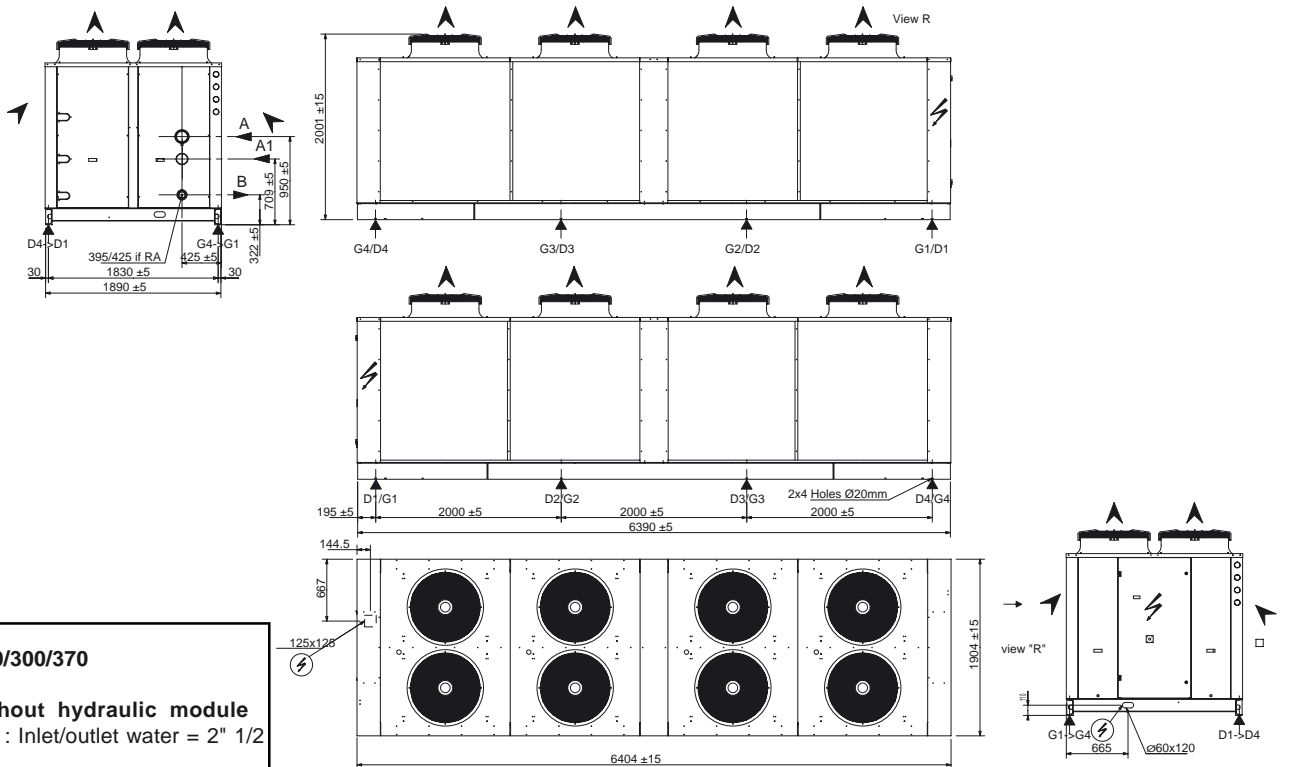
	G1	G2	G3	G4
WA 270 HE/SLN	302	420	440	286
WA 300 HE/SLN	322	448	470	305
WA 370 HE/SLN	351	486	513	341
	294	408	394	242
	312	434	438	247
	337	466	464	283
	D1	D2	D3	D4
270 HE/SLN	306	411	402	234
300 HE/SLN	326	438	428	250
370 HE/SLN	351	471	463	278
	297	399	394	242
	316	424	438	247
	337	452	464	283

**RA 270 SLN
RA 300 SLN
RA 370 SLN**

**RA 270 SLN
RA 300 SLN
RA 370 SLN**

Lennox recommend load distribution as detailed above.

DIMENSIONAL DATA



WA 270/300/370

- **Without hydraulic module**
A/B : Inlet/outlet water = 2" 1/2
- **With hydraulic module**
A/B : Inlet/outlet water = 4"

RA 270/300/370

- Suction Line : 2" 5/8
- Liquid Line : 1" 1/8

**LOAD DISTRIBUTION
(KG - OPERATING WEIGHTS)**

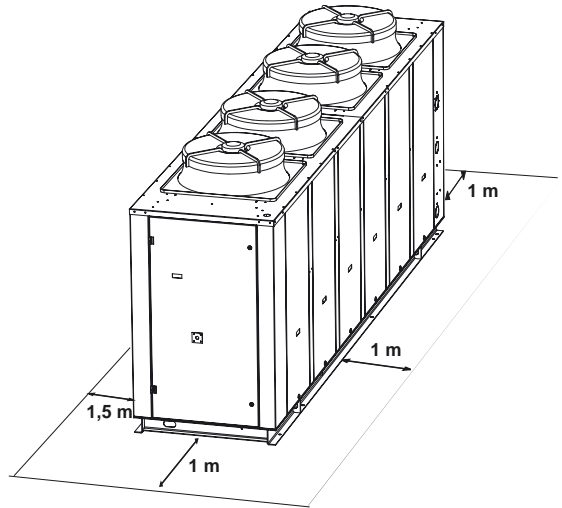
waH 150	std
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G1	G2	G3
150 D 252	264	167
D1	D2	D3
150D 259	312	225

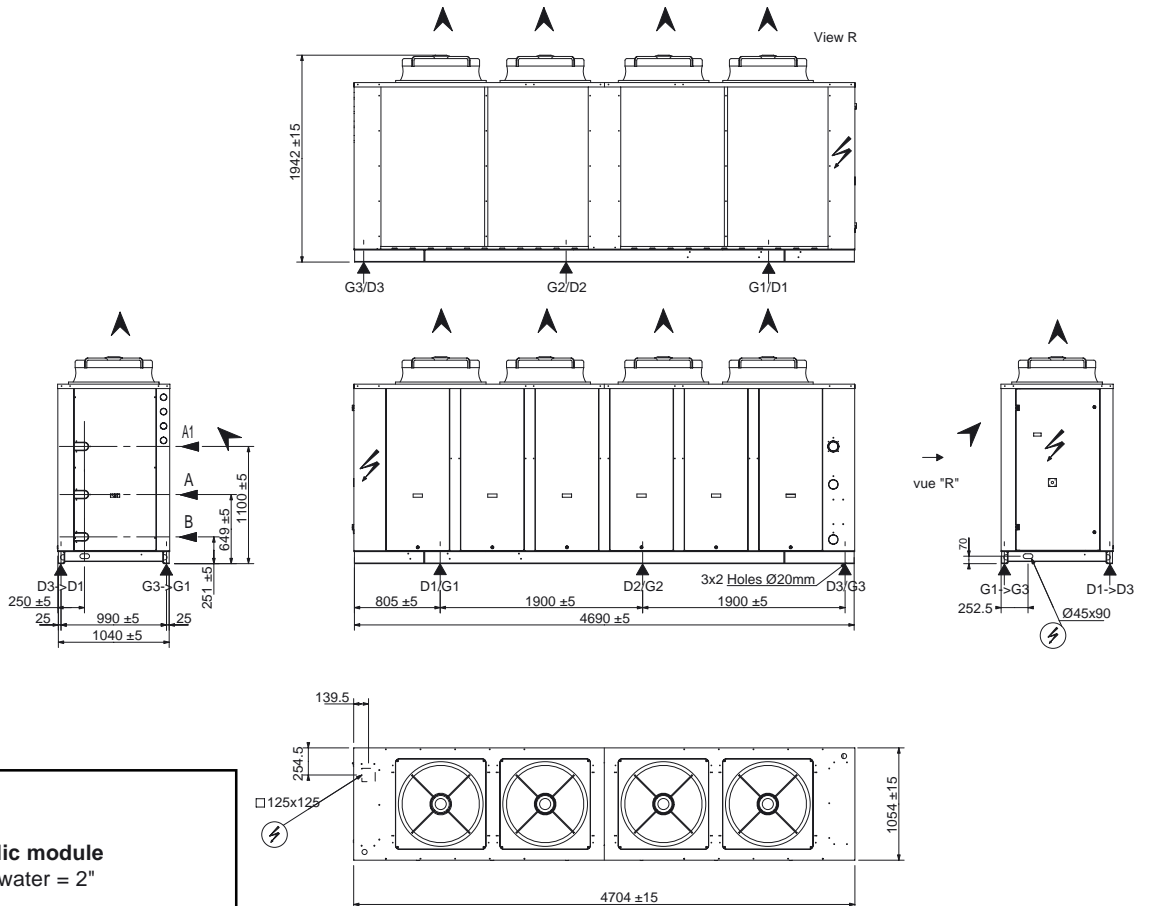
Lennox recommend load distribution as detailed above,

CLEARANCES

OVERHEAD OBSTRUCTIONS ARE NOT PERMITTED



DIMENSIONAL DATA



WAH 150D

- **Without hydraulic module**
A/B : Inlet/outlet water = 2"
- **With hydraulic module**
A1/B : Inlet/outlet water = 2" 1/2



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