

Data: May 2003

Supersedes: 507 B – 03/03 D

Air cooled screw chillers

ALS 081.2÷142.2 (*Energyplus*)

Standard Efficiency – Cooling capacity from 300 to 525 kW

High Efficiency – Cooling capacity from 323 to 546 kW

High Ambient – Cooling capacity from 318 to 540 kW

50Hz – Refrigerant: HFC 134a



McQuay[®]
International

New air cooled screw chillers McQuay ALS

McQuay International introduces their newest air cooled screw chillers equipped with new single screw compressors, the first in cooling capacity range 300 kW – 550 kW.

McQuay air cooled ALS are a new range of chillers using the last generation of McQuay Frame 3200 single screw compressors. They are manufactured by McQuay to satisfy the requirements of the consultants and the end user. McQuay ALS units are designed to minimise energy costs while maximising the refrigeration capacities. Once again McQuay has developed a line of chillers unsurpassed in performance and quality that will meet the most stringent requirements of comfort cooling, ice storage and process applications.

McQuay's chiller design experience, combined with outstanding features makes the ALS chiller unmatched in the industry.

Lower noise – higher flexibility

The McQuay original compressor design with a single screw and twin rotors allows a constant gas flow. This compression process completely eliminates gas pulsations.

The twin gas compressor discharge chambers are designed to act as attenuators, based on the harmonic wave principle with destructive interference, thus always resulting almost equal to zero. The extremely low noise compressor performance allows the use of ALS chiller for all applications.

The reduced level of vibrations produced from the ALS chillers offers a surprisingly quiet operation eliminating the noise transmission through the structure and the chilled water piping system.

Code requirements

All ALS units are designed and manufactured in accordance with applicable selections of the following which are equivalent to American Air-conditioning industry applicable codes:

Rating of chillers: EN 12055.

Construction of pressure vessel: TUV Standards (on request).

Electrical codes: IEC 204-1 CEI 44-5 Elect. & Safety Codes

Safety Codes: CEI-EN 60204–1 Codes.

Manufacturing Quality Stds: ISO 9001.

Infinitely variable capacity control

Cooling capacity control is infinitely variable by means of a capacity slide controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% to 12.5%. This modulation allows the compressor capacity to exactly match the building cooling load. The result is a decrease in chiller energy costs, particularly at the part-load conditions at which the chiller operates most of the time.

Additionally, in some case there should be the possibility to avoid inertial tank in the water circuit.

11 different lines

ALS 3200 line is available with two different efficiencies in order to satisfy every kind of requirements.

Acoustic flexibility up to 65 dBA thanks to different noise level versions:

- **SE Standard Efficiency**
 - **ST** Standard noise – 79,0 ÷ 80,0 dBA
 - **CN** Sound proof cabinet on compressors – 77,0 ÷ 78,0 dBA
 - **LN** Low noise – 75,0 ÷ 76,0 dBA
 - **XN** Extra low noise – 71,0 ÷ 72,0 dBA
 - **XXN** Super quiet – 65,0 dBA

- **XE High Efficiency with high COP**
 - **ST** Standard noise – 79,0 ÷ 80,0 dBA
 - **CN** Sound proof cabinet on compressors – 77,0 ÷ 78,0 dBA
 - **LN** Low noise – 75,0 ÷ 76,0 dBA
 - **XN** Extra low noise – 71,0 ÷ 72,0 dBA

HA High Ambient Applications (suitable for all high ambient application)

- **ST** Standard noise – 79,0 ÷ 80,0 dBA
- **CN** Sound proof cabinet on compressors – 77,0 ÷ 78,0 dBA

Noise version description

CN - The compressors are fitted inside a cabinet which is sound insulated with highly absorbent acoustic material.

LN – Condenser fans rotating at 700 rpm. No sound proof cabinet. Discharge flexible pipes.

XN – Version including sound proof cabinet, fans having 700 rpm and discharge flexible pipes.

XXN – Version including sound proof cabinet, fans having 500 rpm and discharge flexible pipes. Some sizes are equipped with oversized condensing section.

Unmatched serviceability

Field serviceability has not been sacrificed. Inspection covers allows visual inspection of the main screw and gaterotors.

Outstanding reliability features

Full factory testing of all the units ensures a trouble free start-up. Extensive test makes certain that each safety and operating control is properly adjusted, and operates correctly.

General characteristics

Cabinet and structure

The cabinet of ALS units is made of galvanized steel sheet and painted to provide a high resistance to corrosion. The unit base frame has holes to lift the unit with ropes for an easy installation. The weight is uniformly distributed along the profiles of the base and this facilitates the arrangement of the unit.

Screw compressors with integrated oil separator

The newest Stargate™ single-screw compressor (Frame 3200) has a well balanced compression mechanism which cancels the screw rotor load in both the radial and axial directions. Inherent to the basic single-screw compressor design is the virtually load-free operation, that gives main bearing design life of 3-4 times greater than twin-screws, and eliminates expensive and complicated thrust balancing schemes. The two exactly opposed gaterotors create two exactly opposed compression cycles. Compression is made at the lower and upper parts of the screw rotor at the same time, thus cancelling the radial loads. Also, both ends of the screw rotor are subjected to suction pressure only, which cancels the axial loads and eliminates the huge thrust loads inherent in twin-screw compressors.

Compressors are provided with an integrated high efficiency oil separator to maximise oil separation. Compressors have an infinitely variable capacity control down to 25% of its total capacity. This control is made by means of capacity slides controlled by microprocessors.

Standard start is star-delta type; Soft start type is available (as option) in order to have lower inrush current.

Ecological HFC 134a refrigerant

As the HCFC phase out will occur more quickly than currently legislated, the designers, owners and operators should only evaluate equipment using chlorine free refrigerants. McQuay has designed and optimized new Stargate™ compressors to operate with HFC 134a, ecological refrigerant with zero ODP (Ozone Depletion Potential) and very low GWP (Global Warming Potential) that means low TEWI (Total Equivalent Warming Impact).

Evaporator

The units is supplied with new optimised counter-flow evaporator single refrigerant pass. It is direct expansion with refrigerant inside the tubes and water outside (shell side) with carbon steel tube sheets, with straight copper tubes that are spirally wound internally for higher efficiencies, expanded on the tube plates. The external shell, is linked with an electrical heater to prevent freezing down to -28 °C ambient temperature, commanded by a thermostat and is covered with a closed cell insulation material. Each evaporator have 2 refrigerant circuits one for each compressor. Each evaporator is manufactured in accordance to PED approval.

Condenser coils

The new ALS units are constructed with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into McQuay lanced and rippled aluminium condenser fins with full fin collars. An integral subcooler circuit provides sub-cooling to effectively eliminate liquid flashing and increases in cooling capacity without increasing the power input.

Condenser coil fans

The condenser fans are helical type with wing-profile blades to achieve a better performance. The direct coupling with the electrical motor eliminates any problems with regard to the application of transmission devices reducing vibrations caused by the functioning. The three-phase type motors are supplied as standard with IP54 protection (Insulation class F); they are protected against overloading and short circuits by circuit breakers located inside the electrical control panel.

Electronic expansion valve

ALS air cooled chiller is equipped with the most advanced electronic expansion valve to achieve precise control of refrigerant mass flow. As today's system requires improved energy efficiency, tighter temperature control, wider range of operating conditions and incorporate new features like remote monitoring and diagnostics, the application of electronic expansion valves becomes mandatory. ALS's electronic expansion valve proposes features that makes it unique: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, highly linear flow capacity, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.

Electrical control panel

Power and control are located into two sections of the main panel that is manufactured to insure protection for all weather conditions.

The power panel is fitted with an interlocked door main isolator to prevent access while power supply is on. Electrical panel is IP54.

Power section includes - The power section includes contactors, all compressors fuses, fans circuit breaker (magneto-thermal), and control circuit transformer. Additional space is provided for an easy installation of the various optional accessories provided to enhance the ALS units capabilities.

Intelligent Compressor Start Mode

Control software includes an intelligent compressor start mode that is unloading the first compressor to 75% during the start of compressor n° 2, in order to reduce inrush current.

Certifications

All the ALS units are CE marked (89/392). McQuay Italia obtained ISO 9001 certification in 1997.

Water content in cooling circuits

The cooled water distribution circuits should have a minimum water content to avoid excessive compressors start and stop.

In fact, each time the compressor starts up, an excessive quantity of oil goes from the compressor sump and simultaneously there is a rise in the temperature of the compressor motor's stator due to the inrush current during the start-up. To prevent damage to the compressors, McQuay has envisaged the application of a device to limit frequent stops and restarts.

During the span of one hour there will be no more than 6 starts of the compressor. The plant side should therefore ensure that the overall water content allows a more constant functioning of the unit and consequently greater environmental comfort. The minimum installation water content envisaged should be calculated with a certain approximation using this simplified formula:

$$(1) \quad Q = 35,83 \times \frac{P \text{ (kW)}}{\Delta T \text{ (}^\circ\text{C)}} \times \frac{1}{N}$$

where:

Q = Minimum content of the plant expressed in litres

P = Cooling capacity of the plant expressed in kW

ΔT = Entering/leaving water temperature difference of the evaporator expressed in °C

N = Number of compressors.

For a more accurate determination of the quantity of water, it is advisable to contact the designer of the plant.

MicroTech II C Plus controller

MicroTech II C Plus controller is installed as standard on all the units; it can be used to modify unit set points and check control parameters. A display illustrates the machine's operating status, programmable values and setpoints e.g. temperatures, and pressures of fluids (water, refrigerant and air). Device controls maximise the McQuay chillers energy efficiency and reliability characteristics. It uses sophisticated software with predictive logic to select the most energy efficient combination of compressor, EEXV and condenser fan to keep stable operating conditions and maximise energy efficiency. The compressors are automatically rotated to ensure equal operating hours. MicroTech II protects critical components in response to external signals from its system sensors measuring: motor temperatures, refrigerant gas and oil pressures, correct phase sequence and evaporator.

Control section - main features:

- Management of the compressor capacity slide and fans modulation according to the distributed multiprocessor logic system
- Chillers enabled to work in partial failure condition thanks to the distributed multiprocessor logic system
- Full routine operation at condition of:
 - High ambient temperature value
 - High thermal load
 - High evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit
- Leaving water cooled temperature regulation. Temperature tolerance=0,1°C
- Compressors and evaporator/condenser pumps hours counter
- Display of Status Safety Devices
- Start up numbers and compressors working hours equalization
- Excellent management of compressors load
- Fans management according to condensing pressure
- Automatic re-start in case of power supply interruption (adjustable)
- Soft Load
- Return Reset
- AOT Reset
- Setpoint Reset
- Demand limit or Current limit (optional)
- Speedtrol control (optional)

Safety for each refrigerant circuit

High pressure (pressure switch)

Low pressure (pressure switch)

Oil differential pressure switch

Compressor thermal (optional)

Condensation fan Magneto-thermal

High Discharge Temperature on the compressor

Phase Monitor

Star / Delta Transition Failed

Low Delta Pressure between Suction and Discharge

- Low pressure ratio
- High oil pressure drop
- Low oil pressure

System security

- Phase monitor
- Freeze protection

Regulation type

Proportional + integral + derivative regulation on the leaving water evaporator output probe.

Condensation

The condensation can be carried out according to temperature or pressure. The fans can be managed according to ON/OFF mode or with a 0/10 V modulating signal or both (SPEEDTROL).

MicroTech II C Plus terminal

The MicroTech II C Plus terminal has following features:

- 4-lines by 20-character liquid crystal display back lighting
- Removable and remote key-pad
- Key-pad consisting of 15 keys “ clear language display ”
- Memory to protect the data
- General faults alarm relays
- 4-level password access to modify the setting
- Service report displaying all running hours and general conditions
- Alarm history memory to allow an easy fault analysis

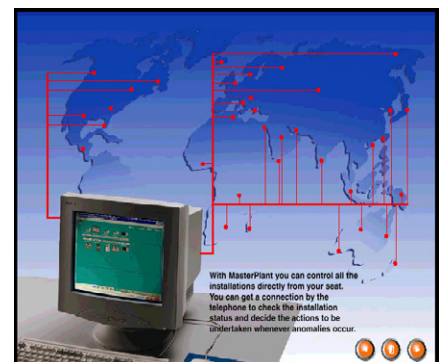
MicroPlant™:

Solution for: tele-maintenance and supervisory systems

MicroTech II can be monitored locally or via modem by MicroPlant™ supervision program, that runs on PC systems under Windows '95 – '98.

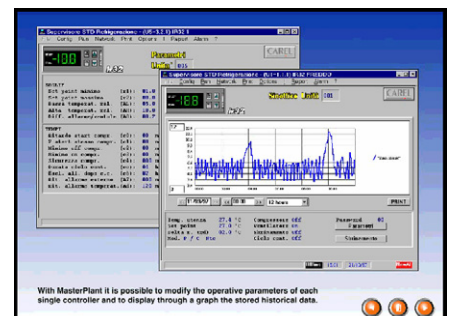
MicroPlant™ is the best solution:

- To centralise all the information in just one local and/or remote PC
- To check all the parameters for each unit connected
- Data logging of temperature - pressure
- Printouts of alarms, parameters and graphs
- To control several plants located in different geographical areas from a central station
- To manage the Service centers



MicroPlant™ allows:

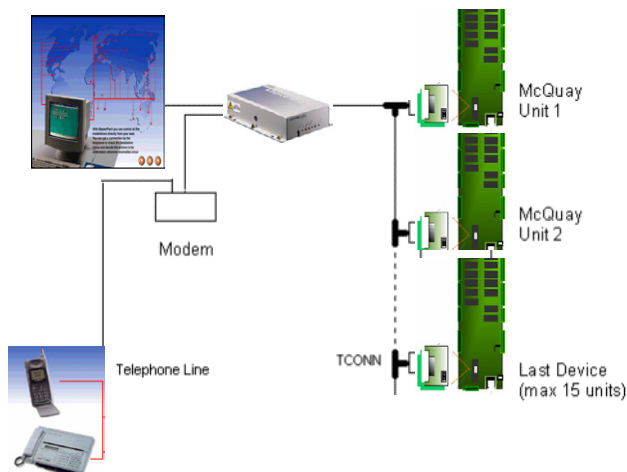
- Visualization of all working conditions for each controller
- Visualization of their graphics
- Display, print-out of the actual alarms
- Connection between local and remote computer via telephone line (Modem)
- unit ON/OFF
- Set-Point change



MicroTech II C Plus remote control

Compatibility with supervisory systems is becoming increasingly important in HVAC. MicroTech II C Plus allows easy interfacing with BMS (Building Management Systems), the external world that can be:

- Full compatible Siemens, Johnson;
- Every MODBUS compatible system; (Satchwell, Honeywell)
- BacNet point to point, ECHELON FTT10. (available on request)



Standard Accessories (furnished on basic unit)

Star Delta Compressors starter – For low inrush current and reduced starting torque.

Phase monitor – The phase monitor controls that phases sequence is correct and controls phase loss

Evaporator electric heater – Electric heater controlled by a thermostat to protect the evaporator from freezing down to -28°C ambient temperature.

Evaporator connection water side Victaulic – Hydraulic joint with gasket for an easy and quick water connection.

General fault relay – Contactor for the alarm warning.

Brine double set point version (CB) - Dual leaving glycol mixture temperature setpoints. The lower setpoint can go down to -8°C.

Discharge line shut off valves – Installed on the discharge port of the compressor.

External high static pressure fans – For all the applications where a higher fans lift is required (not available for XXN version – see table 8 and 9, pag.11). This feature is valid only when fans run at full speed.

Alarm from external device – Microprocessor is able to receive an alarm signal from an external device (pump etc...). User can decide if this alarm signal will stop or not the unit.

Options (on request)

100% total heat recovery R – Realized with shell and tube heat exchangers to produce hot water up to 55°C. The heat exchangers are mounted on the refrigerant circuits parallel to the condenser coils to remove all the condensation heat. With this option the length of units equipped with 4,6 and 8 fans must be increased of 1250mm. For units equipped with 10 fans the length remains unchanged.

25% partial heat recovery D – Produced with plate to plate heat exchangers installed between the compressor discharge and the condenser coil. These allow hot water to be produced up to a maximum temperature of 55°C.

Compressor thermal overload relays - Safety devices against compressor motor overloading in addition to the normal protection envisaged by the electrical windings.

Ammeter and voltmeter - Digital meters of unit drawn amperes and voltage values, installed on the electrical control panel.

Condenser power factor correction - Installed on the electrical control panel to ensure it conforms to the plant rules. (McQuay advices maximum 0,9).

Absorbed Current Limit / Display – This options allows to monitor the chiller absorbed current with possibility to set a limit value. This option excludes the Demand Limit.

250 Pa lift fans – For all the applications where a higher fans lift is required (not available for LN, XN and XXN version).(Fan speed controller not available with this option)

Fan speed control device - This device allows the continuous variation of the fan speed, modifying the air flow according to the external temperature conditions. It allows the unit working with air temperature down to -18°C .

Speedtrol – Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to -20°C .

Fan Silent Mode - The microprocessor clock switches the fan at low speed according to the client setting (i.e. Night & Day), providing that the ambient temperature/condensing pressure is allowing the speed change. It allows a perfect condensing control down to -18°C

Condenser coil guards - Metal protection guards fixed on all the external surface of the condenser coils.

Evaporator area guards – Metal protection guards around evaporator area.

Cu-Cu condensing coils - To give better protection against corrosion by aggressive environments.

Cu-Cu-Sn condensing coils - To give better protection against corrosion in aggressive environments and by salty air.

Alucoat condensing coils - Fins are protected by a special acrylic paint with a high resistance to corrosion.

Flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).

Suction line shut off valve – Suction shut-off valve installed on the suction port of the compressor to facilitate maintenance operation.

Spreader bars - Facilitate the lifting of the units keeping the ropes away from the unit's casing.

Under/Over Voltage – This device control the voltage value and stop the chiller when this exceeds limits set by customer.

Rubber type antivibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal to reduce the vibrations when the unit is floor mounted.

Spring type antivibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

Soft start – Electronic starting device to reduce inrush current and to start compressors gradually, with very low mechanical stress. An overload protection is included (no need of compressors thermal relays).

Witness tests - Every unit is always tested at the test bench prior to the shipment. On request, a second test can be carried out, at customer's presence, in accordance with the procedures indicated on the test form. (Not available for units with Glycol mixtures).

Water circulation pump – The pump is unit mounted for chillers with 6,8 and 10 fans. Hydronic kit consists of: one centrifugal pump direct driven, expansion tank, water feed circuit with pressure gauge, safety valve. The pump motor is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. About units with 4 fans (ALS 081.2 SE ST / CN – ALS 081.2 SE LN / XN) pump is mounted on a metal base frame (1000 x 1000 mm) placed on unit shorter side (that without panel control). See pag. 28 for more information.

Two water circulation pumps – Pumps units are unit mounted for chillers with 6,8 and 10 fans. Hydronic kit consists of: two centrifugal pumps direct driven, expansion tank, water feed circuit with pressure gauge, safety valve, check valves, shut-off valves. The pumps motors are protected by circuit breakers installed in control panel. The kit is assembled and wired to the control panel. About units with 4 fans (ALS 081.2 SE ST / CN – ALS 081.2 SE LN / XN) pumps are mounted on a metal base frame (1000 x 1000 mm) placed on unit shorter side (that without panel control). See pag. 28 for more information.

Installation notes

Handling

Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base, and block the pushing vehicle away from the unit to prevent damage to the cabinet. Never allow the unit fall during unloading or moving as this may result in serious damage. To lift the unit, holes are provided in the base of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location

The ALS units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and

perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table. When the units are positioned in areas which are easily accessible by persons or animals, it is advisable to fit guards to protect the condenser coil guards and, when necessary, also guards to protect the evaporator area.

Space requirements

The ALS units are air-cooled, hence it is important to observe the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.

To determine unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation.

Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity. The ALS chiller performance is less affected in poor air flow situations because of its special condensing coil geometry.

Moreover McQuay's unique microprocessor has the ability to calculate the operating environment of the chiller and the capacity to optimize its performance staying on-line during abnormal conditions.

Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.

Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.

If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (fig.4). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. Once again, the microprocessor will allow the chiller to stay on line, producing the maximum available capacity, even at less than recommended lateral clearances.

When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (fig.3); strong wind could be the cause of air warm recirculation.

For other installation solutions, consult McQuay technicians.

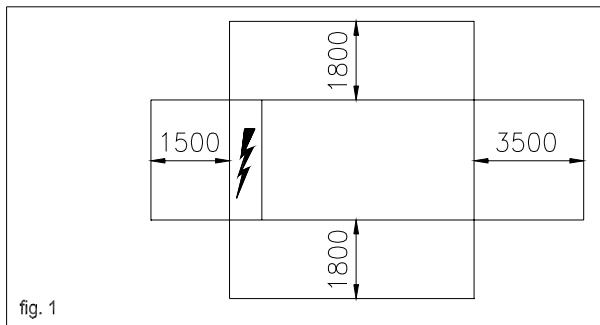


fig. 1

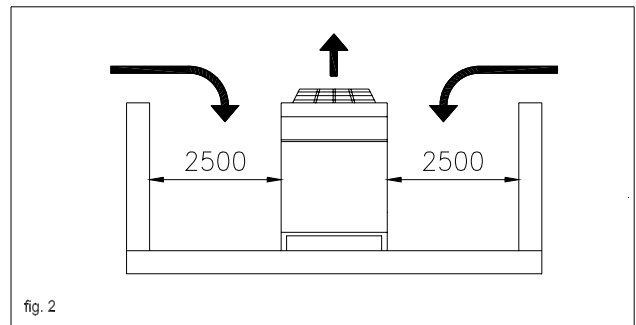


fig. 2

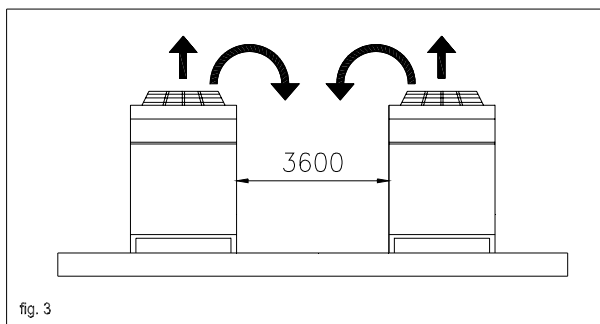


fig. 3

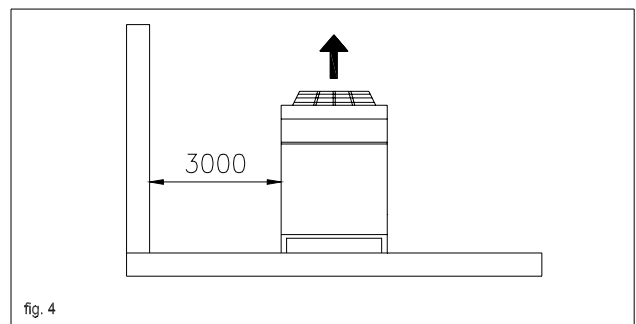


fig. 4

Acoustic protection

The low noise levels of the ALS units means that they meet the most restrictive regulations, thanks to the availability of four versions with different sound levels. When the noise level must meet special requirements it will be necessary to pay the maximum attention to ensure the perfect insulation of the unit from the support base by applying appropriate vibration-dampening devices, applying vibration-dampening mounts on the water pipes and on the electrical connections.

Table 1 – Operating limits – ALS SE

Unit version		ST/CN	LN	XN	XXN
Max ambient temperature	°C	+ 45	+ 40	+ 40	+ 40
Min ambient temperature (1)	°C	+ 10	+ 5	+ 5	+ 5
Max entering evaporator water temperature	°C	+ 20	+ 20	+ 20	+ 20
Min leaving evap. water temp.(without glycol)	°C	+ 4	+ 4	+ 4	+ 4
Min leaving evap. water temp.(with glycol)	°C	- 8	- 8	- 8	- 8
Max evaporator ΔT	°C	8	8	8	8
Min evaporator ΔT	°C	4	4	4	4

Note: (1) When air temperature is lower than +10°C (ST – CN) or +5°C (LN – XN – XXN) you need the fan speed control device. It allows the unit working with air temperature down to -18°C.

Table 2 – Operating limits – ALS XE

Unit version		ST/CN	LN	XN
Max ambient temperature	°C	+ 50	+ 45	+ 45
Min ambient temperature (1)	°C	+ 10	+ 5	+ 5
Max entering evaporator water temperature	°C	+ 20	+ 20	+ 20
Min leaving evap. water temp.(without glycol)	°C	+ 4	+ 4	+ 4
Min leaving evap. water temp.(with glycol)	°C	- 8	- 8	- 8
Max evaporator ΔT	°C	8	8	8
Min evaporator ΔT	°C	4	4	4

Note: (1) When air temperature is lower than +10°C (ST – CN) or +5°C (LN – XN) you need the fan speed control device. It allows the unit working with air temperature down to -18°C.

Table 3 – Operating limits – ALS HA

Unit version		ST/CN
Max ambient temperature	°C	+ 50
Min ambient temperature	°C	+ 10
Max entering evaporator water temperature	°C	+ 20
Min leaving evap. water temp.(without glycol)	°C	+ 4
Min leaving evap. water temp.(with glycol)	°C	- 8
Max evaporator ΔT	°C	8
Min evaporator ΔT	°C	4

Table 4 – Evaporator fouling factors

Fouling factors m ² °C / kW	Cooling capacity correction factor	Power input correction factor	COP correction factor
0,0176	1,000	1,000	1,000
0,0440	0,978	0,986	0,992
0,0880	0,957	0,974	0,983
0,1320	0,938	0,962	0,975

Table 5 – Altitude correction factors

Elvation above sea level (m)	0	300	600	900	1200	1500	1800
Barometric pressure (mbar)	1013	977	942	908	875	843	812
Cooling cap.correction factor	1,000	0,993	0,986	0,979	0,973	0,967	0,960
Power input correction factor	1,000	1,005	1,009	1,015	1,021	1,026	1,031

Table 6 – Ethylene glycol and low ambient temperature correction factors

Air ambient temperature °C	-3	-8	-15	-23	-35
% of ethylene glycol by weight	10	20	30	40	50
Cooling capacity correction factor	0,991	0,982	0,972	0,961	0,946
Power input correction factor	0,996	0,992	0,986	0,976	0,966
Flow rate correction factor	1,013	1,040	1,074	1,121	1,178
Water pressure drops correction factor	1,070	1,129	1,181	1,263	1,308

Table 7 – Low temperature operation performance factors

Ethylene glycol/water leaving temperature °C	2	0	-2	-4	-6	-8
Max air ambient temperature °C (SE-ST)	40	39	38	37	36	35
Max air ambient temperature °C (XE-ST)	44	43	42	41	40	39
Cooling capacity correction factor	0,842	0,785	0,725	0,670	0,613	0,562
Power input compressors correction factor	0,95	0,94	0,92	0,89	0,87	0,84
Min. % of ethylene glycol	10	20	20	30	30	30

Low temperature operation performance factors must be applied to the nominal performance data to have the adjusted value (12/7°C, design ambient temperature).

Performance Correction Factor for External High Static Pressure Application

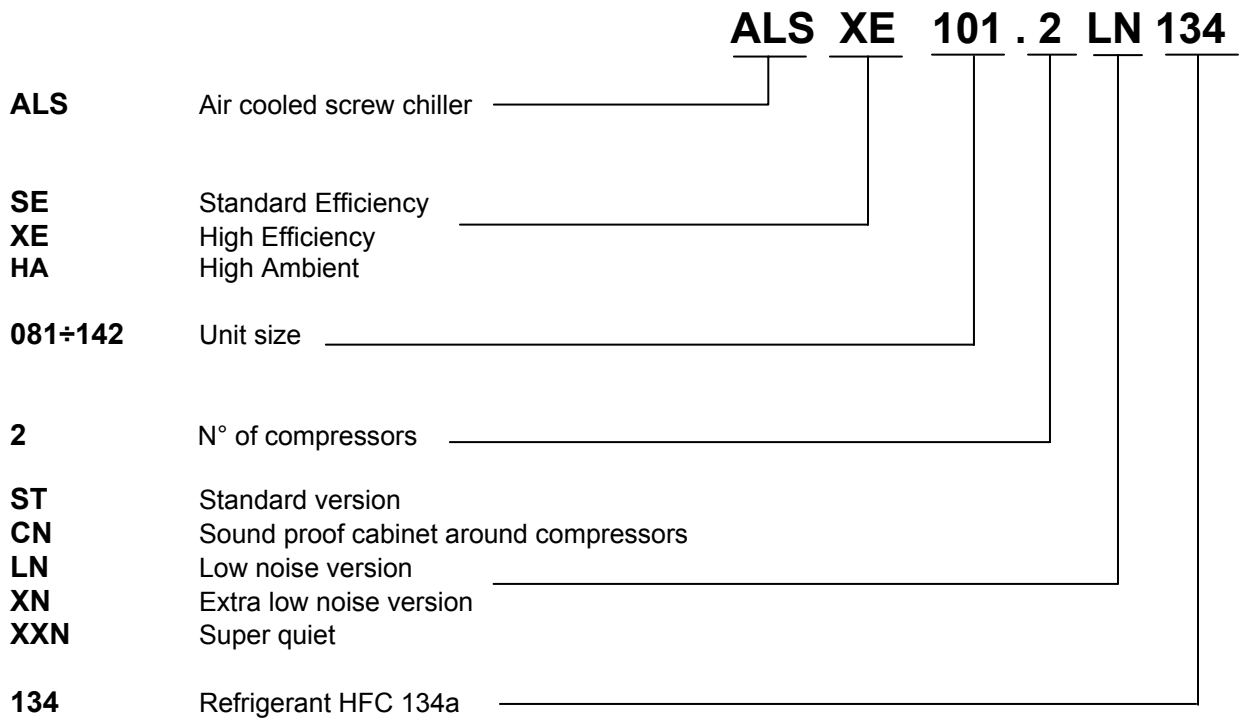
Table 8 – Correction Factor for ALS Unit ST / CN version (SE & XE & HA) with fan 80CC/6/7 900 RPM

External static pressure	10	20	30	40	50	60	70	80	90	100	120	Pa
Cooling capacity	0.997	0.993	0.990	0.985	0.981	0.976	0.972	0.966	0.961	0.953	0.935	
Power input	1,004	1.007	1,012	1,016	1,020	1,025	1,031	1,036	1,042	1,050	1,068	
MAX allowed Ambient Temperature (SE)	44,7	44,5	44,1	43,8	43,4	43,0	42,6	42,2	41,7	41,1	39,6	°C
MAX allowed Ambient Temperature (XE)	49,7	49,5	49,1	48,8	48,4	48,0	47,6	47,2	46,7	46,1	44,6	°C

Table 9 – Correction Factor for ALS Unit LN / XN version (SE & XE) with fan 80CC/6/7 700 RPM

External static pressure	10	20	30	40	50	60	Pa
Cooling capacity	0.992	0.982	0,972	0,961	0,948	0,935	
Power input	1,008	1,017	1,026	1,036	1,047	1,059	
MAX allowed Ambient Temperature (SE)	40,4	39,7	38,9	38,0	37,0	35,8	°C
MAX allowed Ambient Temperature (XE)	45,4	44,7	43,9	43,0	42,0	40,8	°C

Nomenclature



Physical data ALS SE ST / CN HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Cooling capacity (1)	kW	301,1	347,0	370,7	408,0	452,0	524,8
Power input (1)	kW	114,6	117,5	131,1	147,2	164,4	173,4
COP		2,63	2,95	2,83	2,77	2,75	3,02
McQuay Screw compressors	No.	2	2	2	2	2	2
Refrigerant circuits	No.	2	2	2	2	2	2
Refrigerant charge HFC 134a	kg	70	70	80	80	100	100
Oil charge	l	20	20	20	20	20	20
Min % of capacity reduction	%	12,5%	12,5%	12,5%	12,5%	12,5%	12,5%

Condenser fans

No. of fans / nominal power fan	kW	4 / 1,6	6 / 1,6	6 / 1,6	6 / 1,6	6 / 1,6	8 / 1,6
Fan speed	rpm	900	900	900	900	900	900
Diameter	mm	800	800	800	800	800	800
Total air flow	m ³ /s	21,7	33,8	33,8	33,2	32,6	45,0

Evaporator

Evaporators / water volume	No./l	1 / 198	1 / 181	1 / 181	1 / 181	1 / 227	1 / 273
Max operating pressure	bar	10,5	10,5	10,5	10,5	10,5	10,5
Water connection diameter	mm	139,7	139,7	139,7	139,7	139,7	139,7

Condenser coil

Coil type	Lanced fins – Internally spiral wound tubes						
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Weight and dimensions

Standard unit shipping weight	kg	3250	3515	3515	3515	3565	3895
Standard unit shipping weight (CN)	kg	3510	3775	3775	3775	3825	4195
Standard unit operating weight	kg	3448	3696	3696	3696	3792	4168
Standard unit operating weight (CN)	kg	3708	3956	3956	3956	4052	4468
Unit length	mm	2790	3460	3460	3460	3460	4355
Unit width	mm	2225	2225	2225	2225	2225	2225
Unit height	mm	2500	2500	2500	2500	2500	2500

Note: (1) Nominal cooling capacity and power input are based on: 12/7 °C entering/leaving evaporator water temperature; 35°C ambient temperature. The power input is for compressor only.

Electrical data ALS SE ST / CN HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Standard voltage (1)		400 V – 3ph – 50 Hz					
Nominal unit current (2)	A	201	205	223	247	270	285
Max compressor current (3)	A	241	247	273	304	335	369
Fans current	A	16	24	24	24	24	32
Max unit current (3)	A	257	271	297	328	359	401
Max unit inrush current (4)	A	402	405	419	419	436	450
Max unit current for wires sizing (5)	A	282	318	338	368	398	414

- Notes: (1) Allowed voltage tolerance $\pm 10\%$. Voltage unbalance between phases must be within $\pm 3\%$.
 (2) Nominal current are based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.
 (3) Maximum current are based on: 15/10 °C entering/leaving evaporator water temperature and 45°C ambient temp.
 (4) Inrush current of biggest compressor + 75% of nominal absorbed current of the other compressor (see pag. 4 "Intelligent Start Compressor Mode") + fans current.
 (5) Compressor FLA + fans current.

Physical data ALS SE LN / XN HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Cooling capacity (1)	kW	287,4	337,3	359,4	402,7	433,2	512,6
Power input (1)	kW	123,0	123,7	138,6	158,8	176,5	186,1
COP		2,34	2,73	2,59	2,54	2,45	2,75
McQuay Screw compressors	No.	2	2	2	2	2	2
Refrigerant circuits	No.	2	2	2	2	2	2
Refrigerant charge HFC 134a	kg	70	70	80	80	100	100
Oil charge	l	20	20	20	20	20	20
Min % of capacity reduction	%	12.5%	12.5%	12.5%	12.5%	12.5%	12,5%

Condenser fans

No. of fans / nominal power fan	kW	4 / 1	6 / 1	6 / 1	6 / 1	6 / 1	8 / 1
Fan speed	rpm	700	700	700	700	700	700
Diameter	mm	800	800	800	800	800	800
Total air flow	m ³ /s	17,3	27	27	26,5	25,9	36,0

Evaporator

Evaporators / water volume	No./l	1 / 198	1 / 181	1 / 181	1 / 181	1 / 227	1 / 273
Max operating pressure	bar	10,5	10,5	10,5	10,5	10,5	10,5
Water connection diameter	mm	139,7	139,7	139,7	139,7	139,7	139,7

Condenser coil

Coil type	Lanced fins – Internally spiral wound tubes						
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Weight and dimensions

Standard unit shipping weight	kg	3250	3515	3515	3515	3565	3895
Standard unit shipping weight (XN)	kg	3510	3775	3775	3775	3825	4195
Standard unit operating weight	kg	3448	3696	3696	3696	3792	4168
Standard unit operating weight (XN)	kg	3708	3956	3956	3956	4052	4468
Unit length	mm	2790	3460	3460	3460	3460	4355
Unit width	mm	2225	2225	2225	2225	2225	2225
Unit height	mm	2500	2500	2500	2500	2500	2500

Note: (1) Nominal cooling capacity and power input are based on: 12/7 °C entering/leaving evaporator water temperature; 35°C ambient temperature. The power input is for compressor only.

Electrical data ALS SE LN / XN HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Standard voltage (1)		400 V – 3ph – 50 Hz					
Nominal unit current (2)	A	212	213	234	262	288	304
Max compressor current (3)	A	237	239	264	297	328	354
Fans current	A	9	14	14	14	14	18
Max unit current (3)	A	246	252	277	311	342	372
Max unit inrush current (4)	A	400	397	413	413	433	443
Max unit current for wires sizing (5)	A	275	308	328	358	388	400

Notes: (1) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(2) Nominal current are based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current are based on: 15/10 °C entering/leaving evaporator water temperature and 40°C ambient temp.

(4) Inrush current of biggest compressor + 75% of nominal absorbed current of the other compressor (see pag. 4 "Intelligent Start Compressor Mode") + fans current.

(5) Compressor FLA + fans current.

Physical data ALS SE XXN HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Cooling capacity (1)	kW	294,1	330,7	363,3	409,5	447,8	516,9
Power input (1)	kW	118,6	127,7	136,0	149,4	161,5	189,0
COP		2,48	2,59	2,67	2,74	2,77	2,74
McQuay Screw compressors	No.	2	2	2	2	2	2
Refrigerant circuits	No.	2	2	2	2	2	2
Refrigerant charge HFC 134a	kg	70	70	80	80	100	100
Oil charge	l	20	20	20	20	20	20
Min % of capacity reduction	%	12.5%	12.5%	12.5%	12.5%	12.5%	12,5%

Condenser fans

No. of fans / nominal power fan	kW	6 / 0,74	7 / 0,74	8 / 0,74	9 / 0,74	10 / 0,74	10 / 0,74
Fan speed	rpm	500	500	500	500	500	500
Diameter	mm	800	800	800	800	800	800
Total air flow	m ³ /s	19,3	22,5	25,7	26,3	26,9	32,1

Evaporator

Evaporators / water volume	No./l	1 / 192	1 / 192	1 / 190	1 / 225	1 / 221	1 / 265
Max operating pressure	bar	10,5	10,5	10,5	10,5	10,5	10,5
Water connection diameter	mm	139,7	139,7	139,7	139,7	139,7	139,7

Condenser coil

Coil type	Lanced fins – Internally spiral wound tubes						
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Weight and dimensions

Standard unit shipping weight	kg	3720	4000	4110	4335	4435	4535
Standard unit operating weight	kg	3912	4192	4300	4560	4656	4800
Unit length	mm	3460	4355	4355	5255	5255	5255
Unit width	mm	2225	2225	2225	2225	2225	2225
Unit height	mm	2500	2500	2500	2500	2500	2500

Note: (1) Nominal cooling capacity and power input are based on: 12/7 °C entering/leaving evaporator water temperature; 35°C ambient temperature. The power input is for compressor only.

Electrical data ALS SE XXN HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Standard voltage (1)		400 V – 3ph – 50 Hz					
Nominal unit current (2)	A	207	220	232	255	274	309
Max compressor current (3)	A	231	247	261	288	310	361
Fans current	A	9	11	12	14	15	15
Max unit current (3)	A	240	257	273	301	325	376
Max unit inrush current (4)	A	398	400	410	413	429	442
Max unit current for wires sizing (5)	A	271	295	318	352	385	385

Notes: (1) Allowed voltage tolerance $\pm 10\%$. Voltage unbalance between phases must be within $\pm 3\%$.

(2) Nominal current are based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current are based on: 15/10 °C entering/leaving evaporator water temperature and 40°C ambient temp.

(4) Inrush current of biggest compressor + 75% of nominal absorbed current of the other compressor (see pag. 4 "Intelligent Start Compressor Mode") + fans current.

(5) Compressor FLA + fans current.

Physical data ALS XE ST / CN HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Cooling capacity (1)	kW	323,2	366,0	392,6	456,4	491,6	546,2
Power input (1)	kW	103,8	115,4	128,8	135,1	150,5	158,7
COP		3,11	3,17	3,05	3,38	3,27	3,44
McQuay Screw compressors	No.	2	2	2	2	2	2
Refrigerant circuits	No.	2	2	2	2	2	2
Refrigerant charge HFC 134a	kg	70	70	80	80	100	100
Oil charge	l	20	20	20	20	20	20
Min % of capacity reduction	%	12,5%	12,5%	12,5%	12,5%	12,5%	12,5%

Condenser fans

No. of fans / nominal power fan	kW	6 / 1,6	6 / 1,6	6 / 1,6	8 / 1,6	8 / 1,6	10 / 1,6
Fan speed	rpm	900	900	900	900	900	900
Diameter	mm	800	800	800	800	800	800
Total air flow	m ³ /s	33,8	32,6	32,6	46,7	46,7	56,3

Evaporator

Evaporators / water volume	No./l	1 / 181	1 / 227	1 / 227	1 / 205	1 / 205	1 / 265
Max operating pressure	bar	10,5	10,5	10,5	10,5	10,5	10,5
Water connection diameter	mm	139,7	139,7	139,7	139,7	139,7	139,7

Condenser coil

Coil type	Lanced fins – Internally spiral wound tubes						
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Weight and dimensions

Standard unit shipping weight	kg	3515	3565	3565	3855	3855	4235
Standard unit shipping weight (CN)	kg	3775	3825	3825	4155	4155	4535
Standard unit operating weight	kg	3696	3792	3792	4060	4060	4500
Standard unit operating weight (CN)	kg	3956	4052	4052	4360	4360	4800
Unit length	mm	3460	3460	3460	4355	4355	5255
Unit width	mm	2225	2225	2225	2225	2225	2225
Unit height	mm	2500	2500	2500	2500	2500	2500

Note: (1) Nominal cooling capacity and power input are based on: 12/7 °C entering/leaving evaporator water temperature; 35°C ambient temperature. The power input is for compressor only.

Electrical data ALS XE ST / CN HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Standard voltage (1)		400 V – 3ph – 50 Hz					
Nominal unit current (2)	A	186	202	219	235	259	262
Max compressor current (3)	A	239	262	290	313	348	378
Fans current	A	24	24	24	32	32	40
Max unit current (3)	A	263	286	314	345	380	418
Max unit inrush current (4)	A	405	404	417	422	440	449
Max unit current for wires sizing (5)	A	298	318	338	384	414	430

Notes: (1) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(2) Nominal current are based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current are based on: 15/10 °C entering/leaving evaporator water temperature and 50°C ambient temp.

(4) Inrush current of biggest compressor + 75% of nominal absorbed current of the other compressor (see pag. 4 "Intelligent Start Compressor Mode") + fans current.

(5) Compressor FLA + fans current.

Physical data ALS XE LN / XN HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Cooling capacity (1)	kW	315,1	354,8	379,5	444,9	478,2	537,1
Power input (1)	kW	108,7	122,0	136,6	141,5	158,3	168,1
COP		2,90	2,91	2,78	3,14	3,02	3,19
McQuay Screw compressors	No.	2	2	2	2	2	2
Refrigerant circuits	No.	2	2	2	2	2	2
Refrigerant charge HFC 134a	kg	70	70	80	80	100	100
Oil charge	l	20	20	20	20	20	20
Min % of capacity reduction	%	12,5%	12,5%	12,5%	12,5%	12,5%	12,5%

Condenser fans

No. of fans / nominal power fan	kW	6 / 1	6 / 1	6 / 1	8 / 1	8 / 1	10 / 1
Fan speed	rpm	700	700	700	700	700	700
Diameter	mm	800	800	800	800	800	800
Total air flow	m ³ /s	33,8	32,6	32,6	46,7	46,7	45,1

Evaporator

Evaporators / water volume	No./l	1 / 181	1 / 227	1 / 227	1 / 205	1 / 205	1 / 265
Max operating pressure	bar	10,5	10,5	10,5	10,5	10,5	10,5
Water connection diameter	mm	139,7	139,7	139,7	139,7	139,7	139,7

Condenser coil

Coil type	Lanced fins – Internally spiral wound tubes						
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Weight and dimensions

Standard unit shipping weight	kg	3515	3565	3565	3855	3855	4235
Standard unit shipping weight (XN)	kg	3775	3825	3825	4155	4155	4535
Standard unit operating weight	kg	3696	3792	3792	4060	4060	4500
Standard unit operating weight (XN)	kg	3956	4052	4052	4360	4360	4800
Unit length	mm	3460	3460	3460	4355	4355	5255
Unit width	mm	2225	2225	2225	2225	2225	2225
Unit height	mm	2500	2500	2500	2500	2500	2500

Note: (1) Nominal cooling capacity and power input are based on: 12/7 °C entering/leaving evaporator water temperature; 35°C ambient temperature. The power input is for compressor only.

Electrical data ALS XE LN / XN HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Standard voltage (1)		400 V – 3ph – 50 Hz					
Nominal unit current (2)	A	193	211	230	245	271	277
Max compressor current (3)	A	230	254	282	300	335	357
Fans current	A	14	14	14	18	18	23
Max unit current (3)	A	244	268	296	319	354	380
Max unit inrush current (4)	A	397	396	411	412	431	438
Max unit current for wires sizing (5)	A	288	308	328	370	400	413

Notes: (1) Allowed voltage tolerance $\pm 10\%$. Voltage unbalance between phases must be within $\pm 3\%$.

(2) Nominal current are based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current are based on: 15/10 °C entering/leaving evaporator water temperature and 45°C ambient temp.

(4) Inrush current of biggest compressor + 75% of nominal absorbed current of the other compressor (see pag. 4 "Intelligent Start Compressor Mode") + fans current.

(5) Compressor FLA + fans current.

Physical data ALS HA HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Cooling capacity (1)	kW	318,3	353,1	378,0	444,2	477,5	539,6
Power input (1)	kW	103,0	113,6	126,6	133,5	148,6	158,0
COP		3,09	3,11	2,99	3,33	3,21	3,42
McQuay Screw compressors	No.	2	2	2	2	2	2
Refrigerant circuits	No.	2	2	2	2	2	2
Refrigerant charge HFC 134a	kg	70	70	80	80	100	100
Oil charge	l	20	20	20	20	20	20
Min % of capacity reduction	%	12,5%	12,5%	12,5%	12,5%	12,5%	12,5%

Condenser fans

No. of fans / nominal power fan	kW	6 / 1,6	6 / 1,6	6 / 1,6	8 / 1,6	8 / 1,6	10 / 1,6
Fan speed	rpm	900	900	900	900	900	900
Diameter	mm	800	800	800	800	800	800
Total air flow	m ³ /s	33,8	32,6	32,6	46,7	46,7	56,3

Evaporator

Evaporators / water volume	No./l	1 / 181	1 / 227	1 / 227	1 / 205	1 / 205	1 / 265
Max operating pressure	bar	10,5	10,5	10,5	10,5	10,5	10,5
Water connection diameter	mm	139,7	139,7	139,7	139,7	139,7	139,7

Condenser coil

Coil type	Lanced fins – Internally spiral wound tubes						
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Weight and dimensions

Standard unit shipping weight	kg	3515	3565	3565	3855	3855	4235
Standard unit operating weight	kg	3696	3792	3792	4060	4060	4500
Unit length	mm	3460	3460	3460	4355	4355	5255
Unit width	mm	2225	2225	2225	2225	2225	2225
Unit height	mm	2500	2500	2500	2500	2500	2500

Note: (1) Nominal cooling capacity and power input are based on: 12/7 °C entering/leaving evaporator water temperature; 35°C ambient temperature. The power input is for compressor only.

Electrical data ALS HA HFC 134a

ALS Unit Size		081.2	094.2	101.2	114.2	125.2	142.2
Standard voltage (1)		400 V – 3ph – 50 Hz					
Nominal unit current (2)	A	186	200	217	232	255	261
Max compressor current (3)	A	238	261	288	310	344	376
Fans current	A	24	24	24	32	32	40
Max unit current (3)	A	262	285	312	342	376	416
Max unit inrush current (4)	A	405	404	416	422	439	449
Max unit current for wires sizing (5)	A	298	318	338	384	414	430

Notes: (1) Allowed voltage tolerance $\pm 10\%$. Voltage unbalance between phases must be within $\pm 3\%$.

(2) Nominal current are based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current are based on: 15/10 °C entering/leaving evaporator water temperature and 50°C ambient temp.

(4) Inrush current of biggest compressor + 75% of nominal absorbed current of the other compressor (see pag. 4 "Intelligent Start Compressor Mode") + fans current.

(5) Compressor FLA + fans current.

Sound pressure level ALS SE, XE, HA ST

ALS Unit size	Sound pressure level at 1 m from the unit in free field (rif. 2×10^{-5} Pa)								
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
081.2	64,8	73,6	71,7	78,6	71,5	73,0	60,2	52,0	79,0
094.2	65,0	73,8	71,8	78,5	71,6	73,1	60,5	51,8	79,0
101.2	64,9	73,7	71,9	78,8	71,3	72,9	60,6	52,5	79,0
114.2	65,2	74,0	72,0	79,3	71,7	73,3	60,9	53,0	79,5
125.2	66,0	74,5	72,8	79,8	71,9	73,9	61,8	54,0	80,0
142.2	65,8	74,4	73,0	79,7	72,0	74,0	61,9	54,5	80,0

Sound pressure level ALS SE, XE, HA CN

ALS Unit size	Sound pressure level at 1 m from the unit in free field (rif. 2×10^{-5} Pa)								
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
081.2	62,8	71,6	71,1	76,8	68,8	70,9	58,2	50,0	77,0
094.2	62,5	71,7	71,3	76,7	68,9	71,0	58,0	50,8	77,0
101.2	62,9	71,9	70,5	77,0	68,5	70,8	58,5	50,4	77,0
114.2	63,0	72,1	71,6	77,1	69,8	71,5	58,6	51,5	77,5
125.2	63,4	72,3	72,2	77,9	70,2	71,5	58,9	51,0	78,0
142.2	63,5	72,5	72,5	77,5	70,6	71,8	59,2	52,1	78,0

Sound pressure level ALS SE, XE, LN

ALS Unit size	Sound pressure level at 1 m from the unit in free field (rif. 2×10^{-5} Pa)								
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
081.2	55,8	66,2	67,0	74,8	66,4	69,4	54,7	46,3	75,0
094.2	56,0	66,7	67,5	75,1	66,8	70,1	55,0	46,7	75,5
101.2	56,2	66,9	67,4	75,0	66,9	70,2	55,1	47,0	75,5
114.2	56,3	66,5	67,5	75,2	66,5	70,3	55,0	47,1	75,5
125.2	56,5	66,9	67,9	75,7	67,0	70,6	55,5	47,5	76,0
142.2	56,8	70,0	67,7	75,5	67,3	70,7	55,7	48,0	76,0

Sound pressure level ALS SE, XE, XN

ALS Unit size	Sound pressure level at 1 m from the unit in free field (rif. 2×10^{-5} Pa)								
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
081.2	56,4	69,6	69,5	70,5	65,6	61,4	54,1	43,8	71,0
094.2	56,4	69,6	69,0	71,0	65,2	61,2	53,8	43,8	71,0
101.2	56,8	70,0	69,5	71,5	65,6	61,5	54,0	44,0	71,5
114.2	56,5	70,5	69,5	71,5	65,6	61,7	54,5	45,0	71,5
125.2	56,5	70,0	69,1	71,8	65,4	61,3	54,6	45,5	71,5
142.2	57,0	71,0	69,6	72,2	65,9	61,5	55,0	45,6	72,0

Sound pressure level ALS SE XXN

ALS Unit size	Sound pressure level at 1 m from the unit in free field (rif. 2×10^{-5} Pa)								
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
081.2	62,0	60,1	63,5	62,8	59,9	58,1	46,9	36,5	65,0
094.2	62,5	59,5	64,0	62,5	59,2	58,7	49,0	39,0	65,0
101.2	62,5	59,5	63,5	62,3	60,4	58,5	46,4	36,0	65,0
114.2	62,0	60,1	63,5	62,8	59,9	58,1	46,9	36,5	65,0
125.2	63,0	59,0	63,0	62,0	60,0	59,0	46,0	36,5	65,0
142.2	61,0	58,0	63,0	64,0	58,5	58,0	49,5	38,6	65,0

Note: Average sound pressure level rated in accordance to ISO 3744, free field semispheric conditions.

Note: Sound pressure levels are referred to ALS Units furnished without water pump.

Sound pressure level correction factor for different distances ALS SE ST, CN, LN, XN

ALS Unit size	Distance (m)					
	1	5	10	15	20	25
081.2	0	8,0	12,9	16,0	18,3	20,1
094.2	0	7,8	12,6	15,7	18,0	19,8
101.2	0	7,8	12,6	15,7	18,0	19,8
114.2	0	7,8	12,6	15,7	18,0	19,8
125.2	0	7,8	12,6	15,7	18,0	19,8
142.2	0	7,6	12,3	15,3	17,6	19,4

**Sound pressure level correction factor for different distances ALS XE ST, CN, LN, XN;
ALS HA ST, CN**

ALS Unit size	Distance (m)					
	1	5	10	15	20	25
081.2	0	7,8	12,6	15,7	18,0	19,8
094.2	0	7,6	12,3	15,3	17,6	19,4
101.2	0	7,6	12,3	15,3	17,6	19,4
114.2	0	7,3	12,0	15,0	17,2	19,0
125.2	0	7,3	12,0	15,0	17,2	19,0
142.2	0	7,3	12,0	15,0	17,2	19,0

Sound pressure level correction factor for different distances ALS SE XXN

ALS Unit size	Distance (m)					
	1	5	10	15	20	25
081.2	0	7,8	12,6	15,7	18,0	19,8
094.2	0	7,8	12,6	15,7	18,0	19,8
101.2	0	7,8	12,6	15,7	18,0	19,8
114.2	0	7,6	12,3	15,3	17,6	19,4
125.2	0	7,6	12,3	15,3	17,6	19,4
142.2	0	7,3	12,0	15,0	17,2	19,0

Note: The values reported in tables must be subtracted to those declared at 1 meter in free field semispheric conditions.

Standard ratings ALS SE 081.2 ÷ 142.2 ST, CN

ALS Unit size	Evaporator leaving water temp. (°C)	AIR AMBIENT TEMPERATURE - °C									
		25		30		35		40		45	
		Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)
081.2	4	304,6	90,4	290,2	99,7	275,1	109,9	259,1	121,2	242,1	133,7
	5	313,4	91,8	298,7	101,2	283,3	111,4	267,0	122,7	249,6	135,2
	6	322,5	93,3	307,4	102,7	291,7	113,0	275,0	124,3	257,3	136,7
	7	331,6	94,8	316,3	104,3	301,1	114,6	283,1	125,9	265,0	138,4
	8	340,8	96,4	325,2	105,9	308,7	116,2	291,3	127,6	272,8	140,1
	9	350,3	98,0	334,2	107,5	317,4	117,9	299,6	129,3	280,8	141,8
	10	359,7	99,6	343,4	109,2	326,1	119,7	308,1	131,1	288,9	143,6
094.2	4	349,3	92,7	333,7	102,4	317,3	112,9	300,2	124,6	282,1	137,5
	5	359,7	94,1	343,8	103,8	327,1	114,4	309,5	126,1	291,2	139,0
	6	370,3	95,5	354,1	105,3	336,9	115,9	319,1	127,6	300,3	140,5
	7	381,2	97,0	364,5	106,8	347,0	117,5	328,8	129,2	309,5	142,1
	8	392,0	98,5	375,0	108,3	357,2	119,0	338,5	130,8	318,9	143,7
	9	403,1	100,0	385,7	109,9	367,5	120,7	348,5	132,5	328,4	145,4
	10	414,3	101,5	396,5	111,5	378,0	122,3	358,6	134,2	338,1	147,1
101.2	4	374,3	103,4	357,3	114,2	339,6	126,0	321,0	139,1	301,4	153,6
	5	385,2	105,0	367,9	115,8	349,9	127,7	330,9	140,8	310,9	155,3
	6	396,5	106,6	378,7	117,5	360,3	129,4	340,8	142,5	320,5	157,0
	7	407,7	108,3	389,7	119,2	370,7	131,2	351,0	144,3	330,2	158,8
	8	419,3	110,0	400,8	121,0	381,5	133,0	361,3	146,1	340,1	160,6
	9	430,8	111,7	411,9	122,7	392,3	134,8	371,7	148,0	350,1	162,5
	10	442,6	113,5	423,4	124,6	403,2	136,7	382,2	149,9	360,2	164,4
114.2	4	412,9	116,0	393,9	128,0	374,0	141,3	353,1	156,1	331,2	172,5
	5	424,8	117,8	405,5	129,9	385,1	143,2	363,9	158,0	341,6	174,3
	6	437,0	119,6	417,3	131,8	396,6	145,1	374,9	159,9	352,0	176,3
	7	449,4	121,5	429,1	133,7	408,0	147,1	385,9	161,9	362,6	178,3
	8	461,9	123,4	441,3	135,7	419,7	149,2	397,1	164,0	373,4	180,3
	9	474,6	125,4	453,5	137,7	431,6	151,3	408,5	166,1	384,2	182,5
	10	487,4	127,4	465,9	139,8	443,4	153,4	419,9	168,3	395,2	184,6
125.2	4	458,3	129,7	436,8	143,0	414,2	157,7	390,5	174,0	365,6	192,2
	5	471,8	131,7	449,7	145,1	426,6	159,9	402,5	176,2	377,1	194,4
	6	485,3	133,9	462,7	147,3	439,2	162,1	414,5	178,4	388,6	196,6
	7	499,0	136,1	476,0	149,5	452,0	164,4	426,8	180,8	400,3	198,9
	8	512,9	138,3	489,4	151,9	464,9	166,7	439,2	183,1	412,1	201,2
	9	526,9	140,6	503,0	154,2	478,0	169,2	451,7	185,6	424,2	203,7
	10	541,2	143,0	516,7	156,6	491,2	171,6	464,4	188,1	436,3	206,2
142.2	4	519,3	129,5	499,8	148,1	481,6	167,5	462,3	188,4	439,2	210,9
	5	533,5	131,9	514,2	150,1	496,0	169,4	476,3	190,4	452,4	213,4
	6	547,8	134,2	528,8	152,1	510,4	171,4	490,2	192,6	465,9	216,0
	7	562,3	136,6	543,4	154,1	524,8	173,4	504,4	194,8	479,3	218,7
	8	576,9	138,9	558,3	156,2	539,8	175,4	518,9	197,1	493,1	221,6
	9	591,8	141,3	573,4	158,3	554,8	177,6	533,6	199,6	507,2	224,6
	10	607,0	143,7	588,9	160,6	570,3	179,9	548,6	202,2	521,5	227,9

Note: The power input is for compressor only; cooling cap. and power input referred to evap. fouling factor=0,0176m² °C/kW.

Standard ratings ALS SE 081.2 ÷ 142.2 LN, XN

ALS Unit size	Evaporator leaving water temp. (°C)	AIR AMBIENT TEMPERATURE - °C							
		25		30		35		40	
		Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)
081.2	4	294,3	97,0	279,5	106,8	264,0	117,7	247,4	129,7
	5	302,7	98,6	287,6	108,5	271,6	119,4	254,7	131,5
	6	311,2	100,3	295,8	110,3	279,5	121,2	262,2	133,3
	7	319,8	102,1	304,0	112,1	287,4	123,0	269,6	135,1
	8	328,4	103,8	312,4	113,9	295,4	124,9	277,3	137,0
	9	337,3	105,7	320,8	115,8	303,5	126,9	285,0	139,0
	10	346,2	107,6	329,3	117,8	311,5	128,9	292,7	141,0
094.2	4	341,4	97,6	325,5	107,6	308,8	118,7	291,4	130,9
	5	351,4	99,1	335,2	109,2	318,2	120,3	300,3	132,5
	6	361,6	100,7	345,0	110,8	327,6	122,0	309,4	134,2
	7	371,9	102,3	355,0	112,5	337,3	123,7	318,6	135,9
	8	382,4	104,0	365,1	114,2	346,9	125,4	327,9	137,7
	9	393,0	105,7	375,3	116,0	356,8	127,2	337,4	139,6
	10	403,7	107,4	385,7	117,8	366,8	129,1	346,9	141,4
101.2	4	365,0	109,2	347,8	120,5	329,6	132,9	310,6	146,7
	5	375,6	111,0	357,9	122,3	339,5	134,8	320,0	148,5
	6	386,3	112,8	368,2	124,2	349,3	136,7	329,6	150,4
	7	397,1	114,7	378,6	126,1	359,4	138,6	339,3	152,4
	8	408,0	116,6	389,2	128,0	369,6	140,6	348,9	154,4
	9	419,2	118,5	399,9	130,0	379,9	142,7	358,8	156,5
	10	430,4	120,5	410,8	132,1	390,3	144,8	368,8	158,7
114.2	4	410,8	125,2	390,5	137,9	369,3	151,9	347,0	167,5
	5	422,7	127,4	401,9	140,1	380,3	154,2	357,5	169,7
	6	434,8	129,6	413,6	142,4	391,4	156,4	368,1	172,0
	7	447,0	131,8	425,4	144,7	402,7	158,8	378,9	174,4
	8	459,4	134,1	437,2	147,0	414,1	161,2	389,9	176,8
	9	471,8	136,5	449,2	149,5	425,6	163,7	400,9	179,3
	10	484,5	138,9	461,4	151,9	437,2	166,2	412,0	181,9
125.2	4	443,1	139,0	421,1	153,2	397,8	168,9	373,5	186,3
	5	455,7	141,4	433,2	155,6	409,5	171,3	384,7	188,8
	6	468,5	143,8	445,5	158,1	421,4	173,9	396,0	191,3
	7	481,4	146,3	457,9	160,6	433,2	176,5	407,4	193,9
	8	494,6	148,9	470,5	163,3	445,3	179,1	418,8	196,6
	9	507,7	151,5	483,2	166,0	457,5	181,9	430,5	199,4
	10	521,1	154,2	496,0	168,7	469,8	184,7	442,3	202,3
142.2	4	508,0	139,9	489,5	158,9	471,0	179,2	449,8	201,0
	5	522,1	142,3	503,7	161,1	484,9	181,4	463,1	203,6
	6	536,2	144,7	518,0	163,3	498,8	183,7	476,4	206,3
	7	550,6	147,0	532,2	165,6	512,6	186,1	489,8	209,1
	8	565,1	149,4	546,8	167,9	527,1	188,7	503,5	212,1
	9	580,0	151,9	561,8	170,3	541,7	191,3	517,3	215,3
	10	595,1	154,4	577,0	172,9	556,6	194,2	531,6	218,7

Note: The power input is for compressor only; cooling cap. and power input referred to evap. fouling factor=0,0176m² °C/kW.

Standard ratings ALS SE 081.2 ÷ 142.2 XXN

ALS Unit size	Evaporator leaving water temp. (°C)	AIR AMBIENT TEMPERATURE - °C							
		25		30		35		40	
		Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)
081.2	4	299,7	93,5	285,2	103,0	269,9	113,5	253,6	125,2
	5	308,4	95,0	293,5	104,6	277,8	115,2	261,2	126,8
	6	317,1	96,6	301,9	106,2	285,9	116,8	268,9	128,5
	7	326,0	98,2	310,5	107,9	294,1	118,5	276,8	130,2
	8	335,1	99,9	319,1	109,6	302,4	120,3	284,7	132,0
	9	344,1	101,6	327,9	111,4	310,8	122,1	292,7	133,8
	10	353,3	103,4	336,7	113,2	319,3	124,0	300,8	135,7
094.2	4	336,1	100,7	320,0	111,0	303,1	122,4	285,4	134,9
	5	345,9	102,4	329,5	112,7	312,3	124,1	294,1	136,7
	6	355,8	104,1	339,0	114,5	321,4	125,9	302,9	138,5
	7	365,8	105,8	348,7	116,3	330,7	127,7	311,7	140,3
	8	376,0	107,6	358,5	118,1	340,1	129,6	320,8	142,2
	9	386,3	109,4	368,4	120,0	349,7	131,5	329,9	144,2
	10	396,7	111,2	378,4	121,9	359,3	133,5	339,2	146,2
101.2	4	368,2	107,2	351,0	118,3	333,1	130,5	314,2	144,0
	5	378,9	108,9	361,4	120,1	343,0	132,3	323,7	145,8
	6	389,8	110,7	371,8	121,9	353,1	134,2	333,5	147,7
	7	400,8	112,5	382,4	123,7	363,3	136,0	343,2	149,6
	8	411,9	114,3	393,2	125,6	373,7	138,0	353,2	151,6
	9	423,2	116,1	404,0	127,5	384,1	139,9	363,2	153,6
	10	434,5	118,0	415,1	129,5	394,7	142,0	373,4	155,6
114.2	4	414,8	118,0	395,2	130,0	374,8	143,3	353,5	158,0
	5	427,0	119,9	407,1	132,0	386,2	145,3	364,4	160,0
	6	439,4	121,8	419,1	134,0	397,8	147,3	375,5	162,0
	7	452,0	123,8	431,2	136,0	409,5	149,4	386,7	164,1
	8	464,8	125,9	443,5	138,2	421,3	151,6	398,1	166,3
	9	477,7	128,0	456,0	140,3	433,3	153,8	409,6	168,6
	10	490,8	130,1	468,6	142,5	445,4	156,1	421,2	170,9
125.2	4	453,3	127,4	432,2	140,5	410,2	155,0	387,1	171,1
	5	466,6	129,5	445,1	142,6	422,6	157,1	399,0	173,2
	6	480,0	131,5	458,1	144,7	435,1	159,3	411,1	175,4
	7	493,7	133,6	471,3	146,9	447,8	161,5	423,3	177,6
	8	507,5	135,8	484,6	149,1	460,7	163,8	435,6	179,9
	9	521,5	138,0	498,1	151,4	473,7	166,1	448,2	182,3
	10	535,7	140,3	511,8	153,8	486,9	168,5	460,8	184,7
142.2	4	512,2	142,3	493,6	161,3	474,5	181,6	452,6	203,7
	5	526,5	144,7	507,9	163,6	488,6	184,0	465,9	206,4
	6	540,9	147,1	522,4	165,8	502,6	186,4	479,2	209,3
	7	555,5	149,6	537,0	168,2	516,9	189,0	492,9	212,3
	8	570,4	152,0	551,8	170,6	531,4	191,7	506,6	215,5
	9	585,5	154,6	567,0	173,2	546,2	194,5	520,7	218,9
	10	601,1	157,3	582,5	175,9	561,3	197,6	535,2	222,6

Note: The power input is for compressor only; cooling cap. and power input referred to evap. fouling factor=0,0176m² °C/kW.

Standard ratings ALS XE 081.2 ÷ 142.2 ST, CN

ALS Unit size	Evaporator leaving water temp. (°C)	AIR AMBIENT TEMPERATURE - °C											
		25		30		35		40		45		50	
		Cooling capac. (kW)	Power input (kW)	Cooling capac. (kW)	Power input (kW)	Cooling capac. (kW)	Power input (kW)	Cooling capac. (kW)	Power input (kW)	Cooling capac. (kW)	Power input (kW)	Cooling capac. (kW)	Power input (kW)
081.2	4	324,3	82,0	310,1	90,5	295,1	99,8	279,4	110,1	262,8	121,5	245,3	134,0
	5	334,2	83,2	319,6	91,8	304,3	101,1	288,3	111,4	271,4	122,7	253,5	135,2
	6	344,2	84,4	329,3	93,0	313,7	102,4	297,4	112,7	280,0	124,0	261,7	136,5
	7	354,5	85,7	339,2	94,3	323,2	103,7	306,5	114,1	288,9	125,4	270,2	137,9
	8	364,8	86,9	349,2	95,7	332,9	105,1	315,8	115,5	297,8	126,8	278,7	139,3
	9	375,3	88,3	359,3	97,0	342,7	106,5	325,3	116,9	306,8	128,3	287,4	140,7
	10	386,0	89,6	369,7	98,4	352,7	108,0	334,8	118,4	316,1	129,8	296,2	142,2
094.2	4	367,6	91,3	350,9	100,7	333,7	110,9	315,6	122,2	296,7	134,6	276,9	148,4
	5	378,9	92,7	361,9	102,1	344,3	112,4	325,8	123,7	306,5	136,1	286,2	149,8
	6	390,5	94,1	373,2	103,6	355,1	113,9	336,2	125,2	316,5	137,6	295,7	151,3
	7	402,3	95,6	384,5	105,1	366,0	115,4	346,7	126,8	326,6	139,2	305,3	152,8
	8	414,2	97,1	396,1	106,6	377,2	117,0	357,4	128,4	336,8	140,8	315,1	154,4
	9	426,3	98,6	407,7	108,2	388,4	118,7	368,3	130,0	347,2	142,5	325,1	156,1
	10	438,6	100,1	419,7	109,8	399,9	120,3	379,4	131,7	357,7	144,2	335,2	157,8
101.2	4	395,3	101,8	377,3	112,2	358,5	123,6	338,8	136,2	318,3	150,1	296,7	165,5
	5	407,3	103,4	388,8	113,9	369,6	125,3	349,5	137,9	328,7	151,8	306,6	167,1
	6	419,6	105,0	400,7	115,5	381,0	127,0	360,6	139,6	339,2	153,5	316,7	168,8
	7	432,0	106,7	412,7	117,2	392,6	128,8	371,6	141,4	349,8	155,3	326,9	170,6
	8	444,6	108,4	424,8	119,0	404,3	130,6	382,9	143,2	360,6	157,1	337,2	172,4
	9	457,3	110,1	437,1	120,8	416,2	132,4	394,3	145,1	371,5	159,0	347,6	174,2
	10	470,3	111,8	449,6	122,6	428,2	134,3	405,9	147,0	382,6	160,9	358,2	176,2
114.2	4	457,3	106,9	436,9	117,9	415,8	129,9	393,8	143,2	370,8	157,9	346,6	174,1
	5	471,6	108,5	450,8	119,5	429,1	131,6	406,6	144,9	383,0	159,5	358,5	175,7
	6	486,0	110,1	464,7	121,2	442,7	133,3	419,6	146,6	395,5	161,2	370,4	177,4
	7	500,7	111,8	479,0	122,9	456,4	135,1	432,9	148,4	408,3	163,0	382,6	179,1
	8	515,8	113,4	493,5	124,7	470,4	136,9	446,4	150,2	421,3	164,8	395,0	181,0
	9	530,9	115,2	508,2	126,5	484,6	138,7	460,0	152,1	434,4	166,7	407,6	182,8
	10	546,3	116,9	523,1	128,3	499,0	140,6	473,9	154,0	447,7	168,7	420,3	184,8
125.2	4	493,7	119,1	471,7	131,3	448,7	144,7	424,6	159,6	399,4	176,0	373,0	194,3
	5	508,8	120,9	486,3	133,2	462,7	146,6	438,2	161,5	412,4	177,9	385,6	196,1
	6	524,2	122,8	501,2	135,1	477,1	148,6	452,0	163,4	425,8	179,8	398,3	198,0
	7	539,8	124,7	516,2	137,0	491,6	150,5	466,0	165,4	439,2	181,8	411,1	199,9
	8	555,7	126,6	531,5	139,0	506,4	152,6	480,3	167,5	452,9	183,9	424,2	202,0
	9	571,6	128,6	547,1	141,1	521,4	154,7	494,7	169,6	466,7	186,0	437,5	204,1
	10	588,0	130,6	562,8	143,2	536,7	156,8	509,4	171,8	480,8	188,2	451,0	206,2
142.2	4	542,1	117,3	519,9	135,2	500,7	153,7	482,3	173,4	461,8	194,7	436,8	217,9
	5	556,6	119,7	534,8	137,1	515,8	155,4	497,1	175,0	476,2	196,5	450,6	220,1
	6	571,2	122,2	549,8	139,0	530,9	157,0	512,1	176,6	490,8	198,3	464,5	222,5
	7	586,0	124,7	564,9	141,0	546,2	158,7	527,2	178,3	505,6	200,2	478,6	224,9
	8	600,9	127,1	580,3	143,0	561,8	160,5	542,7	180,1	520,7	202,3	493,1	227,5
	9	616,2	129,6	596,1	145,0	577,7	162,3	558,5	182,0	536,1	204,5	507,9	230,3
	10	631,9	132,2	612,2	147,2	594,0	164,2	574,8	184,0	552,0	206,8	523,2	233,2

Note: The power input is for compressor only; cooling cap. and power input referred to evap. fouling factor=0,0176m² °C/kW.

Standard ratings ALS XE 081.2 ÷ 142.2 LN, XN

ALS Unit size	Evaporator leaving water temp. (°C)	AIR AMBIENT TEMPERATURE - °C									
		25		30		35		40		45	
		Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)
081.2	4	317,7	85,9	303,2	94,7	288,0	104,4	272,1	115,1	255,2	126,9
	5	327,3	87,2	312,4	96,1	296,9	105,8	280,6	116,5	263,3	128,3
	6	336,9	88,6	321,8	97,5	306,0	107,2	289,3	118,0	271,6	129,7
	7	346,8	90,0	331,3	98,9	315,1	108,7	298,0	119,5	280,0	131,2
	8	356,8	91,4	340,9	100,4	324,3	110,2	306,9	121,0	288,5	132,8
	9	366,9	92,8	350,7	101,9	333,8	111,8	315,9	122,6	297,2	134,4
	10	377,2	94,3	360,6	103,5	343,4	113,4	325,2	124,2	306,0	136,0
094.2	4	358,4	96,5	341,6	106,2	324,0	116,9	305,7	128,7	286,3	141,7
	5	369,3	98,0	352,1	107,8	334,1	118,6	315,3	130,4	295,6	143,4
	6	380,3	99,6	362,7	109,5	344,4	120,2	325,2	132,1	305,0	145,1
	7	391,5	101,3	373,6	111,2	354,8	122,0	335,2	133,8	314,6	146,8
	8	403,0	102,9	384,5	112,9	365,4	123,8	345,3	135,6	324,2	148,6
	9	414,5	104,6	395,7	114,7	376,1	125,6	355,6	137,5	334,1	150,5
	10	426,3	106,4	407,0	116,5	386,9	127,5	366,0	139,4	344,1	152,4
101.2	4	384,5	108,0	366,1	118,9	347,0	130,8	327,1	144,1	306,1	158,7
	5	396,0	109,8	377,3	120,7	357,7	132,7	337,3	146,0	315,8	160,6
	6	407,6	111,6	388,5	122,6	368,6	134,6	347,7	147,9	325,8	162,5
	7	419,5	113,4	399,8	124,5	379,5	136,6	358,2	149,9	335,8	164,5
	8	431,4	115,4	411,4	126,5	390,5	138,6	368,8	151,9	346,0	166,6
	9	443,6	117,3	423,0	128,5	401,7	140,7	379,5	154,1	356,2	168,7
	10	455,9	119,3	434,9	130,6	413,1	142,8	390,4	156,2	366,6	170,8
114.2	4	447,8	112,0	427,2	123,3	405,8	135,8	383,6	149,6	360,2	164,9
	5	461,6	113,7	440,6	125,2	418,6	137,7	395,9	151,5	372,0	166,7
	6	475,5	115,5	454,0	127,0	431,7	139,6	408,3	153,4	384,0	168,6
	7	489,7	117,4	467,8	128,9	444,9	141,5	421,1	155,3	396,2	170,6
	8	504,2	119,2	481,6	130,9	458,3	143,5	434,0	157,4	408,5	172,6
	9	518,8	121,2	495,8	132,8	471,9	145,6	447,0	159,4	421,1	174,7
	10	533,6	123,1	510,1	134,9	485,7	147,7	460,2	161,6	433,8	176,8
125.2	4	482,6	125,2	460,2	137,9	436,9	151,9	412,4	167,4	386,9	184,6
	5	497,2	127,2	474,3	139,9	450,5	153,9	425,5	169,5	399,3	186,6
	6	512,0	129,2	488,6	142,0	464,2	156,1	438,7	171,6	412,0	188,8
	7	526,9	131,3	503,1	144,2	478,2	158,3	452,1	173,8	424,8	191,0
	8	542,1	133,5	517,7	146,4	492,2	160,6	465,7	176,1	437,9	193,2
	9	557,6	135,7	532,6	148,7	506,6	162,9	479,4	178,5	451,1	195,6
	10	573,1	137,9	547,7	151,0	521,1	165,3	493,4	180,9	464,4	198,0
142.2	4	531,4	125,4	510,9	143,5	492,3	162,6	473,2	182,9	451,1	205,0
	5	545,9	127,8	525,6	145,5	507,2	164,4	487,7	184,8	464,8	207,3
	6	560,5	130,2	540,5	147,5	522,0	166,2	502,3	186,8	478,9	209,6
	7	575,2	132,6	555,6	149,5	537,1	168,1	517,0	188,8	493,1	212,1
	8	590,1	135,0	570,9	151,5	552,4	170,0	532,1	190,9	507,6	214,6
	9	605,4	137,4	586,5	153,7	568,1	172,1	547,5	193,2	522,4	217,4
	10	621,1	139,9	602,5	155,9	584,1	174,3	563,3	195,7	537,6	220,4

Note: The power input is for compressor only; cooling cap. and power input referred to evap. fouling factor=0,0176m² °C/kW.

Standard ratings ALS HA 081.2 ÷ 142.2

ALS Unit size	Evaporator leaving water temp. (°C)	AIR AMBIENT TEMPERATURE - °C											
		25		30		35		40		45		50	
		Cooling capac. (kW)	Power input (kW)	Cooling capac. (kW)	Power input (kW)	Cooling capac. (kW)	Power input (kW)	Cooling capac. (kW)	Power input (kW)	Cooling capac. (kW)	Power input (kW)	Cooling capac. (kW)	Power input (kW)
081.2	4	319,2	81,4	305,3	89,9	290,9	99,3	275,5	109,6	259,5	121,0	242,2	133,5
	5	328,9	82,6	314,6	91,1	299,8	100,5	284,2	110,8	267,8	122,2	250,2	134,7
	6	338,6	83,7	324,1	92,3	308,9	101,7	293,1	112,1	276,2	123,5	258,3	136,0
	7	348,5	84,9	333,7	93,6	318,3	103,0	302,0	113,4	284,8	124,8	266,5	137,3
	8	358,6	86,2	343,5	94,9	327,6	104,4	311,0	114,8	293,5	126,1	274,9	138,6
	9	368,8	87,4	353,3	96,2	337,2	105,7	320,3	116,1	302,4	127,5	283,4	140,0
	10	379,2	88,7	363,4	97,6	346,9	107,1	329,6	117,6	311,3	129,0	292,0	141,5
094.2	4	354,4	89,7	338,8	99,1	322,7	109,4	305,8	120,7	287,9	133,3	269,1	147,2
	5	365,1	91,0	349,2	100,4	332,6	110,8	315,4	122,1	297,3	134,7	278,0	148,5
	6	375,9	92,3	359,7	101,8	342,8	112,2	325,2	123,5	306,6	136,1	287,0	149,9
	7	386,9	93,7	370,3	103,2	353,1	113,6	335,2	125,0	316,2	137,5	296,2	151,4
	8	398,1	95,0	381,3	104,6	363,6	115,1	345,2	126,5	325,8	139,1	305,4	152,8
	9	409,5	96,4	392,2	106,1	374,2	116,6	355,4	128,1	335,7	140,6	314,9	154,4
	10	420,9	97,9	403,4	107,6	385,0	118,1	365,8	129,6	345,7	142,2	324,5	156,0
101.2	4	380,2	99,9	363,4	110,3	345,8	121,8	327,5	134,5	308,2	148,5	287,9	164,0
	5	391,4	101,3	374,3	111,8	356,4	123,3	337,7	136,0	317,9	150,1	297,3	165,6
	6	402,9	102,8	385,4	113,4	367,1	124,9	348,0	137,6	327,9	151,7	306,7	167,1
	7	414,5	104,3	396,6	115,0	378,0	126,6	358,5	139,3	337,9	153,3	316,4	168,8
	8	426,3	105,9	408,0	116,6	388,9	128,2	369,1	141,0	348,2	155,0	326,1	170,4
	9	438,3	107,5	419,6	118,2	400,2	129,9	379,8	142,7	358,5	156,8	336,0	172,2
	10	450,3	109,1	431,2	119,9	411,4	131,7	390,7	144,5	369,0	158,6	346,1	174,0
114.2	4	444,8	105,5	425,5	116,5	405,3	128,6	384,3	142,0	362,3	156,7	339,3	173,1
	5	458,3	107,0	438,6	118,1	418,0	130,2	396,6	143,5	374,1	158,3	350,6	174,6
	6	472,1	108,6	451,9	119,7	430,9	131,8	409,1	145,2	386,1	159,9	362,0	176,2
	7	486,2	110,1	465,6	121,3	444,2	133,5	421,8	146,9	398,4	161,6	373,8	177,9
	8	500,4	111,7	479,3	123,0	457,5	135,2	434,6	148,6	410,8	163,3	385,7	179,6
	9	514,8	113,3	493,4	124,7	471,0	137,0	447,6	150,4	423,3	165,1	397,7	181,3
	10	529,5	115,0	507,6	126,4	484,7	138,7	461,0	152,2	436,1	167,0	410,0	183,2
125.2	4	479,3	117,4	458,3	129,7	436,5	143,1	413,6	158,1	389,7	174,7	364,4	193,1
	5	493,7	119,1	472,3	131,4	450,0	144,9	426,6	159,9	402,2	176,4	376,4	194,8
	6	508,2	120,9	486,5	133,2	463,7	146,8	439,8	161,7	414,9	178,2	388,6	196,6
	7	523,1	122,6	500,7	135,0	477,5	148,6	453,3	163,6	427,8	180,1	401,0	198,4
	8	538,1	124,5	515,3	136,9	491,6	150,6	466,8	165,5	440,8	182,1	413,5	200,3
	9	553,4	126,3	530,1	138,8	505,9	152,5	480,6	167,5	454,1	184,1	426,3	202,3
	10	568,8	128,2	545,1	140,8	520,4	154,5	494,6	169,6	467,6	186,1	439,2	204,3
142.2	4	535,9	116,2	513,9	134,4	495,0	153,1	476,8	172,8	456,8	194,0	432,4	217,1
	5	550,2	118,7	528,6	136,3	509,8	154,7	491,4	174,4	470,9	195,8	445,8	219,3
	6	564,6	121,1	543,3	138,2	524,6	156,3	506,1	176,0	485,3	197,6	459,6	221,6
	7	579,1	123,5	558,1	140,1	539,6	158,0	521,0	177,6	499,8	199,5	473,4	224,0
	8	593,7	125,9	573,2	142,1	554,8	159,7	536,1	179,3	514,5	201,4	487,5	226,5
	9	608,6	128,4	588,5	144,1	570,4	161,4	551,6	181,1	529,6	203,5	502,0	229,2
	10	623,8	130,9	604,3	146,1	586,2	163,3	567,3	183,0	545,1	205,8	516,9	232,0

Note: The power input is for compressor only; cooling cap. and power input referred to evap. fouling factor=0,0176m² °C/kW.

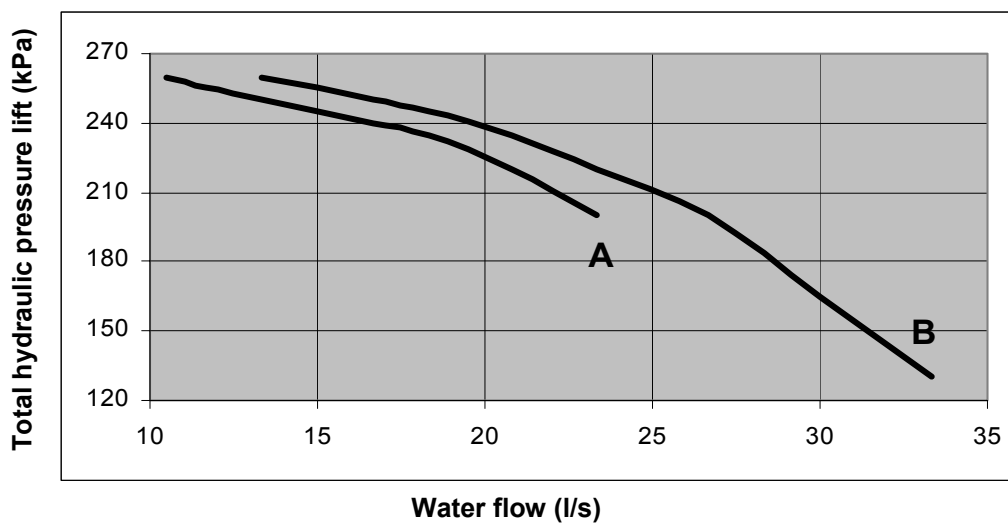
Total heat recovery ratings ALS 081.2 ÷ 142.2

Taglia unità ALS	Temperatura acqua uscita evaporatore °C	TEMPERATURA ACQUA USCENTE DAL RECUPERATORE °C											
		40			45			50			55		
		Pot. Frigor. (kW)	Pot. Assor. (kW)	Pot. Recup. (kW)	Pot. Frigor. (kW)	Pot. Assor. (kW)	Pot. Recup. (kW)	Pot. Frigor. (kW)	Pot. Assor. (kW)	Pot. Recup. (kW)	Pot. Frigor. (kW)	Pot. Assor. (kW)	Pot. Recup. (kW)
081.2	4	304,6	90,4	383,2	290,2	99,7	378,2	275,1	109,9	373,5	259,1	121,2	368,9
	5	313,4	91,8	393,0	298,7	101,2	387,9	283,3	111,4	382,9	267,0	122,7	378,0
	6	322,5	93,3	403,3	307,4	102,7	397,8	291,7	113	392,6	275,0	124,3	387,3
	7	331,6	94,8	413,6	316,3	104,3	408,0	301,1	114,6	403,2	283,1	125,9	396,7
	8	340,8	96,4	424,1	325,2	105,9	418,2	308,7	116,2	412,2	291,3	127,6	406,3
	9	350,3	98	434,9	334,2	107,5	428,4	317,4	117,9	422,2	299,6	129,3	416,0
	10	359,7	99,6	445,5	343,4	109,2	439,0	326,1	119,7	432,4	308,1	131,1	426,0
094.2	4	349,3	92,7	428,7	333,7	102,4	423,0	317,3	112,9	417,3	300,2	124,6	412,1
	5	359,7	94,1	440,2	343,8	103,8	434,2	327,1	114,4	428,3	309,5	126,1	422,5
	6	370,3	95,5	451,8	354,1	105,3	445,6	336,9	115,9	439,2	319,1	127,6	433,3
	7	381,2	97	463,9	364,5	106,8	457,2	347,0	117,5	450,6	328,8	129,2	444,3
	8	392,0	98,5	475,8	375,0	108,3	468,8	357,2	119	461,9	338,5	130,8	455,2
	9	403,1	100	488,0	385,7	109,9	480,7	367,5	120,7	473,6	348,5	132,5	466,6
	10	414,3	101,5	500,3	396,5	111,5	492,8	378,0	122,3	485,3	358,6	134,2	478,0
101.2	4	374,3	103,4	463,4	357,3	114,2	457,4	339,6	126	451,6	321,0	139,1	446,3
	5	385,2	105	475,5	367,9	115,8	469,2	349,9	127,7	463,3	330,9	140,8	457,5
	6	396,5	106,6	488,0	378,7	117,5	481,3	360,3	129,4	475,0	340,8	142,5	468,8
	7	407,7	108,3	500,5	389,7	119,2	493,6	370,7	131,2	486,8	351,0	144,3	480,4
	8	419,3	110	513,4	400,8	121	506,1	381,5	133	499,1	361,3	146,1	492,2
	9	430,8	111,7	526,2	411,9	122,7	518,6	392,3	134,8	511,3	371,7	148	504,1
	10	442,6	113,5	539,4	423,4	124,6	531,6	403,2	136,7	523,7	382,2	149,9	516,1
114.2	4	412,9	116	513,0	393,9	128	506,2	374,0	141,3	499,8	353,1	156,1	493,9
	5	424,8	117,8	526,3	405,5	129,9	519,3	385,1	143,2	512,5	363,9	158	506,2
	6	437,0	119,6	539,9	417,3	131,8	532,6	396,6	145,1	525,4	374,9	159,9	518,8
	7	449,4	121,5	553,8	429,1	133,7	545,9	408,0	147,1	538,4	385,9	161,9	531,4
	8	461,9	123,4	567,7	441,3	135,7	559,7	419,7	149,2	551,8	397,1	164	544,3
	9	474,6	125,4	582,0	453,5	137,7	573,5	431,6	151,3	565,4	408,5	166,1	557,4
	10	487,4	127,4	596,4	465,9	139,8	587,5	443,4	153,4	578,9	419,9	168,3	570,6
125.2	4	458,3	129,7	570,4	436,8	143	562,4	414,2	157,7	554,7	390,5	174	547,6
	5	471,8	131,7	585,4	449,7	145,1	577,0	426,6	159,9	568,9	402,5	176,2	561,3
	6	485,3	133,9	600,6	462,7	147,3	591,7	439,2	162,1	583,3	414,5	178,4	575,1
	7	499,0	136,1	616,0	476,0	149,5	606,7	452,0	164,4	597,9	426,8	180,8	589,4
	8	512,9	138,3	631,7	489,4	151,9	622,1	464,9	166,7	612,7	439,2	183,1	603,6
	9	526,9	140,6	647,5	503,0	154,2	637,5	478,0	169,2	627,8	451,7	185,6	618,2
	10	541,2	143	663,7	516,7	156,6	653,1	491,2	171,6	642,9	464,4	188,1	632,9
142.2	4	519,3	129,5	629,3	499,8	148,1	628,5	481,6	167,5	629,6	462,3	188,4	631,2
	5	533,5	131,9	645,4	514,2	150,1	644,4	496,0	169,4	645,4	476,3	190,4	646,7
	6	547,8	134,2	661,5	528,8	152,1	660,5	510,4	171,4	661,3	490,2	192,6	662,3
	7	562,3	136,6	677,9	543,4	154,1	676,6	524,8	173,4	677,3	504,4	194,8	678,2
	8	576,9	138,9	694,3	558,3	156,2	693,1	539,8	175,4	693,7	518,9	197,1	694,5
	9	591,8	141,3	711,1	573,4	158,3	709,7	554,8	177,6	710,4	533,6	199,6	711,2
	10	607,0	143,7	728,2	588,9	160,6	727,0	570,3	179,9	727,7	548,6	202,2	728,3

Partial heat recovery ratings ALS 081.2 ÷ 142.2

ALS Unit Size		LEAVING DESUPERHEATERS WATER TEMPERATURE – °C			
		40	45	50	55
		Heating capacity (kW)	Heating capacity (kW)	Heating capacity (kW)	Heating capacity (kW)
081.2	Leaving chilled water temperature 7°C ΔT 5°C – Air temperature 35°C	55,4	50,5	45,7	40,9
094.2		62,2	56,6	51,1	45,8
101.2		67,1	61,1	55,2	49,5
114.2		74,2	67,5	61,1	54,8
125.2		82,6	75,1	67,8	60,8
142.2		90,9	83,7	76,8	69,9

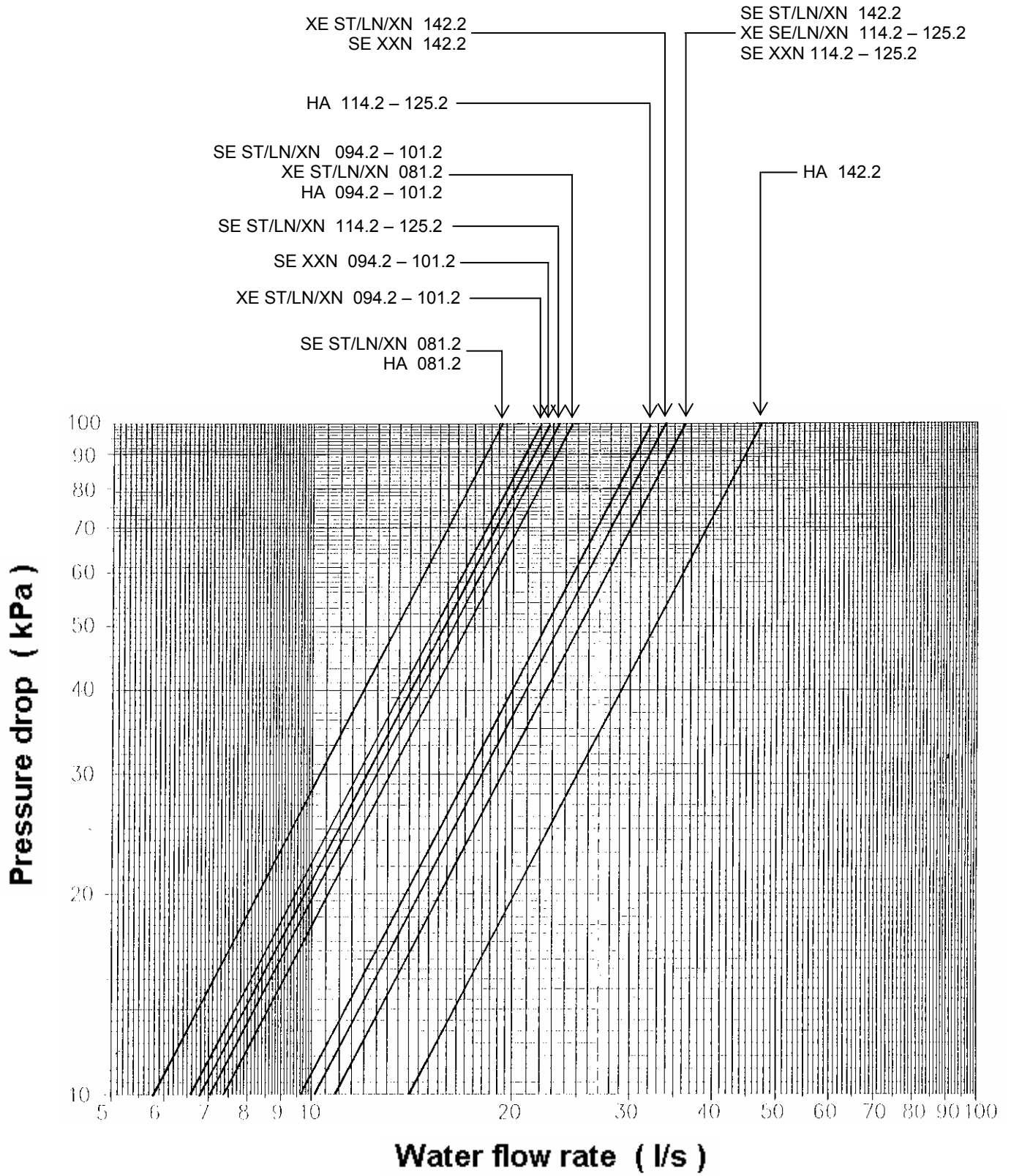
Water pump diagram



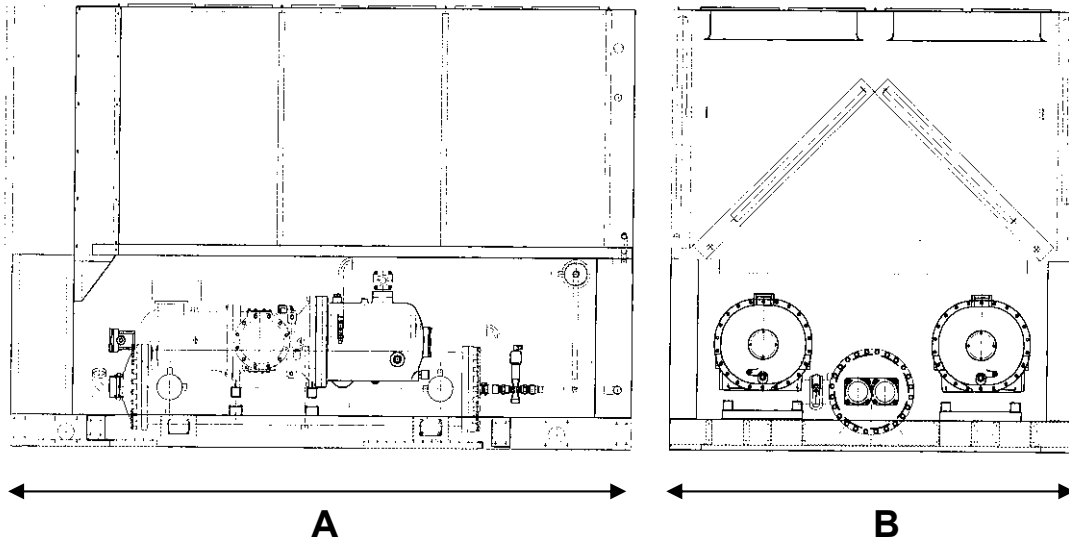
Type pump	Unit models	Motor power	AMPS	Electric protection	Voltage
		kW	A		V / Hz
A	081.2 - 101.2 SE 081.2 - 125.2 XE	7,5	16,0	IP54	400/3/50
B	114.2 - 142.2 SE 142.2 XE	7,5	16,0	IP54	400/3/50

Note: to have the useful hydraulic lift is necessary to subtract the evaporator pressure drop to the total hydraulic lift.

Evaporator pressure drop – ALS SE ST, CN, LN, XN, XXN; ALS XE ST, CN, LN, XN; ALS HA



Dimensions ALS SE, XE, HA 081.2 ÷ 142.2 ST, CN, LN, XN, XXN



ALS SE Units	Length – A (mm)	Width – B (mm)	Height (mm)
ST-CN-LN-XN			
ALS SE 081.2	2790	2225	2500
ALS SE 094.2 – 101.2 – 114.2 – 125.2	3460	2225	2500
ALS SE 142.2	4355	2225	2500
XXN			
ALS SE 081.2	3460	2225	2500
ALS SE 094.2 – 101.2	4355	2225	2500
ALS SE 114.2 – 125.2 – 142.2	5255	2225	2500

ALS XE Units	Length – A (mm)	Width – B (mm)	Height (mm)
ST-CN-LN-XN			
ALS XE 081.2 – 101.2	3460	2225	2500
ALS XE 114.2 – 125.2	4355	2225	2500
ALS XE 142.2	5255	2225	2500

ALS HA Units	Length – A (mm)	Width – B (mm)	Height (mm)
ST-CN			
ALS SE 081.2 – 094.2 – 101.2	3460	2225	2500
ALS SE 114.2 – 125.2	4355	2225	2500
ALS SE 142.2	5255	2225	2500

We reserve the right to make changes in design and construction at any time without notice, thus the cover picture is not binding.



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