Carrier

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

Air-Cooled Screw Chillers

30XBEZE 200-1200
30XBPZE 200 - 1200

Nominal cooling capacity: 212 - 1170 kW - 50Hz

AQUAFORCE
PUREtec

Original document

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The AquaForce Puretec™ 30XBEZE and 30XBPZE units are designed to cool water for the air conditioning of buildings and industrial processes.

Prior to the initial start-up of the 30XB(E/P)ZE units, the people involved in the on-site installation, start-up, operation, and maintenance of this unit should be thoroughly familiar with these instructions and the specific project data for the installation site.

They are designed for an operating life of 15 years by assuming a 75% utilisation factor; that is approximately 100,000 operating hours.

The 30XB(E/P)ZE liquid chillers are designed to provide a very high level of safety during installation, start-up, operation and maintenance. They will provide safe and reliable service when operated within their application range.

This manual provides the necessary information to familiarize yourself with the control system before performing start-up procedures. The procedures in this manual are arranged in the sequence required for machine installation, start-up, operation and maintenance.

Always ensure that all required safety measures are followed, including those in this document, such as, wearing protective clothing (gloves, ear defenders, safety glasses and shoes), using appropriate tools, employing qualified and skilled technicians (electricians, refrigeration engineers) and following local regulations.

To find out, if these products comply with European directives (machine safety, low voltage, electromagnetic compatibility, equipment under pressure etc.) check the declarations of conformity for these products.

1.1 - Installation safety considerations

According to ISO-817, R1234ze(E) is classified in safety group A2L: lower flammability. One of the characteristic of this refrigerant is the absence of flammable mixture with air under 21°C of ambiance and controlled humidity conditions. However when humidity or temperature goes up, this refrigerant can become flammable and can represent a potential danger if flammability risks are not properly mitigated within the near vincinity of the unit or in the machine room installation.

Local building codes and safety standards shall be followed.

In absence of local codes and standards, please refer to EN-378 (2012) (Safety requirements for substances classified A2) or to ISO-5149 (2014) (for substances classified A2L) as a guide. Customer shall obtain approval from the local building authorities.

Carrier also provides additional guidelines for the safe use of R1234ze(E) refrigerant that should be added to the requirements of safety standards and building codes to insure that the risks are minimised to acceptable levels.

For further details on physical properties, flammability & toxicity characteristics, hazards Identification, installation safety requirements, etc., refer to standards such as:

- SHRAE 34, EN 378, ISO-817 and ISO-5149
- European union's REACH database (Registration, Evaluation, Authorization and Restriction of Chemicals)

Operations have to be performed by qualified and fully trained technicians for flammable refrigerant using and associated risks (see EN 378-4, annex E).

Use a portable gas detector for any intervention on the unit.

Due to R1234ze(E) mild flammability, a 0.5m perimeter around the unit is considered as ATEX zone 2 (see chapter 3 - Dimensions, clearances). In this area, no ignition source must be present (see EN 378-2, Annex K).

If an ignition source is identified, an additional ventilation shall be installed.

Define a non smoking area around the unit.

30XB(E/P)ZE chillers are classified as "Indirect heat exchange system". They are intended to be installed in open air in a restricted access location (category "c" according to ISO-5149 and EN-378). Access to the unit must be reserved to authorised personnel, qualified and trained in monitoring and maintenance. The access limitation device (e.g. cut-off, enclosure) is under the customer's responsibility.

The unit shall be installed in a location where the air flow is free and the minimum distance from a building opening is 6 meters.

No refrigerant charge restriction applies (Class III - open air or machinery room and occupation category "c") with R1234ze(E). For more details, refer to the standard EN-378-1. This category shall be confirmed by the customer.

After the unit has been received, when it is ready to be installed or reinstalled, and before it is started up, it must be inspected for damage. Check that the refrigerant circuit(s) is (are) intact, especially that no components or pipes have shifted (e.g. following a shock). If in doubt, carry out a leak tightness check and verify with the manufacturer that the circuit integrity has not been impaired. If damage is detected upon receipt, immediately file a claim with the shipping company.

An appropriate fire extinguisher shall be accessible and visible in the unit installation area.

Carrier strongly recommends employing a specialised company to unload the machine.

Do not remove the skid or the packaging until the unit is in its final position. These units can be moved with a fork lift truck, as long as the forks are positioned in the right place and direction on the unit.

The units can also be lifted with slings, using only the designated lifting points marked on the unit.

These units are not designed to be lifted from above. Use slings with the correct capacity, and always follow the lifting instructions on the certified drawings supplied with the unit.

Safety is only guaranteed, if these instructions are carefully followed. If this is not the case, there is a risk of material deterioration and injuries to personnel.

RELATED TO PROTECTION DEVICE

Check that the protective devices are well installed before operating the unit.

DO NOT COVER ANY PROTECTION DEVICES.

This applies to relief valves (if used) in the refrigerant or heat transfer medium circuits. Check if the original protection plugs are still present at the valve outlets. These plugs are generally made of plastic and should not be used. If they are still present, please remove them. Install devices at the valve outlets or drain piping that prevent the penetration of foreign bodies (dust, building debris, etc.) and atmospheric agents (water can form rust or ice). These devices, as well as the drain piping, must not impair operation and not lead to a pressure drop that is higher than 10% of the control pressure.

Classification and control

In accordance with the Pressure Equipment Directive and national usage monitoring regulations in the European Union the protection devices for these machines are classified as follows:

	Safety device(1)	Device for damage limitation in the event of an external fire(2)
Refrigerant Side		
High pressure safety loop(3)	X	
External relief valve(4)		X
Rupture disk		X
Heat transfer fuid side		
External relief valve	(5)	(5)

(1) Classified for protection in normal service situations.
(2) Classified for protection in abnormal service situations. These accessories are sized for fires with a thermal flow of 10kW/m². No combustible matter should be placed within 6.5m of the unit.
(3) High pressure safety loop = SRMCR as described in component section of this manual and in electrical diagram.
(4) The instantaneous overpressure limitation of 10% of the operating pressure does not apply to this abnormal service situation.
The control pressure can be higher than the service pressure. In this case, either the design temperature or the high pressure switch ensures that the service pressure is not exceeded in normal service situations.
(5) The selection of these relief valves must be made by the personnel responsible for completing the hydraulic installation.

In compliance with the European Pressure Equipment Directive (PED) and national regulations relating to design:

- **These valves are not safety devices but accessories which limit damage in the event of a fire,**
- **The safety device is the high pressure safety loop described in section 11.3.1**

Do not remove these valves even if the fire risk is under control for a particular installation. There is no guarantee that the accessories are re-installed if the installation is changed or for transport with a gas charge.

When the unit is subjected to fire, safety devices prevent rupture due to over-pressure by releasing the refrigerant. The fluid may then be decomposed into toxic residues when subjected to the flame:

- **Stay away from the unit.**
- **Set up warnings and recommendations for personnel in charge to stop the fire.**
- **Fire extinguishers appropriate to the system and the refrigerant type must be easily accessible**

NOTE : Pressure equipment for the hydraulic side (optional) are delivered as separate items. Their integration in the complete hydraulic installation remain under the user's responsibility.

All factory-installed relief valves are lead-sealed to prevent any calibration change. If the relief valves are installed on a change-over valve, this is equipped with a relief valve on each of the two outlets. Only one of the two relief valves is in operation, the other one is isolated. Never leave the change-over valve in the intermediate position, i.e. with both ways open (Bring the actuator in abutment, front or back according to the outlet to isolate).

If a relief valve is removed for checking or replacement please ensure that there is always an active relief valve on each of the change-over valves installed in the unit.

The external relief valves must always be connected to drain pipes for units installed in a closed room. Refer to the installation regulations, for example those of European standard EN 378 and EN 13136.

These pipes must be installed in a way that ensures that people and property are not exposed to refrigerant leaks. As the fluids can be diffused in the air, ensure that the outlet is far away from any building air intake, or that they are discharged in a quantity that is appropriate for a suitably absorbing environment (note that R1234ze(E) refrigerant is heavier than air).

Periodic check of the relief valves: See chapter 1.3 - "Maintenance safety considerations".

Provide a drain in the drain pipe, close to each relief valve, to avoid an accumulation of condensate or rain water.

It is recommended to install an indicating device to check whether any refrigerant has leaked from the relief valve.

The presence of oil at the outlet orifice is a useful indicator that refrigerant has leaked. Keep this orifice clean to ensure that any leaks are obvious. The calibration of a valve that has leaked is generally lower than its original calibration. The new calibration may affect the operating range. To avoid nuisance tripping or leaks, replace or re-calibrate the valve.

All precautions concerning handling of refrigerant must be observed in accordance with local regulations.

Ensure good ventilation, as accumulation of refrigerant in an enclosed space can displace oxygen and cause asphyxiation or explosions.

Inhalation of high concentrations of vapour is harmful and may cause heart irregularities, unconsciousness, or death. Vapour is heavier than air and reduces the amount of oxygen available for breathing. These products cause eye and skin irritation. Decomposition products are hazardous.

1.2 - Equipment and components under pressure

These products incorporate equipment or components under pressure, manufactured by Carrier or other manufacturers. We recommend that you consult your appropriate national trade association or the owner of the equipment or components under pressure (declaration, re-qualification, retesting, etc.). The characteristics of this equipment/these components are given on the nameplate or in the required documentation, supplied with the products.

These units comply with the European Pressure Equipment Directive.

These units are intended to be stored and operated in an environment where the ambient temperature must be not less than the lowest allowable temperature indicated on the nameplate.

Do not introduce significant static or dynamic pressure with regard to the operating pressures used during operation or for tests in the refrigerant circuit or in the heat exchange circuits.

See section "10.2 - Pressure vessels".

1.3 - Maintenance safety considerations

If the unit is running, hearing protection is required for any intervention in its vicinity.

Carrier recommends the following drafting for a logbook (the table below should not be considered as reference and does not involve Carrier responsibility):

Intervention		Name of the commissioning engineer	Applicable national regulations	Verification Organism
Date	Nature (1)			

(1) Maintenance, repairs, regular verifications (EN 378), leakage, etc.

Engineers working on the electric or refrigeration components must be authorized, trained and fully qualified to do so.

All refrigerant circuit repairs must be carried out by a trained person, fully qualified to work on these units. He must have been trained and be familiar with the equipment and the installation. All welding operations must be carried out by qualified specialists.

Any manipulation (opening or closing) of a shut-off valve must be carried out by a qualified and authorised engineer. These procedures must be carried out with the unit shut-down.

NOTE: The unit must never be left shut down with the liquid line valve closed, as liquid refrigerant can be trapped between this valve and the expansion device and lead to the risk of a pressure increase. This valve is situated on the liquid line before the filter drier box.

Equip the engineers that work on the unit as follows:

Personal protection equipment (PPE) (1)	Operations		
	Handling	Maintenance, service	Welding or brazing (2)
Protective gloves, eye protection, safety shoe, protective clothing.	X	X	X
Ear protection.		X	X
Filtering respirator.			X

(1) We recommend to follow the instructions in EN 378-3.
(2) Performed in the presence of A1 refrigerant according to EN 378-1.

Never work on a unit that is still energized.

Never work on any of the electrical components, until the general power supply to the unit has been cut using the disconnect switch(es) in the control box(es).

If any maintenance operations are carried out on the unit, lock the power supply circuit in the open position ahead of the machine.

If the work is interrupted, always ensure that all circuits are still deenergized before resuming the work.

ATTENTION: Even if the unit has been switched off, the power circuit remains energized, unless the unit or circuit disconnect switch is open. Refer to the wiring diagram for further details. Attach appropriate safety labels.

Units with option 231 are equipped with capacitor batteries with a discharge time of five (5) minutes after disconnecting the power. After disconnecting the power to the control box, wait five minutes before opening the control box. Before any intervention, verify that there is no voltage present at any accessible conducting parts of the power circuit.

Operating checks:

Important information regarding the refrigerant used:

- **It's a HFO gas.**

Fluid type: R1234ze(E)

Global Warming Potential (GWP): 1 (following AR5)

CAUTION:

1. ***Ensure that the refrigerant is never released to the atmosphere during installation, maintenance or equipment disposal.***
2. ***The deliberate gas release into the atmosphere is not allowed.***
3. ***If a refrigerant leak is detected, ensure that it is stopped and repaired as quickly as possible.***
4. ***Only a qualified and certified personnel can perform installation operations, maintenance, refrigerant circuit leak test as well as the equipment disposal and the refrigerant recovering.***
5. ***The gas recovery for recycling, regeneration or destruction is at customer charge.***
6. ***Periodic leak tests have to be carried out by the customer or by third parties. The EU regulation set the periodicity here after:***

System WITHOUT leakage detection		No check	12 months	6 months	3 months
System WITH leakage detection		No check	24 months	12 months	6 months
Refrigerant charge/circuit (CO_2 equivalent)		< 5 tons	5 ≤ charge < 50 tons	50 ≤ charge < 500 tons	Charge > 500 tons(1)
Refrigerant charge/circuit (kg)	R1234ze(E) (GWP 1)	No requirement			

(1) From 01/01/2017, units must be equipped with a leakage detection system

7. ***A logbook must be established for equipments subject to periodic leak tests. It should contain the quantity and the type of fluid present within the installation (added and recovered), the quantity of recycled fluid, regenerated or destroyed, the date and output of the leak test, the designation of the operator and its belonging company, etc.***
8. ***Contact your local dealer or installer if you have any questions.***

The information on operating inspections given in annex C of standard EN 378 can be used if no similar criteria exist in the national regulations.

While working in the fan area, especially when grilles or casings are removed, disconnect the fan power supply to prevent their automatic restart.

PROTECTION DEVICE CHECKS:

- **If no national regulations exist, check the protection devices on site in accordance with standard EN 378: Once a year for the high-pressure switches, every five years for external relief valves.**

The company or organisation that conducts a pressure switch test must establish and implement detailed procedures for:

- Safety measures
- Measuring equipment calibration
- Validating operation of protective devices
- Test protocols
- Recommissioning of the equipment.

Consult Carrier Service for this type of test. Carrier mentions here only the principle of a test without removing the pressure switch:

- Verify and record the set-points of pressure switches and relief devices (valves and possible rupture discs)
- Be ready to switch-off the main disconnect switch of the power supply if the pressure switch does not trigger (avoid over-pressure or excess gas in case of valves on the high-pressure side with the recovery condensers)
- Connect a pressure gauge protected against pulsations (filled with oil with maximum pointer if mechanical), preferably calibrated (the values displayed on the user interface may be inaccurate in an instant reading because of the scanning delay applied in the control)
- Complete an HP Test as provided by the software (refer to the Control IOM for details).

If the machine operates in a corrosive environment, inspect the protection devices more frequently.

Regularly carry out leak tests and immediately repair any leaks. Ensure regularly that the vibration levels remain acceptable and close to those at the initial unit start-up.

Before opening a refrigerant circuit, purge and consult the pressure gauges.

Change the refrigerant after an equipment failure, following a procedure such as the one described in NF E29-795 or carry out a refrigerant analysis in a specialist laboratory.

Plug all openings whenever the refrigerant circuit is opened for up to one day. For longer openings place a nitrogen charge in the circuit.

1.4 - Repair safety considerations

Equip the engineers that work on the unit with the protections described in section 1.3 above.

All installation parts must be maintained by the personnel in charge, in order to avoid material deterioration and injuries to people. Faults and leaks must be repaired immediately. The authorized technician must have the responsibility to repair the fault immediately. After each repair of the unit, check the operation of the protection devices and create a report of the parameter operation at 100%.

Comply with the regulations and recommendations in unit and HVAC installation safety standards, such as: EN 378, ISO 5149, etc.

If a leak occurs or if the refrigerant becomes contaminated (e.g. by a short circuit in a motor) remove the complete charge using a recovery unit and store the refrigerant in mobile containers.

Repair the leak detected and recharge the circuit with the total R-1234ze(E) charge, as indicated on the unit name plate. Certain parts of the circuit can be isolated. Only charge liquid refrigerant R-1234ze(E) at the liquid line.

Ensure that you are using the correct refrigerant type before recharging the unit. Charging any refrigerant other than the original charge type R-1234ze(E) will impair machine operation and even destroy the compressors. The compressors operating with this refrigerant type are lubricated with a synthetic polyolester oil.

RISK OF EXPLOSION: 

Never use air or a gas containing oxygen during leak tests to purge lines or to pressurise a machine. Pressurised air mixtures or gases containing oxygen can be the cause of an explosion.

Only use dry nitrogen for leak tests, possibly with an appropriate tracer gas.

If the recommendations above are not observed, this can have serious or even fatal consequences and damage the installation.

Never exceed the specified maximum operating pressures. Verify the allowable maximum high- and low-side test pressures by checking the instructions in this manual and the pressures given on the unit name plate.

Do not unweld or flamecut the refrigerant lines or any refrigerant circuit component until all refrigerant (liquid and vapour) as well as the oil have been removed from chiller. Traces of vapour should be displaced with dry air nitrogen. Refrigerant in contact with an open flame produces toxic gases.

The necessary protection equipment must be available, and appropriate fire extinguishers for the system and the refrigerant type used must be within easy reach.

Do not siphon refrigerant.

Avoid spilling liquid refrigerant on skin or splashing it into the eyes. Use safety goggles and safety gloves. Wash any spills from the skin with soap and water. If liquid refrigerant enters the eyes, immediately and abundantly flush the eyes with water and consult a doctor.

The accidental releases of the refrigerant, due to small leaks or significant discharges following the rupture of a pipe or an unexpected release from a safety valve, can cause frostbites and burns to personnel exposed. Do not ignore such injuries. Installers, owners and especially service engineers for these units must:

- **Seek medical attention before treating such injuries.**
- **Have access to a first-aid kit, especially for treating eye injuries.**

We recommend to apply standard EN 378-3 Annex 3.

Never apply an open flame or live steam to a refrigerant container. Dangerous overpressure can result. If it is necessary to heat refrigerant, use only warm water.

During refrigerant removal and storage operations follow applicable regulations. These regulations, permitting conditioning and recovery of halogenated hydrocarbons under optimum quality conditions for the products and optimum safety conditions for people, property and the environment are described in standard NF E29-795.

Any refrigerant transfer and recovery operations must be carried out using a transfer unit. A 3/8" SAE connector on the manual liquid line valve is supplied with all units for connection to the transfer station. The units must never be modified to add refrigerant and oil charging, removal and purging devices. All these devices are provided with the units. Please refer to the certified dimensional drawings for the units.

Do not re-use disposable (non-returnable) cylinders or attempt to refill them. It is dangerous and illegal. When cylinders are empty, evacuate the remaining gas pressure, and move the cylinders to a place designated for their recovery. Do not incinerate them.

ATTENTION: Only use refrigerant R1234ze(E), in accordance with 700 AHRI (Air conditioning, Heating and Refrigeration Institute). The use of any other refrigerant may expose users and operators to unexpected risks.

Do not attempt to remove refrigerant circuit components or fittings, while the machine is under pressure or while it is running. Be sure pressure is at 0 kPa and that the unit has been shut-down and de-energised before removing components or opening a circuit.

Do not attempt to repair or recondition any safety devices when corrosion or build-up of foreign material (rust, dirt, scale, etc.) is found within the valve body or mechanism. If necessary, replace the device. Do not install relief valves in series or backwards.

ATTENTION: No part of the unit must be used as a walk-way, rack or support. Periodically check and repair or if necessary replace any component or piping that shows signs of damage.

The refrigerant lines can break under the weight and release refrigerant, causing personal injury.

Use a platform, or staging to work at higher levels.

Use mechanical lifting equipment (crane, hoist, winch, etc.) to lift or move heavy components. For lighter components, use lifting equipment when there is a risk of slipping or losing your balance.

Use only original replacement parts for any repair or component replacement. Consult the list of replacement parts that corresponds to the specification of the original equipment.

Do not drain water circuits containing industrial brines, without informing the technical service department at the installation site or a competent body first.

Close the entering and leaving water shutoff valves and purge the unit water circuit, before working on the components installed on the circuit (screen filter, pump, water flow switch, etc.).

Do not loosen the water box bolts until the water boxes have been completely drained.

Periodically inspect all valves, fittings and pipes of the refrigerant and hydraulic circuits to ensure that they do not show any corrosion or any signs of leaks.

It is recommended to wear ear defenders, when working near the unit and the unit is in operation.

2.1 - Check equipment received

- Check that the unit has not been damaged during transport and that no parts are missing. If the unit has been damaged or the shipment is incomplete, send a claim to the shipping company.
- Compare the name plate data with the order. The name plate is attached in two places to the unit:
  - On one of the unit sides on the outside,
  - On the control box door on the inside.
- The unit name plate must include the following information:
  - Address of manufacturer
  - Version number
  - Model number
  - CE marking
  - Serial number
  - Year of manufacture and test date
  - Fluid being transported
  - Refrigerant used and refrigerant class
  - Refrigerant charge per circuit
  - Containment fluid to be used
  - **PS:** Min./max. allowable pressure (high and low pressure side)
  - **TS:** Min./max. allowable temperature (high and low pressure side)
  - Pressure switch cut-out pressure
  - Unit leak test pressure
  - Voltage, frequency, number of phases
  - Maximum current drawn
  - Maximum power input
  - Unit net weight
- Confirm that all accessories ordered for on-site installation have been supplied, are complete and undamaged.

The unit must be checked periodically during its whole operating life to ensure that no shocks (handling accessories, tools etc.) have damaged it. If necessary, damaged parts must be repaired or replaced. See also chapter 12 - "Standard maintenance".

2.2 - Moving and siting the unit

2.2.1 - Moving

See chapter 1.1 "Installation safety considerations".

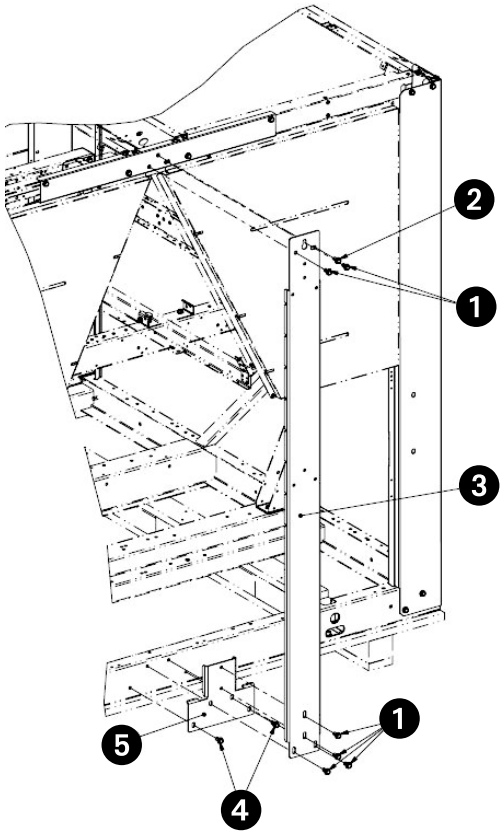
In some cases vertical supports are added for the transport and handling of the unit. These supports can be removed for access or connection, if required.

IMPORTANT: Follow the disassembly sequence shown in the disassembly instruction notes.

NOTE:

- **Screw off item: 1**
- **Loosen screw item: 2**
- **Raise and remove frame post item: 3**
- **Screw off item: 4 and remove reinforcement plate item: 5**
- **Keep the vertical supports after commissioning the units and re-insert them when the unit is moved.**

See the slinging plan for each machine in appendix 4.



2.2.2 - Siting the unit

The machine must be installed in a place that is not accessible to the public or protected against access by non-authorised persons.

The unit is not intended to be used in ATEX zone.

The unit must be installed in outdoor and open space. Condenser air flow shall not be restricted for proper unit operation.

In case of extra-high units the machine environment must permit easy access for maintenance operations.

Always refer to the chapter 3 "Dimensions, clearances" to confirm that there is adequate space for all connections and service operations. For the centre of gravity coordinates, the position of the unit mounting holes, and the weight distribution points, refer to the certified dimensional drawing supplied with the unit.

The support points under the chassis must have at least the size of the chassis opening at the lifting point (minimum 220 x 180 mm) in order to prevent a deformation of the chassis.

Typical applications of these units are in refrigeration systems, and they do not require earthquake resistance. Earthquake resistance has not been verified.

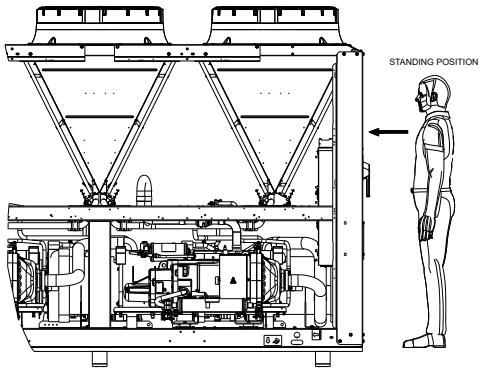
CAUTION: Only use slings at the designated lifting points which are marked on the unit.

(See also chapter 3 for information about slinging points)

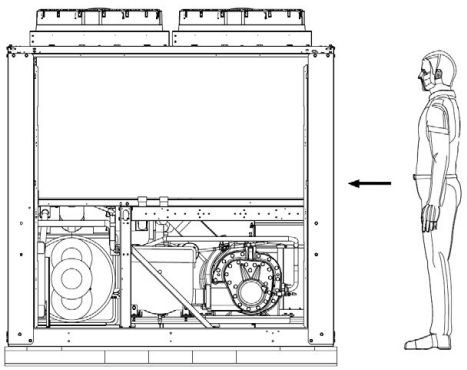
Before siting the unit check that:

- The permitted loading at the site is adequate or that appropriate strenghtening measures have been taken.
- The unit is installed level on an even surface (maximum tolerance is 5 mm in both axes).
- There is adequate space above the unit for air flow and to ensure access to the components.
- The number of support points is adequate and that they are in the right places.
- If the support structure is sensitive to vibration and/or noise transmission it is advisable to insert anti-vibration mounts between the unit and the structure. Selection of these devices is based on the system characteristics and the comfort level required and should be made by technical specialists.
- If the optional anti-vibration mounts are present, their number and position must comply with the indications given on the certified dimensional drawing.
- The location is not subject to flooding.
- For outdoor installations, where heavy snowfall is likely and long periods of sub-zero temperatures are normal, provision has to be made to prevent snow accumulating by raising the unit above the height of drifts normally experienced.
- Baffles may be necessary to deflect strong winds. They must not restrict air flow into the unit.
- Operator work position

30XB(E/P)ZE 200_400



30XB(E/P)ZE 450_1200



CAUTION: Before lifting the unit, check that all casing panels are securely fixed in place. Lift and set down the unit with great care. Tilting and jarring can damage the unit and impair unit operation.

If 30XB(E/P)ZE units are hoisted with rigging, it is advisable to protect coils against crushing while a unit is being moved. Use struts or spreader bar to spread the slings above the unit. Do not tilt a unit more than 15°.

WARNING: Never push or lever on any of the enclosure panels of the unit. Only the base of the unit frame is designed to withstand such stresses.

If a unit includes a hydraulic module (options 116S or U), the hydraulic module and pump piping must be installed in a way that does not submit it to any strain. The hydraulic module pipes must be fitted so that the pump does not support the weight of the pipes.

2.2.3 - Checks before system start-up

Before the start-up of the refrigeration system, the complete installation, including the refrigeration system must be verified against the installation drawings, dimensional drawings, system piping and instrumentation diagrams and the wiring diagrams.

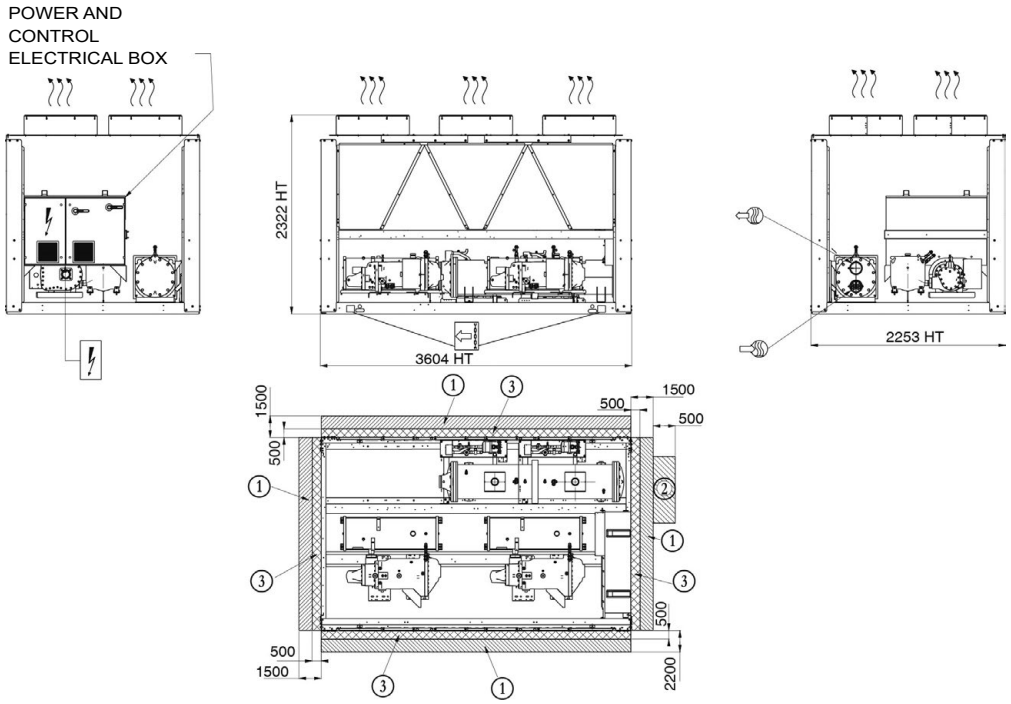
For these checks national regulations must be followed. If the national regulation does not specify any details, refer to standard EN 378 as follows:

External visual installation checks:

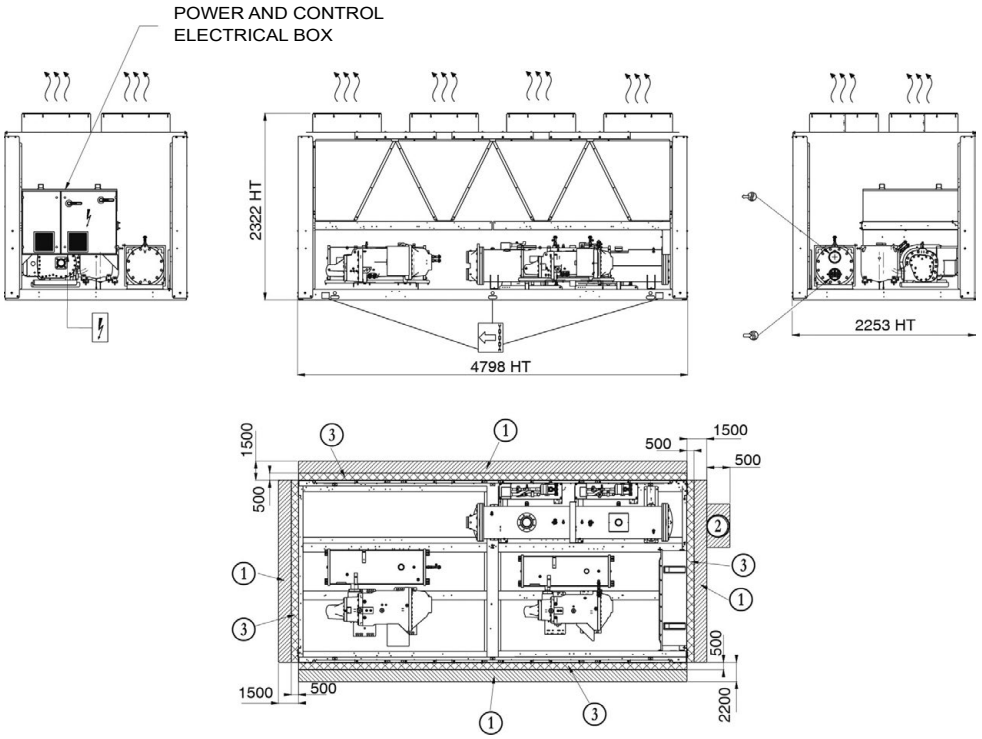
- Ensure that the machine is charged with refrigerant. Verify on the unit nameplate that the 'fluid transported' is R1234ze(E) and is not nitrogen.
- Compare the complete installation with the refrigeration system and power circuit diagrams.
- Check that all components comply with the design specifications.
- Check that all protection documents and equipment provided by the manufacturer (dimensional drawings, P&ID, declarations etc.) to comply with the regulations are present.
- Verify that the environmental safety and protection and devices and arrangements provided by the manufacturer to comply with the regulations are in place.
- Verify that all documents for pressure containers, certificates, name plates, files, instruction manuals provided by the manufacturer to comply with the regulations are present.
- Verify the free passage of access and safety routes.
- Check that ventilation in the plant room is adequate (if applicable).
- Check that refrigerant detectors are present (if applicable).
- Verify the instructions and directives to prevent the deliberate removal of refrigerant gases that are harmful to the environment.
- Verify the installation of connections.
- Verify the supports and fixing elements (materials, routing and connection).
- Verify the quality of welds and other joints.
- Check the protection against mechanical damage.
- Check the protection against heat.
- Check the protection of moving parts.
- Verify the accessibility for maintenance or repair and to check the piping.
- Verify the status of the valves.
- Verify the quality of the thermal insulation and of the vapour barriers.3 -

3 - DIMENSIONS, CLEARANCES

3.1 - 30XB(E/P)ZE 0200 to 250



3.2 - 30XB(E/P)ZE 0300 to 400



Legend
All dimensions are given in mm.

(1) Required clearances for maintenance (see note)

(2) Recommended space for evaporator tube removal

(3) ATEX zone around the unit

Water inlet for standard unit - for options 100A, 100C, 107 refer to the certified drawing.

Water outlet for standard unit - for options 100A, 100C, 107 refer to the certified drawing.

Air outlet – do not obstruct

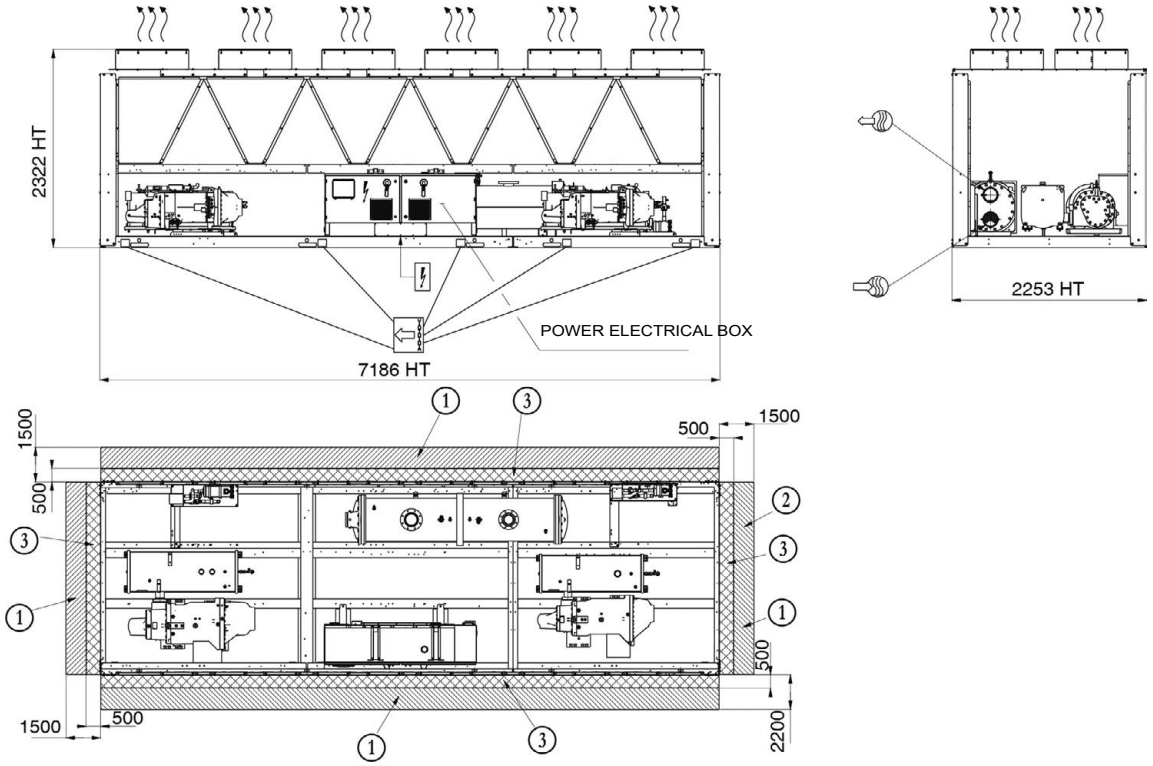
Power supply and control connection

Slinging points

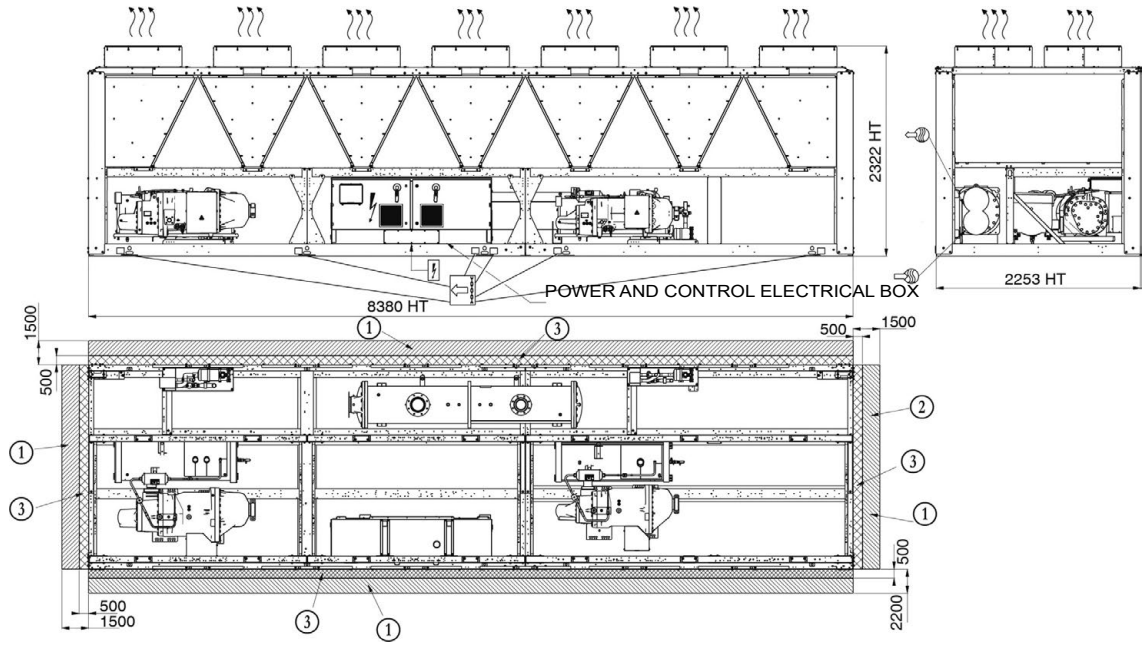
NOTES:

- Drawings are not contractually binding.
- Refer to unit nameplate for unit weight information
- Before designing an installation, consult the certified dimensional drawings, provided with the unit (Appedix 4).
- If the installation includes several units or if this (these) is (are) close to walls, please refer to chapters 3.8 - “Multiple chiller installation” and 3.9 - “Distance to the wall” of the installation manual to determine the space required

3.3 - 30XBEZE 0450 to 630, 30XBPZE 0450 to 0600



3.4 - 30XBEZE 0700 & 750, 30XBPZE 0630 & 700



Legend

All dimensions are given in mm.

(1) Required clearances for maintenance (see note)

(2) Recommended space for evaporator tube removal

(3) ATEX zone around the unit

Water inlet for standard unit - for options 100A, 100C, 107 refer to the certified drawing.

Water outlet for standard unit - for options 100A, 100C, 107 refer to the certified drawing.

Air outlet – do not obstruct

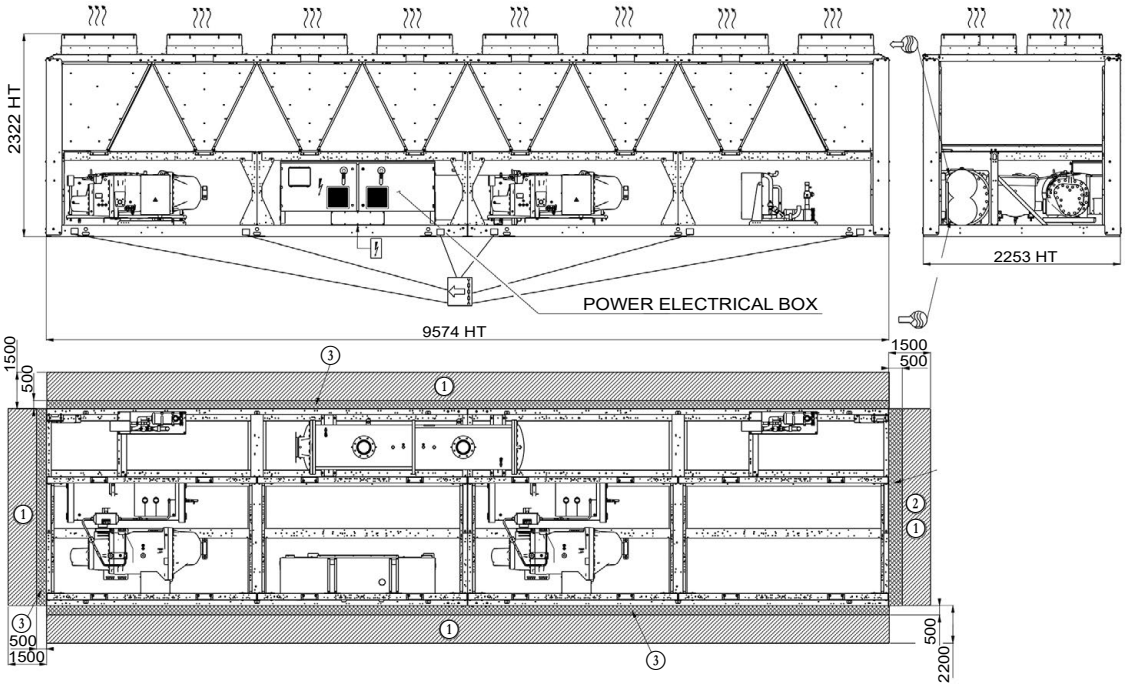
Power supply and control connection

Slinging points

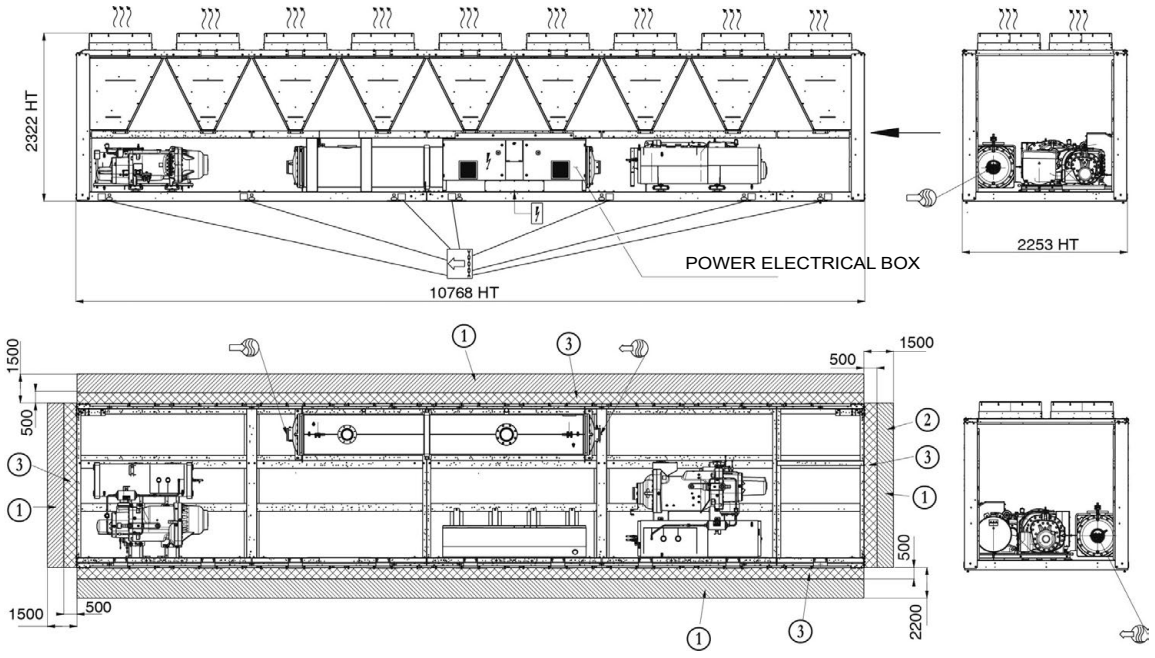
NOTES:

- Drawings are not contractually binding.
- Refer to unit nameplate for unit weight information
- Before designing an installation, consult the certified dimensional drawings, provided with the unit (Appedix 4).
- If the installation includes several units or if this (these) is (are) close to walls, please refer to chapters 3.8 - “Multiple chiller installation” and 3.9 - “Distance to the wall” of the installation manual to determine the space required

3.5 - 30XBPZE 0750



3.6 - 30XBEZE 0900 & 950



Legend
All dimensions are given in mm.

(1) Required clearances for maintenance (see note)

(2) Recommended space for evaporator tube removal

(3) ATEX zone around the unit

Water inlet for standard unit - for options 100A, 100C, 107 refer to the certified drawing.

Water outlet for standard unit - for options 100A, 100C, 107 refer to the certified drawing.

Air outlet – do not obstruct

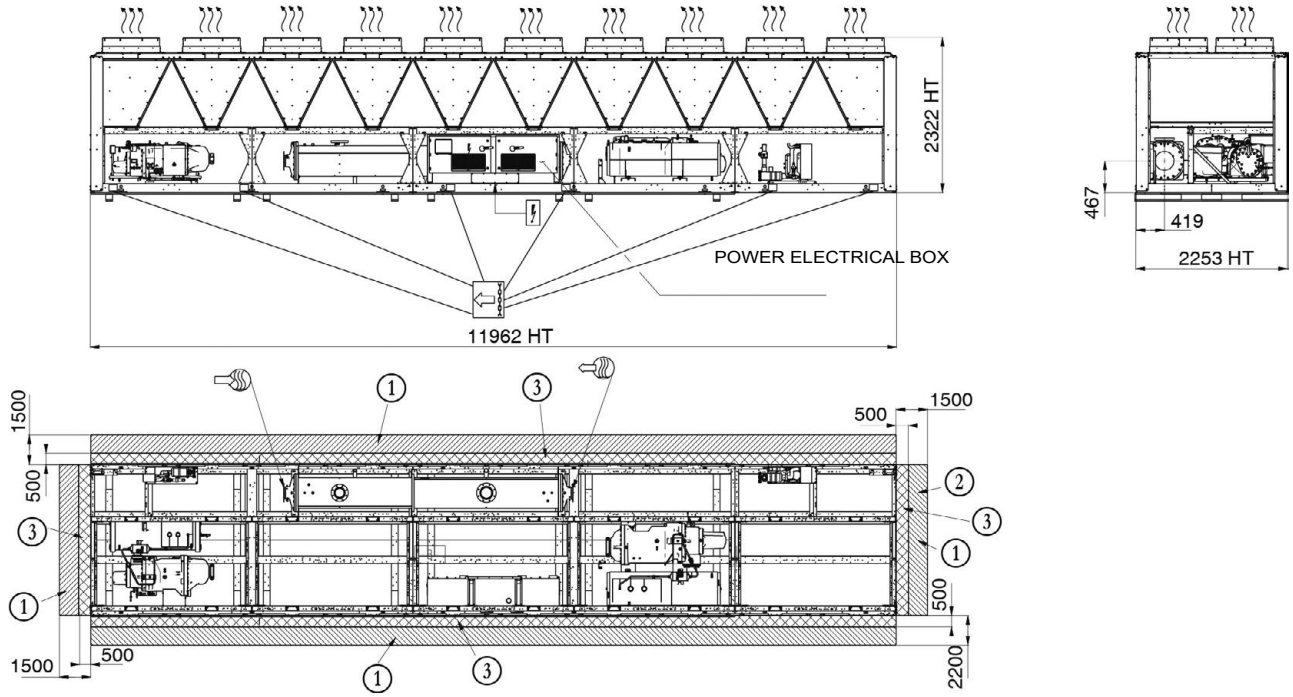
Power supply and control connection

Slinging points

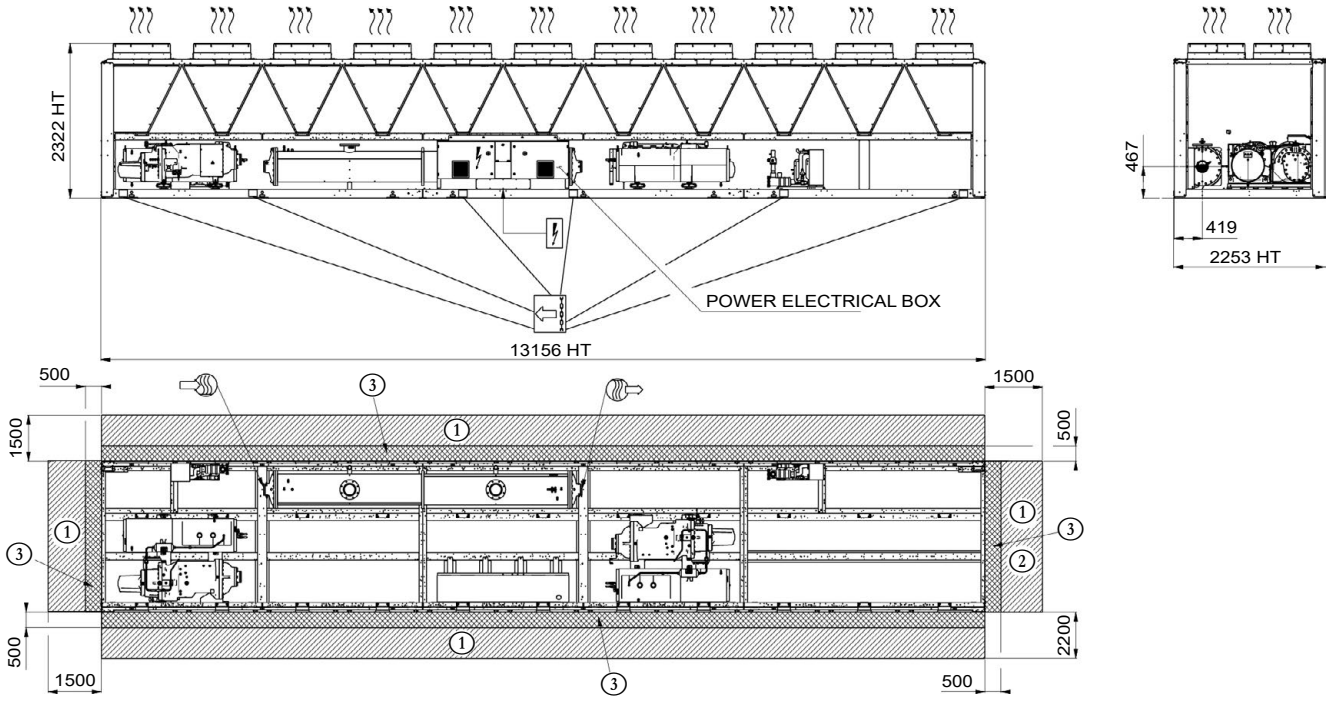
NOTES:

- Drawings are not contractually binding.
- Refer to unit nameplate for unit weight information
- Before designing an installation, consult the certified dimensional drawings, provided with the unit (Appedix 4).
- If the installation includes several units or if this (these) is (are) close to walls, please refer to chapters 3.8 - “Multiple chiller installation” and 3.9 - “Distance to the wall” of the installation manual to determine the space required

3.7 - 30XBEZE 1050 & 1150, 30XBPZE 0900 to 1150



3.8 - 30XB(E/P)ZE 1200



Legend

All dimensions are given in mm.

1. Required clearances for maintenance (see note)
2. Recommended space for evaporator tube removal
3. ATEX zone around the unit

Water inlet for standard unit - for options 100A, 100C, 107 refer to the certified drawing.

Water outlet for standard unit - for options 100A, 100C, 107 refer to the certified drawing.

Air outlet – do not obstruct

Power supply and control connection

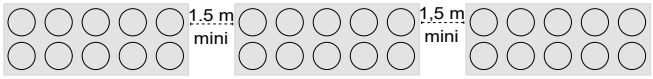
Slinging points

NOTES:

- Drawings are not contractually binding.
- Refer to unit nameplate for unit weight information
- Before designing an installation, consult the certified dimensional drawings, provided with the unit (Appedix 4).
- If the installation includes several units or if this (these) is (are) close to walls, please refer to chapters 3.8 - “Multiple chiller installation” and 3.9 - “Distance to the wall” of the installation manual to determine the space required

3.9 - Multiple chiller installation

It is recommended to install multiple chillers in a single row, arranged as shown in the example below, to avoid recycling of warm air from one unit to another.



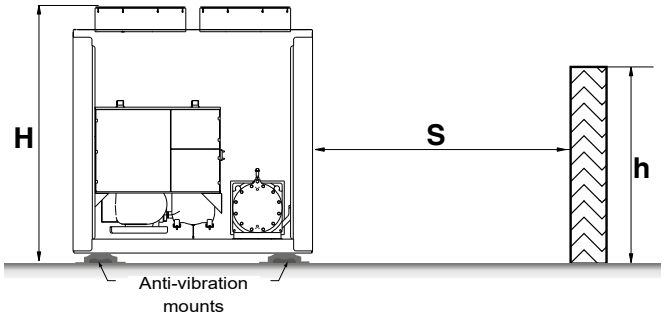
If the situation at the site does not permit this arrangement, contact your Carrier distributor to evaluate the various possible arrangements. In certain situations an accessory (supplied loose at the time of purchase) can be added.

3.10 - Distance to the wall

To ensure correct operation for most cases:

If h < H (2.3 m), minimum S = 3 m

If h > H or S < 3 m, contact your Carrier distributor to evaluate the various possible arrangements.



3.11 - Underneath a roof.

The upper part of the machine (on top of the fans) must not be covered.

If the floor space requires the machine to be partially covered, contact your Carrier distributor to assess the various installation option.

4 - PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

4.1 - Physical data 30XBEZE

30XBEZE 0200 to 0600 standard units

30XBEZE		200	230	250	300	350	400	450	500	550	600
Sound levels											
Standard unit											
Sound power(1)	dB(A)	99	99	99	99	101	99	101	99	103	103
Sound pressure at 10 m(2)		67	67	67	67	69	67	68	66	70	70
Sound pressure at 1 m	dB(A)	80	80	80	79	81	79	80	78	82	82
Unit + option 15(3)											
Sound power(1)	dB(A)	93	93	94	95	95	95	97	96	97	98
Sound pressure at 10 m(2)	dB(A)	61	61	62	63	63	63	64	63	64	65
Sound pressure at 1 m	dB(A)	74	74	75	75	75	75	76	75	76	77
Unit + option 15LS(3)											
Sound power(1)	dB(A)	87	87	87	90	91	91	93	92	94	94
Sound pressure at 10 m(2)	dB(A)	55	55	55	58	59	59	60	59	61	61
Sound pressure at 1 m	dB(A)	68	68	68	70	71	71	72	71	73	73
Unit + option 15LS+(3)											
Sound power(1)	dB(A)	-	-	-	-	89	89	91	90	91	92
Sound pressure at 10 m(2)	dB(A)	-	-	-	-	57	57	58	57	58	59
Sound pressure at 1 m	dB(A)	-	-	-	-	69	69	70	69	70	71
Dimensions											
Standard unit											
Length	mm	3604	3604	3604	4798	4798	4798	7186	7186	7186	7186
Width	mm	2253	2253	2253	2253	2253	2253	2253	2253	2253	2253
Height	mm	2322	2322	2322	2322	2322	2322	2322	2322	2322	2322
Operating weight(4)											
Standard unit	kg	3040	3071	3091	3674	3737	3798	4797	4943	5201	5514
Unit + option 15 (3)	kg	3308	3339	3359	3973	4036	4097	5128	5274	5532	5845
Compressors		06T semi-hermetic screw compressor, 50 r/s									
Circuit A		1	1	1	1	1	1	1	1	1	1
Circuit B		1	1	1	1	1	1	1	1	1	1
No, of control stages											
Refrigerant for standard unit(4)		R1234ze(E) / A2L									
Circuit A	kg	39	37	37	52	53	55	60	61	69	69
	teqCO_2	0,04	0,04	0,04	0,05	0,05	0,05	0,06	0,06	0,07	0,07
Circuit B	kg	40	38	39	40	40	37	61	64	61	67
	teqCO_2	0,04	0,04	0,04	0,04	0,04	0,04	0,06	0,06	0,06	0,07
Oil											
Circuit A	l	20,8	20,8	20,8	23,5	23,5	23,5	23,5	23,5	27,6	27,6
Circuit B	l	20,8	20,8	20,8	20,8	20,8	20,8	23,5	23,5	23,5	23,5

(1) in dB ref=10^{-12} W, 'A' weighted. Declared dual-number noise emission values in accordance with ISO 4871 with an associated uncertainty of +/-3dB(A). Measured in accordance with ISO 9614-1 and certified by Eurovent.
(2) In dB ref 20µPa, 'A' weighted. Declared dual-number noise emission values in accordance with ISO 4871 with an associated uncertainty of +/-3dB(A). For information, calculated from the sound power Lw(A).
(3) Options : 15 = Low noise, 15LS = Very Low noise, 15LS+ = Ultra Low noise
(4) Values are guidelines only. Refer to the unit name plate.

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4 -PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

30XBEZE		200	230	250	300	350	400	450	500	550	600
Capacity control		SmartVu™, Electronic Expansion Valve (EXV)									
Minimum capacity	%	15	15	15	15	15	15	15	15	15	15
Air heat exchanger		Aluminum micro-channel coils (MCHE)									
Fans		FLYING-BIRD 6, axial fan with rotating impeller									
Standard unit											
Quantity		6	6	6	8	8	8	11	12	12	12
Maximum total air flow	l/s	28920	28920	28920	38560	38560	38560	53020	57840	57840	57840
Maximum rotation speed	r/s	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7
Unit + option 15LS											
Maximum total air flow	l/s	23580	23580	23580	31440	31440	31440	43230	47160	47160	47160
Maximum rotation speed	r/s	11,7	11,7	11,7	11,7	11,7	11,7	11,7	11,7	11,7	11,7
Water heat exchanger		Flooded multi-pipe type									
Water volume	l	58	61	61	66	70	77	79	94	98	119
Max, water-side operating pressure without hydraulic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Water connections		Victaulic® type									
Standard & option 6											
Nominal diameter	in	5	5	5	5	5	5	5	6	6	6
Actual outside diameter	mm	141,3	141,3	141,3	141,3	141,3	141,3	141,3	168,3	168,3	168,3
Options 5 & 100A											
Nominal diameter	in	4	4	4	4	4	4	5	5	5	5
Actual outside diameter	mm	114,3	114,3	114,3	114,3	114,3	114,3	141,3	141,3	141,3	141,3
Options 116											
Nominal diameter	in	4	4	4	4	4	4	-	-	-	-
Actual outside diameter	mm	114,3	114,3	114,3	114,3	114,3	114,3	-	-	-	-
Casing paint		Colour code RAL 7035									

(5) Depends on options.

4 -PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

30XBEZE 0630 to 1200 standard units

30XBEZE		630	700	750	900	950	1050	1150	1200
Sound levels									
Standard unit									
Sound power(1)	dB(A)	101	104	102	103	102	104	104	104
Sound pressure at 10 m(2)		68	71	69	70	69	71	71	71
Sound pressure at 1 m	dB(A)	80	83	81	81	80	81	81	81
Unit + option 15(3)									
Sound power(1)	dB(A)	97	99	98	98	98	100	99	99
Sound pressure at 10 m(2)	dB(A)	64	66	65	65	65	67	66	66
Sound pressure at 1 m	dB(A)	76	78	77	76	76	77	76	76
Unit + option 15LS(3)									
Sound power(1)	dB(A)	94	95	94	94	94	99	95	96
Sound pressure at 10 m(2)	dB(A)	61	62	61	61	61	66	62	63
Sound pressure at 1 m	dB(A)	73	74	73	72	72	76	72	73
Unit + option 15LS+(3)									
Sound power(1)	dB(A)	91	93	92	93	93	97	94	95
Sound pressure at 10 m(2)	dB(A)	58	60	59	60	60	64	61	62
Sound pressure at 1 m	dB(A)	70	72	71	71	71	74	71	72
Dimensions									
Standard unit									
Length	mm	7186	8380	8380	10770	10770	11962	11962	13157
Width	mm	2253	2253	2253	2253	2253	2253	2253	2253
Height	mm	2322	2322	2322	2322	2322	2322	2322	2322
Operating weight(4)									
Standard unit	kg	5563	6168	6344	7687	7780	8660	8735	9072
Unit + option 15(3)	kg	5894	6499	6675	8061	8154	9034	9109	9446
Compressors		06T semi-hermetic screw compressor, 50 r/s							
Circuit A		1	1	1	1	1	1	1	1
Circuit B		1	1	1	1	1	1	1	1
No. of control stages									
Refrigerant for standard unit(4)		R1234ze(E) / A2L							
Circuit A	kg	69	72	72	80	80	115	121	124
	teqCO_2	0,07	0,07	0,07	0,08	0,08	0,12	0,12	0,12
Circuit B	kg	67	74	74	121	126	121	127	130
	teqCO_2	0,07	0,07	0,07	0,12	0,13	0,12	0,13	0,13
Oil									
Circuit A	l	27,6	27,6	27,6	27,6	27,6	36,0	36,0	36,0
Circuit B	l	23,5	27,6	27,6	36,0	36,0	36,0	36,0	36,0

(1) in dB ref=10^{-12} W, 'A' weighted. Declared dual-number noise emission values in accordance with ISO 4871 with an associated uncertainty of +/-3dB(A). Measured in accordance with ISO 9614-1 and certified by Eurovent.
(2) In dB ref 20µPa, 'A' weighted. Declared dual-number noise emission values in accordance with ISO 4871 with an associated uncertainty of +/-3dB(A). For information, calculated from the sound power Lw(A).
(3) Options : 15 = Low noise, 15LS = Very Low noise, 15LS+ = Ultra Low noise
(4) Values are guidelines only. Refer to the unit name plate.

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4 -PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

30XBEZE		630	700	750	900	950	1050	1150	1200
Capacity control		SmartVu™, Electronic Expansion Valve (EXV)							
Minimum capacity	%	15	15	15	15	15	15	15	15
Air heat exchanger		Aluminum micro-channel coils (MCHE)							
Fans		FLYING-BIRD 6, axial fan with rotating impeller							
Standard unit									
Quantity		12	14	14	18	18	20	20	22
Maximum total air flow	l/s	57840	67480	67480	86760	86760	96400	96400	106040
Maximum rotation speed	r/s	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7
Unit + option 15LS									
Maximum total air flow	l/s	47160	55020	55020	70740	70740	78600	78600	86460
Maximum rotation speed	r/s	11,7	11,7	11,7	11,7	11,7	11,7	11,7	11,7
Water heat exchanger		Flooded multi-pipe type							
Water volume	l	119	130	140	164	174	180	189	189
Max, water-side operating pressure without hydraulic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000
Water connections		Victaulic® type							
Standard & option 6									
Nominal diameter	in	6	6	8	6	6	6	6	6
Actual outside diameter	mm	168,3	168,3	219,1	168,3	168,3	168,3	168,3	168,3
Options 5 & 100A									
Nominal diameter	in	5	5	6	6	6	6	6	6
Actual outside diameter	mm	141,3	141,3	168,3	168,3	168,3	168,3	168,3	168,3
Casing paint		Colour code RAL 7035							

(5) Depends of options.

4.2 - Physical data 30XBPZE

30XBPZE 0200 to 600

30XBPZE		200	230	250	300	350	400	450	500	550	600
Sound levels											
Standard unit											
Sound power(1)	dB(A)	99	99	99	99	101	99	101	99	103	103
Sound pressure at 10 m(2)		67	67	67	67	69	67	68	66	70	70
Sound pressure at 1 m	dB(A)	80	80	80	79	81	79	80	78	82	82
Unit + option 15(3)											
Sound power(1)	dB(A)	93	93	94	95	95	95	97	96	97	98
Sound pressure at 10 m(2)	dB(A)	61	61	62	63	63	63	64	63	64	65
Sound pressure at 1 m	dB(A)	74	74	75	75	75	75	76	75	76	77
Unit + option 15LS(3)											
Sound power(1)	dB(A)	87	87	87	90	91	91	93	92	94	94
Sound pressure at 10 m(2)	dB(A)	55	55	55	58	59	59	60	59	61	61
Sound pressure at 1 m	dB(A)	68	68	68	70	71	71	72	71	73	73
Unit + option 15LS+(3)											
Sound power(1)	dB(A)	-	-	-	-	89	89	91	90	91	92
Sound pressure at 10 m(2)	dB(A)	-	-	-	-	57	57	58	57	58	59
Sound pressure at 1 m	dB(A)	-	-	-	-	69	69	70	69	70	71
Dimensions											
Standard unit											
Length	mm	3604	3604	3604	4798	4798	4798	7186	7186	7186	7186
Width	mm	2253	2253	2253	2253	2253	2253	2253	2253	2253	2253
Height	mm	2322	2322	2322	2322	2322	2322	2322	2322	2322	2322
Operating weight(4)											
Standard unit	kg	3015	3047	3066	3652	3715	3776	4761	4895	5161	5474
Unit + option 15(3)	kg	3283	3314	3334	3952	4014	4075	5092	5226	5492	5805
Compressors		06T semi-hermetic screw compressor, 50 r/s									
Circuit A		1	1	1	1	1	1	1	1	1	1
Circuit B		1	1	1	1	1	1	1	1	1	1
No, of control stages											
Refrigerant for standard unit(4)		R1234ze(E) / A2L									
Circuit A	kg	39	37	37	52	53	55	60	61	69	69
	teqCO_2	0,04	0,04	0,04	0,05	0,05	0,05	0,06	0,06	0,07	0,07
Circuit B	kg	40,0	38	39	40	40	36	61	64	61	67
	teqCO_2	0,04	0,04	0,04	0,04	0,04	0,04	0,06	0,06	0,06	0,07
Oil											
Circuit A	l	20,8	20,8	20,8	23,5	23,5	23,5	23,5	23,5	27,6	27,6
Circuit B	l	20,8	20,8	20,8	20,8	20,8	20,8	23,5	23,5	23,5	23,5

(1) in dB ref=10^{-12} W, 'A' weighted. Declared dual-number noise emission values in accordance with ISO 4871 with an associated uncertainty of +/-3dB(A). Measured in accordance with ISO 9614-1 and certified by Eurovent.
(2) In dB ref 20µPa, 'A' weighted. Declared dual-number noise emission values in accordance with ISO 4871 with an associated uncertainty of +/-3dB(A). For information, calculated from the sound power Lw(A).
(3) Options : 15 = Low noise, 15LS = Very Low noise, 15LS+ = Ultra Low noise
(4) Values are guidelines only. Refer to the unit name plate.

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4 -PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

30XBPZE		200	230	250	300	350	400	450	500	550	600
Capacity control		SmartVu™, , Electronic Expansion Valve (EXV)									
Minimum capacity	%	15	15	15	15	15	15	15	15	15	15
Air heat exchanger		Aluminum micro-channel coils (MCHE)									
Fans		FLYING-BIRD 6, axial fan with rotating impeller									
Standard unit											
Quantity		6	6	6	8	8	8	11	12	12	12
Maximum total air flow	l/s	28920	28920	28920	38560	38560	38560	53020	57840	57840	57840
Maximum rotation speed	r/s	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7
Unit + option 15LS											
Maximum total air flow	l/s	23580	23580	23580	31440	31440	31440	43230	47160	47160	47160
Maximum rotation speed	r/s	11,7	11,7	11,7	11,7	11,7	11,7	11,7	11,7	11,7	11,7
Water heat exchanger		Flooded multi-pipe type									
Water volume	l	58	61	61	66	70	77	79	94	98	119
Max, water-side operating pressure without hydraulic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Water connections		Victaulic® type									
Standard & option 6											
Nominal diameter	in	4	4	4	4	4	4	5	6	6	6
Actual outside diameter	mm	114,3	114,3	114,3	114,3	114,3	114,3	141,3	168,3	168,3	168,3
Options 5 & 100A											
Nominal diameter	in	5	5	5	5	5	5	5	5	5	5
Actual outside diameter	mm	141,3	141,3	141,3	141,3	141,3	141,3	141,3	141,3	141,3	141,3
Options 116											
Nominal diameter	in	4	4	4	4	4	4	-	-	-	-
Actual outside diameter	mm	114,3	114,3	114,3	114,3	114,3	114,3	-	-	-	-
Casing paint		Colour code RAL 7035									

(5) Depends on options.

4 -PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

30XBPZE 630 to 1200

30XBPZE		630	700	750	900	950	1050	1150	1200
Sound levels									
Standard unit									
Sound power(1)	dB(A)	101	104	102	103	102	104	104	104
Sound pressure at 10 m(2)		68	71	69	70	69	71	71	71
Sound pressure at 1 m	dB(A)	80	83	80	80	79	81	81	81
Unit + option 15(3)									
Sound power(1)	dB(A)	97	99	98	98	98	100	99	99
Sound pressure at 10 m(2)	dB(A)	64	66	65	65	65	67	66	66
Sound pressure at 1 m	dB(A)	76	78	76	75	75	77	76	76
Unit + option 15LS(3)									
Sound power(1)	dB(A)	94	95	94	94	94	99	95	96
Sound pressure at 10 m(2)	dB(A)	61	62	61	61	61	66	62	63
Sound pressure at 1 m	dB(A)	73	74	72	71	71	76	72	73
Unit + option 15LS+(3)									
Sound power(1)	dB(A)	91	92	92	93	93	97	94	95
Sound pressure at 10 m(2)	dB(A)	58	59	59	60	60	64	61	62
Sound pressure at 1 m	dB(A)	70	71	70	70	70	74	71	72
Dimensions									
Standard unit									
Length	mm	8380	8380	9574	11962	11962	11962	11962	13157
Width	mm	2253	2253	2253	2253	2253	2253	2253	2253
Height	mm	2322	2322	2322	2322	2322	2322	2322	2322
Operating weight(4)									
Standard unit	kg	5841	6114	6607	7867	7993	8622	8697	9000
Unit + option 15(3)	kg	6172	6445	6938	8241	8367	8996	9071	9374
Compressors		06T semi-hermetic screw compressor, 50 r/s							
Circuit A		1	1	1	1	1	1	1	1
Circuit B		1	1	1	1	1	1	1	1
No, of control stages									
Refrigerant for standard unit(4)		R1234ze(E) /A2L							
Circuit A	kg	75	72	79	82	84	115	121	124
	$teqCO_2$	0,08	0,07	0,08	0,08	0,08	0,12	0,12	0,12
Circuit B	kg	67	74	83	118	130	121	127	130
	$teqCO_2$	0,07	0,07	0,08	0,12	0,13	0,12	0,13	0,13
Oil									
Circuit A	l	27,6	27,6	27,6	27,6	27,6	36,0	36,0	36,0
Circuit B	l	23,5	27,6	27,6	36,0	36,0	36,0	36,0	36,0

(1) in dB ref=10^{-12} W, 'A' weighted. Declared dual-number noise emission values in accordance with ISO 4871 with an associated uncertainty of +/-3dB(A). Measured in accordance with ISO 9614-1 and certified by Eurovent.
(2) In dB ref 20µPa, 'A' weighted. Declared dual-number noise emission values in accordance with ISO 4871 with an associated uncertainty of +/-3dB(A). For information, calculated from the sound power Lw(A).
(3) Options : 15 = Low noise, 15LS = Very Low noise, 15LS+ = Ultra Low noise
(4) Values are guidelines only. Refer to the unit name plate.

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

Eurovent certified values

4 -PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

30XBPZE		630	700	750	900	950	1050	1150	1200
Capacity control									
Minimum capacity	%	15	15	15	15	15	15	15	15
Air heat exchanger		Aluminum micro-channel coils (MCHE)							
Fans		FLYING-BIRD 6, axial fan with rotating impeller							
Standard unit									
Quantity		14	14	16	19	20	20	20	22
Maximum total air flow	l/s	67480	67480	77120	91580	96400	96400	96400	106040
Maximum rotation speed	r/s	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7
Unit + option 15LS									
Maximum total air flow	l/s	55020	55020	62880	74670	78600	78600	78600	86460
Maximum rotation speed	r/s	11,7	11,7	11,7	11,7	11,7	11,7	11,7	11,7
Water heat exchanger		Flooded multi-pipe type							
Water volume	l	119	130	140	164	174	180	189	189
Max, water-side operating pressure without hydraulic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000
Water connections		Victaulic® type							
Standard & option 6									
Nominal diameter	in	6	6	8	6	6	6	6	6
Actual outside diameter	mm	168,3	168,3	219,1	168,3	168,3	168,3	168,3	168,3
Options 5 & 100A									
Nominal diameter	in	5	5	6	6	6	6	6	6
Actual outside diameter	mm	141,3	141,3	168,3	168,3	168,3	168,3	168,3	168,3
Casing paint		Colour code RAL 7035							

(5) Depends on options.

4.3 - Short-circuit stability current for all units

30XB(E/P)ZE		200 to 400	450 to 750	900 to 1200
Short-circuit whistand current (TN system)				
Circuit A+B	KA	38	50	50
Unit + option 81	kA	NA	NA	50

(1) If another current limitation protection device is used, its time-current and thermal constraint (I^2t) trip characteristics must be at least equivalent to those of the recommended protection.

Note: The short-circuit stability current values above are suitable with the TN system.

4.4 - Electrical data

30XBEZE from 200 to 750

30XBEZE		200	230	250	300	350	400	450	500	550	600	630	700	750
Power circuit supply														
Nominal voltage	V-ph-Hz	400-3-50												
Voltage range	V	360-440												
Control circuit supply		24 V via internal transformer												
Maximum operating input power (1)														
Standard unit	kW	97	105	112	142	160	174	224	239	257	270	281	305	327
Unit + option 15LS	kW	92	99	107	135	153	167	214	229	246	260	271	293	315
Power factor at maximum power (1)														
Standard unit														
Displacement Power Factor (Cos Phi)		0,90	0,90	0,89	0,90	0,90	0,90	0,90	0,90	0,89	0,89	0,90	0,88	0,89
Unit + option 15LS														
Displacement Power Factor (Cos Phi)		0,90	0,90	0,89	0,89	0,90	0,88	0,89	0,90	0,89	0,89	0,89	0,89	0,89
Nominal operating current draw (2)														
Standard unit	A	116	125	134	161	181	198	248	268	288	304	314	347	367
Unit + option 15LS	A	107	116	125	149	169	185	231	249	269	286	296	326	345
Maximum operating current draw (Un) (1)														
Standard unit	A	155	169	182	227	258	280	359	384	417	439	454	500	530
Unit + option 15LS	A	147	160	173	216	247	269	343	367	400	422	437	480	510
Maximum current (Un-10%) (1)														
Standard unit	A	166	181	195	244	277	300	385	412	447	471	488	537	569
Unit + option 15LS	A	158	172	187	232	265	289	369	395	430	454	471	517	549
Nominal start-up current (3)														
Standard unit	A	227	227	236	360	454	454	501	521	700	717	717	759	769
Unit + option 15LS	A	223	223	232	356	450	450	494	512	693	710	710	749	759
Unit + option 25C	A	184	180	189	317	407	407	392	412	605	612	612	628	642
Maximum start-up current(Un) (2)														
Standard unit	A	248	261	261	381	479	479	581	580	754	776	776	837	852
Unit + option 15LS	A	244	257	257	377	475	475	574	572	747	769	769	827	842
Unit + option 25C	A	205	214	214	338	432	432	472	472	659	671	671	706	725

(1) Values obtained at unit continuous maximum operating conditions (data given on the unit nameplate)
(2) Operating current of the smallest compressor(s) + fan current + locked rotor current or reduced start-up current of the largest compressor.
(3) Standardised EUROVENT conditions, water-cooled exchanger water inlet/outlet = 12°C/7°C, outdoor air temperature = 35°C.

4 -PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

30XBEZE from 900 to 1200

30XBEZE		900	950	1050	1150	1200
Power circuit supply						
Nominal voltage	V-ph-Hz	400-3-50				
Voltage range	V	360-440				
Control circuit supply		24 V via internal transformer				
Maximum operating input power(1)						
Standard unit	kW					
Circuit 1(a)	kW	154	163	224	245	262
Circuit 2(a)	kW	246	262	244	260	262
Option 081	kW	399	426	468	505	524
Unit + option 15LS						
Circuit 1(a)	kW	147	157	215	236	253
Circuit 2(a)	kW	236	253	235	252	253
Option 081	kW	383	410	450	487	505
Power factor at maximum power (1)						
Standard unit						
Displacement Power Factor (Cos Phi)		0,89	0,89	0,89	0,89	0,89
Unit + option 15LS						
Displacement Power Factor (Cos Phi)		0,89	0,89	0,89	0,89	0,89
Nominal operating current draw(2)						
Standard unit						
Circuit 1(a)	A	174	184	250	267	292
Circuit 2(a)	A	270	292	267	288	292
Option 081	A	444	475	516	555	583
Unit + option 15LS						
Circuit 1(a)	A	163	173	235	252	275
Circuit 2(a)	A	253	275	252	273	275
Option 081	A	416	447	486	524	549
Maximum operating current draw (Un)(1)						
Standard unit						
Circuit 1(a)	A	250	265	365	397	425
Circuit 2(a)	A	400	425	397	422	425
Option 081	A	650	690	762	819	850
Unit + option 15LS						
Circuit 1(a)	A	240	255	351	383	410
Circuit 2(a)	A	384	410	383	408	410
Option 081	A	624	665	733	790	819
Maximum current (Un-10%)(1)						
Standard unit						
Circuit 1(a)	A	269	285	392	426	457
Circuit 2(a)	A	429	457	426	454	457
Option 081	A	697	741	818	879	913
Unit + option 15LS						
Circuit 1(a)	A	259	275	378	412	441
Circuit 2(a)	A	414	441	412	440	441
Option 081	A	672	716	790	851	882
Nominal start-up current (3)						
Circuit 1(a)	A	587	587	629	629	629
Circuit 2(a)	A	629	629	629	629	629
Option 081	A	854	876	893	915	918
Option 081 & Opt 25c	A	629	640	672	683	683
Maximum start-up current(Un)(2)						
Circuit 1(a)	A	587	587	629	629	629
Circuit 2(a)	A	629	629	629	629	629
Option 081	A	987	1012	1026	1051	1054
Option 081 & Opt 25c	A	761	776	804	819	818

(1) Values obtained at unit continuous maximum operating conditions (data given on the unit nameplate)
(2) Operating current of the smallest compressor(s) + fan current + locked rotor current or reduced start-up current of the largest compressor.
(3) Standardised EUROVENT conditions, water-cooled exchanger water inlet/outlet = 12°C/7°C, outdoor air temperature = 35°C.
(a) When the machines are equipped with two power supplies, circuit 1 supplies the refrigerant circuit A and circuit 2 supplies the refrigerant circuit B..

4 -PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

30XBPZE from 200 to 750

30XBPZE		200	230	250	300	350	400	450	500	550	600	630	700	750
Power circuit supply														
Nominal voltage	V-ph-Hz	400-3-50												
Voltage range	V	360-440												
Control circuit supply		24 V via internal transformer												
Maximum operating input power (1)														
Standard unit	kW	96	103	111	140	158	172	222	237	255	268	282	302	328
Unit + option 15LS	kW	94	101	109	138	156	170	218	233	250	264	278	298	323
Power factor at maximum power (1)														
Standard unit														
Displacement Power Factor (Cos Phi)		0,90	0,89	0,89	0,90	0,89	0,89	0,90	0,90	0,89	0,89	0,89	0,88	0,89
Unit + option 15LS														
Displacement Power Factor (Cos Phi)		0,90	0,89	0,89	0,90	0,89	0,89	0,90	0,90	0,89	0,89	0,89	0,88	0,89
Nominal operating current draw (2)														
Standard unit	A	113	122	131	158	177	194	243	262	282	299	314	341	366
Unit + option 15LS	A	110	119	128	154	173	190	237	256	276	293	307	334	358
Maximum operating current draw (Un) (1)														
Standard unit	A	154	167	181	226	256	278	357	382	415	437	457	497	533
Unit + option 15LS	A	151	164	178	222	252	274	351	375	408	430	450	490	525
Maximum current (Un-10%) (1)														
Standard unit	A	165	180	194	242	275	299	383	409	445	469	491	534	572
Unit + option 15LS	A	162	176	191	238	271	295	377	403	439	463	483	527	564
Nominal start-up current (3)														
Standard unit	A	227	227	236	360	454	454	500	519	699	716	718	758	770
Unit + option 15LS	A	225	225	234	358	452	452	498	516	697	713	715	754	766
Unit + option 25C	A	184	180	189	317	407	407	392	411	604	611	614	626	643
Maximum start-up current(Un) (2)														
Standard unit	A	247	261	261	380	479	479	580	579	753	775	778	836	854
Unit + option 15LS	A	246	259	259	379	477	477	577	576	751	773	775	832	850
Unit + option 25C	A	204	213	213	337	431	431	471	470	658	670	673	705	727

(1) Values obtained at unit continuous maximum operating conditions (data given on the unit nameplate)
(2) Operating current of the smallest compressor(s) + fan current + locked rotor current or reduced start-up current of the largest compressor.
(3) Standardised EUROVENT conditions, water-cooled exchanger water inlet/outlet = 12°C/7°C, outdoor air temperature = 35°C.

4 -PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

30XBPZE from 900 to 1200

30XBPZE		900	950	1050	1150	1200
Power circuit supply						
Nominal voltage	V-ph-Hz	400-3-50				
Voltage range	V	360-440				
Control circuit supply		24 V via internal transformer				
Maximum operating input power (1)						
Standard unit	kW					
Circuit 1(a)	kW	154	164	222	243	260
Circuit 2(a)	kW	244	262	242	258	260
Option 081	kW	397	425	464	501	520
Unit + option 15LS						
Circuit 1(a)	kW	151	162	219	240	256
Circuit 2(a)	kW	240	258	239	255	256
Option 081	kW	391	419	457	494	513
Power factor at maximum power (1)						
Standard unit						
Displacement Power Factor (Cos Phi)		0,88	0,89	0,88	0,89	0,89
Unit + option 15LS						
Displacement Power Factor (Cos Phi)		0,88	0,89	0,88	0,89	0,89
Nominal operating current draw (2) - 30XBPZE						
Standard unit						
Circuit 1(a)	A	173	183	245	263	287
Circuit 2(a)	A	265	289	263	284	287
Option 081	A	438	472	507	546	573
Unit + option 15LS						
Circuit 1(a)	A	169	179	240	257	281
Circuit 2(a)	A	260	283	257	279	281
Option 081	A	428	462	497	536	561
Maximum operating current draw (Un) (1)						
Standard unit						
Circuit 1(a)	A	252	267	363	395	423
Circuit 2(a)	A	398	426	395	420	423
Option 081	A	649	692	758	815	846
Unit + option 15LS						
Circuit 1(a)	A	247	263	358	390	417
Circuit 2(a)	A	392	420	390	415	417
Option 081	A	639	682	747	804	834
Maximum current (Un-10%) (1)						
Standard unit						
Circuit 1(a)	A	270	286	390	424	454
Circuit 2(a)	A	427	457	424	452	454
Option 081	A	697	743	814	876	908
Unit + option 15LS						
Circuit 1(a)	A	266	282	385	419	449
Circuit 2(a)	A	421	451	419	447	449
Option 081	A	687	733	804	865	897
Nominal start-up current (3)						
Circuit 1(a)	A	587	587	629	629	629
Circuit 2(a)	A	629	629	629	629	629
Option 081	A	852	876	892	913	916
Option 081 & Opt 25c	A	627	640	670	681	680
Maximum start-up current(Un) (2)						
Circuit 1(a)	A	587	587	629	629	629
Circuit 2(a)	A	629	629	629	629	629
Option 081	A	985	1013	1024	1049	1052
Option 081 & Opt 25c	A	759	777	802	817	816

(1) Values obtained at unit continuous maximum operating conditions (data given on the unit nameplate)
(2) Operating current of the smallest compressor(s) + fan current + locked rotor current or reduced start-up current of the largest compressor.
(3) Standardised EUROVENT conditions, water-cooled exchanger water inlet/outlet = 12°C/7°C, outdoor air temperature = 35°C.
(a) When the machines are equipped with two power supplies, circuit 1 supplies the refrigerant circuit A and circuit 2 supplies the refrigerant circuit B.

4.5 - Compressor electrical data

Compressor	I Nom(1)	I Max (Un) (2)	I Max (Un - 10%) (3)	LRYA A (4)	LRDA A (5)	Cos Phi nom.(6)	Cos Phi Max. (7)
06TSA155	48	69	74	170	530	0,87	0,90
06TSA186	57	82	89	170	530	0,86	0,89
06TTA266	87	135	146	303	945	0,86	0,90
06TTA301	98	152	164	388	1210	0,87	0,90
06TTA356	115	174	188	388	1210	0,87	0,90
06TUA483	151	229	248	587	1828	0,87	0,88
06TUA554	161	244	264	587	1828	0,88	0,89
06TVA680	218	336	362	629	1919	0,87	0,88
06TVA753	235	367	397	629	1919	0,88	0,89
06TVA819	256	393	424	629	1919	0,88	0,89

Legend
(1) Nominal current draw at standard Eurovent conditions (see definition of conditions under nominal unit current draw)
(2) Maximum operating current
(3) Maximum compressor operating current, limited by the unit (current given for maximum capacity at 360 V)
(4) Locked rotor current for star connection (connection during compressor start-up)
(5) Locked rotor current for delta connection
(6) Value at standard Eurovent conditions: evaporator entering/leaving water temperature 12°C/7°C, condenser entering/leaving water temperature 30°C/35°C.
(7) Value at maximum capacity and nominal voltage

4.6 - Compressor usage per circuit (A, B)

Compresseur	Circuit	200	230	250	300	350	400	450	500	550	600	630	700	750	900	950	1050	1150	1200
06TSA155	A	1																	
	B	1	1		1														
06TSA186	A		1	1			1												
	B			1		1													
06TTA266	A				1														
	B																		
06TTA301	A					1													
	B							1		1									
06TTA356	A						1	1	1										
	B								1		1	1							
06TUA483	A									1	1		1		1				
	B												1						
06TUA554	A											1		1		1			
	B													1					
06TVA680	A																1		
	B																		
06TVA753	A																	1	
	B														1		1		
06TVA819	A																		1
	B															1		1	1

4 -PHYSICAL AND ELECTRICAL DATA FOR 30XB(E/P)ZE UNITS

Electrical data notes and operating conditions for 30XB(E/P)ZE units:

- 30XB(E/P)ZE 200 to 750 have a single power connection point; 30XB(E/P)ZE 900 to 1200 have two connections points.
- The control box includes the following standard features:
  - One supply disconnect switch per circuit
  - Starter and motor protection devices for each compressor, the fan(s) and the pump
  - Control devices

Field connections:

- All connections to the system and the electrical installations must be in full accordance with all applicable local codes.
- The Carrier 30XB(E/P)ZE units are designed and built to ensure conformance with these codes. The recommendations of European standard EN 60204-1 (corresponds to IEC 60204-1) (machine safety - electrical machine components - part 1: General regulations) are specifically taken into account, when designing the electrical equipment.

IMPORTANT:

Annex B of EN 60204-1 describes the electrical characteristics used for the operation of the machines.

1. Environment(1) . Environment as classified in EN 60364 (corresponds to IEC 60364):
   - Outdoor installation(1)
   - Ambient temperature range: from -20°C to +55°C(2)
   - Altitude less than or equal to 2000 m (for hydraulic module, see paragraph 4.7 in the IOM)
   - Presence of hard solids, class AE3 (no significant dust present)(1)
   - Presence of corrosive and polluting substances, class AF1 (negligible)
   - Competence of persons: BA4 (skilled persons). Particularly, units shall not be located in places open to all persons, which can include children.
2. Compatibility for low-frequency conducted disturbances according to IEC61000-2-2 and to class 2 levels per IEC61000-2-4 standard:
   - Power supply frequency variation : +-2Hz
   - Phase imbalance : 2%
   - Total Voltage Harmonic Distortion (THDV) : 8%(2)
3. The neutral (N) line must not be connected directly to the unit (if necessary use a transformer).
4. Overcurrent protection of the power supply conductors is not provided with the unit.
5. The factory.installed disconnect switch(es)/circuit breaker(s) is (are) of a type suitable for power interruption in accordance with EN 60947-3 (corresponds to IEC 60947-3).
6. The units are designed for simplified connection on TN(s) networks (IEC 60364). For IT networks provide a local earth and consult competent local organisations to complete the electrical installation. 30XBEZE units (in which variable frequency drives are present) are not compatible with IT network. 30XBEZE units are designed to use for domestic / residential and industrial environments:
   Machines that are not equipped with variable frequency drive(s) (30XBPZE) are in accordance with the codes :
   - 61000-6-3: Generic standards - Emission standard for residential, commercial and light industry.
   - 61000-6-2: Generic standards - Immunity for industrial environments.

- Leakage currents: If protection by monitoring the leakage currents is necessary to ensure the safety of the installation, the presence of circuitry with DC component as well as additional leakage currents introduced by the use of variable frequency drive(s) in the unit must be considered. In particular these protection devices shall be
  - suitable for protection of circuitry with AC and DC components
  - of reinforced immunity types and have a threshold not lower than 150mA.
- Capacitors that are integrated as part of the option 231 can generate electrical disturbances in the installation the unit is connected to. Presence of these capacitors must be considered during the electrical study prior to the start-up.

NOTE: If particular aspects of an actual installation do not conform to the conditions described above, or if there are other conditions which should be considered, always contact your local Carrier representative.

(1) The required protection level for this class is IP43BW (according to reference document IEC 60529). All 30XB(E/P)ZE units are protected to IP54-W and fulfil this protection condition.

(2) These limits are modified for machines equipped with option/QM 231:
Maximum ambiant temperature : 45°C
Total Voltage harmonic distortion : 3%

4.7 - Electrical data, optional hydraulic module

The pumps that are factory-installed in these units comply with the European Ecodesign directive ErP. The additional electrical data required(1) is as follows:

Motors of dual low-pressure pumps for 30XB(E/P)ZE units (option 116U)

No.(2)	description(3)		200	230	250	300	350	400
1	Nominal efficiency at full load and nominal voltage	%	86,7	86,7	87,2	88,1	89,4	89,4
1	Nominal efficiency at 75% full load and nominal voltage	%	87,0	87,0	86,9	88,0	88,9	88,9
1	Nominal efficiency at 50% full load and nominal voltage	%	85,5	85,5	84,5	86,1	86,7	86,7
2	Efficiency level	-	IE3					
3	Year of manufacture	-	This information varies depending on the manufacturer and model at the time of incorporation. Please refer to the motor nameplates.					
4	Company name or trademark, commercial registration number and head office of manufacturer	-	Same as above					
5	Product model number	-	Same as above					
6	Number of motor poles	-	2					
7-1	Nominal shaft power output at full load and nominal voltage (400 V)	kW	2,2	2,2	3	4	5,5	5,5
7-2	Maximum input power (400V)(4)	kW	2,5	2,5	3,4	4,5	6,2	6,2
8	Nominal input frequency	Hz	50					
9-1	Nominal voltage	V	3*400					
9-2	Maximum current drawn (400V)(5)	A	4,2	4,2	5,5	7,4	9,7	9,7
10	Nominal speed	r/s - r/min	48 - 2900	48 - 2900	49 - 2915	49 - 2915	49 - 2930	49 - 2930
11	product disassembly, recycling or disposal at end of life	-	Disassembly using standard tools. Disposal and recycling using an appropriate company.					
12	Operating conditions for which the motor is specifically designed							
	I - Altitudes above sea level	m	< 1000(6)					
	II - Ambient air temperature	°C	< 40					
	III - Maximum operating temperature	°C	Please refer to the operating conditions given in this manual or in the specific conditions given in the Carrier selection programs.					
	IV - Potentially explosive atmospheres	-	Non ATEX environment					

Motors of dual high-pressure pumps for 30XB(E/P)ZE units (option 116S)

No.(2)	description(3)		200	230	250	300	350	400
1	Nominal efficiency at full load and nominal voltage	%	88,1	89,4	89,4	90,1	91,3	91,3
1	Nominal efficiency at 75% full load and nominal voltage	%	88,0	88,9	88,9	89,7	91,4	91,4
1	Nominal efficiency at 50% full load and nominal voltage	%	86,1	86,7	86,7	87,9	90,3	90,3
2	Efficiency level	-	IE3					
3	Year of manufacture	-	This information varies depending on the manufacturer and model at the time of incorporation. Please refer to the motor nameplates.					
4	Company name or trademark, commercial registration number and head office of manufacturer	-	Same as above					
5	Product model number	-	Same as above					
6	Number of motor poles	-	2					
7-1	Nominal shaft power output at full load and nominal voltage (400 V)	kW	4	5,5	5,5	7,5	11	11
7-2	Maximum input power (400V)(4)	kW	4,5	6,2	6,2	8,3	12,0	12,0
8	Nominal input frequency	Hz	50					
9-1	Nominal voltage	V	3*400					
9-2	Maximum current drawn (400V)(5)	A	7,4	9,7	9,7	13,2	18,7	18,7
10	Nominal speed	r/s - r/min	49 - 2915	49 - 2930	49 - 2930	49 - 2935	49 - 2945	49 - 2945
11	product disassembly, recycling or disposal at end of life	-	Disassembly using standard tools. Disposal and recycling using an appropriate company.					
12	Operating conditions for which the motor is specifically designed							
	I - Altitudes above sea level	m	< 1000(6)					
	II - Ambient air temperature	°C	< 40					
	III - Maximum operating temperature	°C	Please refer to the operating conditions given in this manual or in the specific conditions given in the Carrier selection programs.					
	IV - Potentially explosive atmospheres	-	Non ATEX environment					

(1) Required by regulation No. 2019/1781 concerning the application of directive 2009/125/EC on the eco-design requirements for electric motors.
(2) Item number imposed by regulation No. 2019/1781, annex I2b.
(3) Description given by regulation No. 2019/1781, annex I2b.
(4) To obtain the maximum input power for a unit with hydraulic module, add the maximum unit input power from the electrical data table to the pump power input.
(5) To obtain the maximum unit operating current draw for a unit with hydraulic module, add the maximum unit current draw from the electrical data table to the pump current draw.
(6) Above 1000 m, a degradation of 3% for each 500 m should be taken into consideration.

Please refer to the certified dimensional drawings, supplied with the unit.

5.1 - Power supply

The power supply must conform to the specification on the chiller nameplate. The supply voltage must be within the range specified in the electrical data table. For connections refer to the wiring diagrams and the certified dimensional drawings.

WARNING: Operation of the chiller with an improper supply voltage or excessive phase imbalance constitutes abuse which will invalidate the Carrier warranty. If the phase imbalance exceeds 2% for voltage, or 10% for current, contact your local electricity supply at once and ensure that the chiller is not switched on until corrective measures have been taken.

5.2 - Voltage phase imbalance (%)

$$\frac{100 \times \text{max. deviation from average voltage}}{\text{Average voltage}}$$

Example:

On a 400 V - 3 ph - 50 Hz supply, the individual phase voltages were measured to be:

AB = 406 V; BC = 399; AC = 394 V

Average voltage = (406 + 399 + 394)/3 = 1199/3

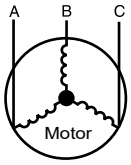
= 399.7 say 400 V

Calculate the maximum deviation from the 400 V average:

(AB) = 406 - 400 = 6

(BC) = 400 - 399 = 1

(CA) = 400 - 394 = 6



The maximum deviation from the average is 6 V. The greatest percentage deviation is: 100 x 6/400 = 1.5 %

This is less than the permissible 2% and therefore acceptable.

5.3 - Power connection/disconnect switch

Units	Connection points
30XB(E/P)ZE 200 to 750	1 per unit
30XB(E/P)ZE 900 to 1200	1 for circuit 1
	1 for circuit 2

5.4 - Recommended wire sections

Wire sizing is the responsibility of the installer, and depends on the characteristics and regulations applicable to each installation site. The following is only to be used as a guide-line, and does not make in any way liable. After wire sizing has been completed, using the certified dimensional drawing, the installer must ensure easy connection and define any modifications necessary on site.

The connections provided as standard for the field-supplied power entry cables to the general disconnect/isolator switch are designed for the number and type of wires, listed in column 2 of the table on the next page.

The calculations are based on the maximum machine current (see electrical data tables).

The calculations for favourable and unfavourable cases are based on the maximum current for each unit (see electrical data tables). For the design the standardised installation methods in accordance with IEC 60364 are used: PVC (70 °C) or XLPE (90 °C) insulated cables with copper core; arrangement to comply with table 52c of the above standard. The maximum temperature is 46 °C. The given maximum length is calculated to limit the voltage drop to 5%.

IMPORTANT: Before connection of the main power cables (L1 - L2 - L3) on the terminal block, it is imperative to check the correct order of the 3 phases before proceeding to the connection on then terminal block or the main disconnect/ isolator switch.

5.5 - Power cable entry

The power cables can enter the 30XB(E/P)ZE control box from below or from the unit side. For 30XB(E/P)ZE unit sizes 450 to 1200 the control box that includes the power supply cable connection terminal is located in the lower part of the unit. In this case the control box is raised by 120 mm compared to the lowest point of the chassis.

The cable entry point depends on the unit configuration:

1. Unit raised from the ground (e.g. installation on sup-port rails): It is recommended to enter the power cables from below the control box. A removable aluminium plate below the control box allows introduction of the cables.
2. Unit placed on the ground: For power cable entry from below the control box ensure that the cable bend radius is compatible with the connection space available in the control box. If not, an aluminium plate on the control box face allows introduction of the cables.

IMPORTANT: Check the cable bend radius for cable entry into a control box, located in the lower part of the unit.

Refer to the certified dimensional drawing for the unit.

5.6 - Field control wiring

IMPORTANT: Field connection of interface circuits may lead to safety risks: Any control box modification must maintain equipment conformity with local regulations. Precautions must be taken to prevent accidental electrical contact between circuits supplied by different sources:

- ***The routing selection and/or conductor insulation characteristics must ensure dual electric insulation.***
- ***In case of accidental disconnection, conductor fixing between different conductors and/or in the control box prevents any contact between the conductor ends and an active energised part.***

Refer to the SmartVu™ control manual and the certified wiring diagram supplied with the unit for the field control wiring of the following features:

- Remote on/off switch
- Demand limit external switch
- Remote dual set point
- Alarm, alert and operation report
- Evaporator pump control
- Heat reclaim condenser pump control (option)
- Hot water valve control (option)
- Set point reset via outside air temperature sensor reset
- Various interlocks on the Energy ManagementModule (EMM) board (option).

Connections to the customer communication bus.

The CCN bus is connected using the connectors specially provided inside the electrical box. Two connectors are provided to allow both permanent and service connections.

Selection of minimum and maximum wire sections for connection to 30XB(E/P)ZE units

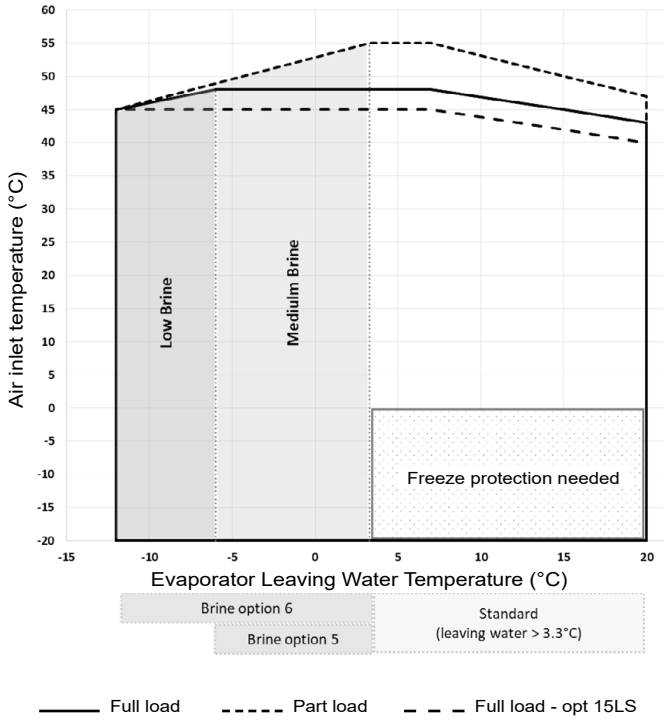
30XB(E/P)ZE	Max. connectable wire section(1)	Calculation of favourable case: -Suspended overhead/aerial line (standardised routing no. 17) -90°C insulated cable - Copper conductor (Cu) - Ambient temperature 45°C			Calculation of unfavourable case: - Conductors in ducts or multi-conductor cables in closed conduit (standardised routing No. 41) -70°C insulated cable if possible - Copper conductor (Cu) - Ambient temperature 45°C		
		Calculation of favourable case: - Perforated horizontal conduit (standardised routing No. 13/15) - 90°C insulated cable - Copper conductor (Cu) - Ambient temperature 45°C			Calculation of unfavourable case: - Closed conduit (standardised routing No. 41) - 70°C insulated cable if possible - Copper conductor (Cu) - Ambient temperature 45°C		
		Section(2)	Max. length for a voltage drop <5%	Cable type	Section(2)	Max. length for a voltage drop <5%	Cable type
	qty x mm² (per phase)	qty x mm² (per phase)	m	-	qty x mm² (per phase)	m	-
Standard unit							
200	2 × 185	1 x 70	230	XLPE Cu	1 x 120	380	PVC Cu
230	2 × 185	1 x 70	210	XLPE Cu	1 X 150	430	PVC Cu
250	2 × 185	1 x 70	200	XLPE Cu	1 X 150	400	PVC Cu
300	2 × 185	1 x 95	210	XLPE Cu	1 x 240	470	PVC Cu
350	2 × 185	1 x 120	230	XLPE Cu	2 x 120	410	PVC Cu
400	2 × 185	1 x 150	250	XLPE Cu	2 x 150	450	PVC Cu
450	2 × 240	1 x 185	240	XLPE Cu	2 × 240	500	PVC Cu
500	2 × 240	1 x 240	270	XLPE Cu	2 × 240	460	PVC Cu
550	2 × 240	1 x 240	250	XLPE Cu	2 x 150	300	XLPE Cu
600	2 × 240	2 x 120	240	XLPE Cu	2 x 185	340	XLPE Cu
630	2 × 240	2 x 120	230	XLPE Cu	2 x 185	320	XLPE Cu
700	2 × 240	2 × 150	250	XLPE Cu	2 × 240	350	XLPE Cu
750	2 × 240	2 × 150	240	XLPE Cu	2 × 240	330	XLPE Cu
900	2x240/3x240	1 x 120/1 x 240	230/260	XLPE Cu	1 x 240/2 x 240	420/440	PVC Cu/PVC Cu
950	2x240/3x240	1 x 120/1 x 240	220/250	XLPE Cu	2 x 150/2 x 185	480/350	PVC Cu/XLPE Cu
1050	2x240/3x240	1 x 240/1 x 240	290/260	XLPE Cu	2 x 240/2 x 240	480/450	PVC Cu/PVC Cu
1150	2x240/3x240	1 x 240/1 x 240	260/250	XLPE Cu	2 x 240/2 x 185	450/350	PVC Cu/XLPE Cu
1200	2x240/3x240	1 x 240/1 x 240	250/250	XLPE Cu	2 x 185/2 x 185	350/350	PVC Cu/XLPE Cu
Option 81							
900 to 1200	5x240						

(1) Connection capacities actually available for each machine. These are defined according to the connection terminal size, the electrical/control box access opening dimensions and the available space inside the electrical/control box.
(2) Selection simulation result considering the hypotheses indicated.
(3) If the maximum calculated section is for a 90°C cable type, this means that a selection based on a 70°C cable type can exceed the connection capacity actually available. Special attention must be given to selection.
The protection against direct contact at the electrical connection point is compatible with the addition of terminals extension. The installer must determine whether these are necessary based on the cable sizing calculation

Note: The currents considered are given for a machine equipped with an hydraulic module operating at maximum current.

6.1 - Operating range

30XBEZE & 30XBPZE



NOTE

Ranges in brine applications given as a guide using ethylene glycol for an evaporator ΔT = 3K. Refer to the electronic catalogue.

Low temperature brine, (-12°C ethylene glycol / -10°C propylene glycol)

Medium temperature brine, (-6°C ethylene glycol / 0°C propylene glycol)

Power factor correction option (option/QM 231) available for an inlet air temperature
up to +45°C (30XBPZE only)
For operation in pure water at an inlet air temperature below 0°C, the frost protection (option_41A or 41B) must be provided

ATTENTION:

For 30XBEZE range, if the outside temperature is below -10°C and the unit has been switched off for more than 4 hours, it is necessary to wait 2 hours after the unit has been switched on again to allow the frequency converter to warm up.

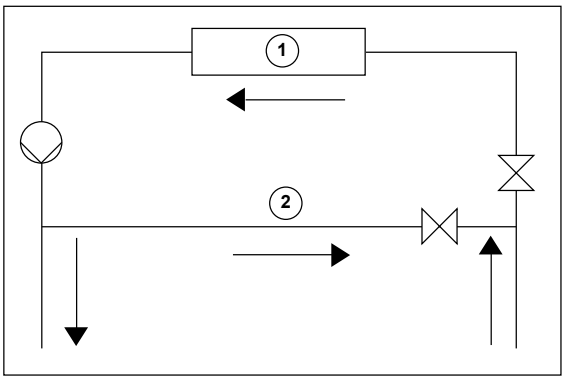
Water heat exchanger		Minimum	Maximun
Entering temperature at start-up	°C	-	45(1)
Leaving temperature during operation	°C	3,3	20
Entering/leaving water temperature difference	K	2,8	10
Condenser air temperature		**Minimum**	**Maximun**
Storage	°C	-20	68
Operation, standard unit	°C	-20	55(2)
With Low noise option (option 15LS)	°C	-20	52(2)

Note: If the air temperature is below 0°C, a glycol/water solution or the frost protection option must be used.
Note: If the leaving water temperature is below 4°C, a glycol/water solution or the frost protection option must be used.
(1) Based on the installation type and the air temperature
(2) Part load, depended of sizes & leaving water temperature

6.2 - Minimum chilled water flow (units without hydraulic module)

The minimum chilled water flow is shown in the table on the next page. It is determined in order to allow sufficient exchange and prevent the risk of excessive fouling. If the system flow is less than this, the evaporator flow can be recirculated, as shown in the diagram.

For minimum chilled water flow rate

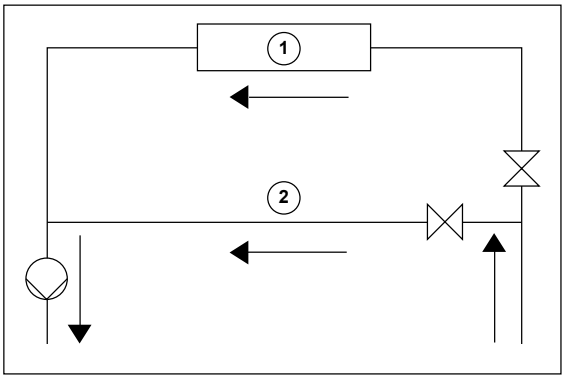


1 Evaporator
2 Recirculation

6.3 - Maximum chilled water flow (units without hydraulic module)

The maximum chilled water flow is shown in the table on the next page. If the system flow exceeds the maximum value, it can be bypassed as shown in the diagram.

For maximum chilled water flow rate



1 Evaporator
2 Bypass

6.4 - Variable flow evaporator

Variable evaporator flow can be used in standard 30XB(E/P)ZE chillers. The chillers maintain a constant leaving water temperature under all flow conditions. For this to happen, the minimum flow rate must be higher than the minimum flow given in the table of permissible flow rates and must not vary by more than 10% per minute.

If the flow rate changes more rapidly, the system should contain a minimum of 6.5 litres of water per kW instead of 3.25 l/kW.

6.5 - System minimum water volume

Whichever the system, the water loop minimum capacity is given by the formula:

Capacity = Cap (kW) x N litres

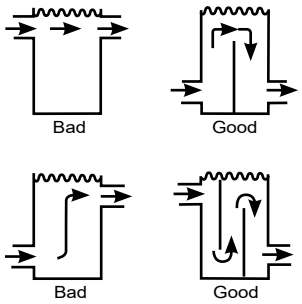
Application	N
Normal air conditioning	3,25
Process type cooling	6,5

Where Cap is the nominal system cooling capacity (kW) at the nominal operating conditions of the installation.

This volume is necessary for stable operation and accurate temperature control.

It is often necessary to add a buffer water tank to the circuit in order to achieve the required volume. The tank must itself be internally baffled in order to ensure proper mixing of the liquid (water or brine). Refer to the examples below.

Connection to a buffer tank



6.6 - Maximum system water volume

Units with incorporated expansion tank (Opt. 293) have a maximum water volume. The table below gives the maximum loop volume for pure water or ethylene glycol with various system

concentrations, as well as the static pressures. If the maximum volume is insufficient, compared to the minimum system water loop volume, an additional expansion tank must be added to the system.

30XB(E/P)ZE		Sizes 200 to 350			400		
Static pressure	bar	1	2	2,5	1	2	2,5
Pure water	l	2400	1600	1200	3960	2640	1980
10% EG	l	1800	1200	900	2940	1960	1470
20% EG	l	1320	880	660	2100	1400	1050
30% EG	l	1080	720	540	1740	1160	870
40% EG	l	900	600	450	1500	1000	750

EG : Ethylene Glycol

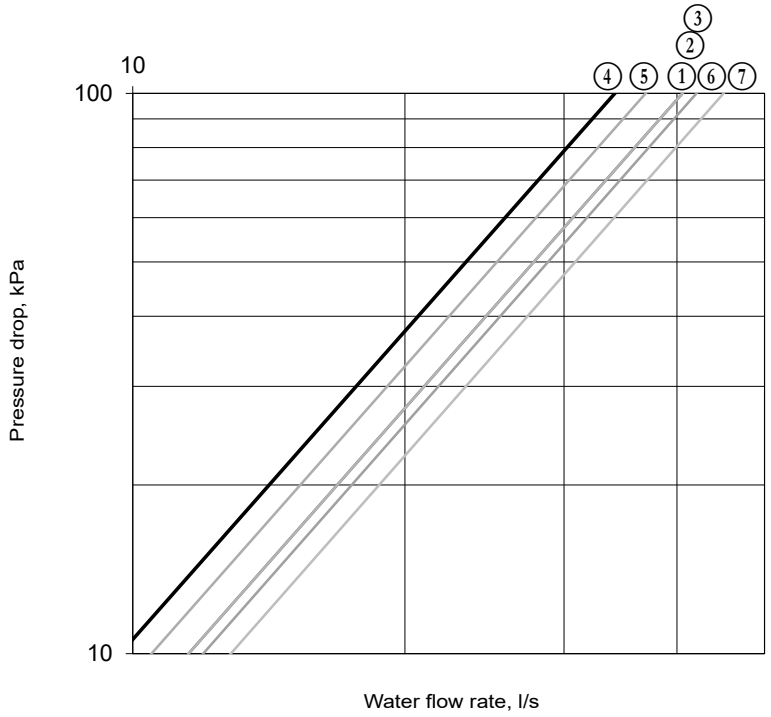
6.7 - Evaporator water flow rate

30XBEZE & 30XBPZE	Minimum flow rate (1) (l/s)	Maximum flow rate (2) (l/s)
200	4,5	37,5
230	4,9	40,5
250	5,3	40,5
300	6,4	34,1
350	7,3	36,9
400	8,2	42,0
450	10,1	45,0
500	11,2	56,1
550	11,9	59,1
600	12,7	67,1
630	13,5	67,1
700	14,7	73,9
750	16,2	83,9
900	18,8	87,8
950	20,5	126,5
1050	22,0	92,9
1150	24,0	132,1
1200	25,1	107,4

(1) Minimum flow rate for optimal efficiency in variable flow configuration
(2) Maximum flow rate for a pressure drop of 100 kPa in the exchanger

6.8 - Evaporator pressure drop curve

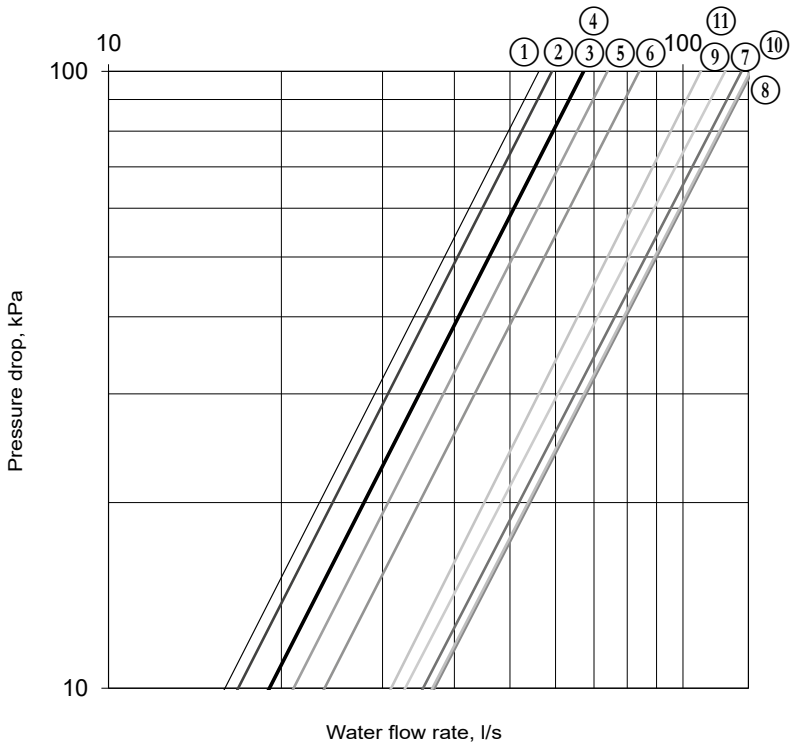
Sizes 200 to 450



Legend

1	200
2	230
3	250
4	300
5	350
6	400
7	450

Sizes 500 to 1200



Legend

1	500
2	550
3	600
4	630
5	700
6	750
7	900
8	950
9	1050
10	1150
11	1200

7 - WATER CONNECTIONS

ATTENTION: Before carrying out any water connections install the water box purge plugs (one plug per water box in the lower section - supplied in the control box).

For size and position of the heat exchanger water inlet and outlet connections refer to the certified dimensional drawings supplied with the unit.

The water pipes must not transmit any radial or axial force to the heat exchangers nor any vibration.

The water supply must be analysed and appropriate filtering, treatment, control devices, isolation and bleed valves and circuits built in, to prevent corrosion, fouling and deterioration of the pump fittings. Consult either a water treatment specialist or appropriate literature on the subject.

7.1 - Operating precautions

The water circuit should be designed to have the least number of elbows and horizontal pipe runs at different levels. Below the main points to be checked for the connection:

- Comply with the water inlet and outlet connections shown on the unit.
- Install manual or automatic air purge valves at all high points in the circuit(s). They must be installed outdoor (possible ATEX zone 2 at the valve discharge).
- Use a pressure reducer to maintain pressure in the circuit(s) and install a relief valve as well as an expansion tank.
- Install thermometers in both the entering and leaving water connections.
- Install drain connections at all low points to allow the whole circuit to be drained.
- Install stop valves, close to the entering and leaving water connections.
- Use flexible connections to reduce the transmission of vibrations.
- Insulate all pipework, after testing for leaks, both to reduce heat gains and to prevent condensation.
- Cover the insulation with a vapour barrier.
- Where there are particles in the fluid that could foul the heat exchanger, a screen filter should be installed ahead of the pump. , or directly at the exchanger inlet in case the pump is more than 20m away. The mesh size of the filter must be 1.2 mm (see 'Typical water circuit diagram').
- Before the system start-up verify that the water circuits are connected to the appropriate heat exchangers (e.g. no reversal between evaporator and condenser).
- Do not introduce any significant static or dynamic pressure into the heat exchange circuit (with regard to the design operating pressures).
- Before any start-up verify that the heat exchange fluid is compatible with the materials and the water circuit coating.
- The use of different metals on hydraulic piping could generate eletrolytic pairs and consequently corrosion. Verify then, the need to install sacrificial anodes.

In case additives or other fluids than those recommended by Carrier are used, ensure that the fluids are not considered as a gas, and that they belong to class 2, as defined in directive 2014/68/UE.

Carrier recommendations on heat exchange fluids:

- No NH^{4+} ammonium ions in the water, they are very detrimental for copper. This is one of the most important factors for the operating life of copper piping. A content of several tenths of mg/l will badly corrode the copper over time.
- Cl^- Chloride ions are detrimental for copper with a risk of perforations by corrosion by puncture. If possible keep below 125 mg/l.
- SO_4^{2-} sulphate ions can cause perforating corrosion, if their content is above 30 mg/l.
- No fluoride ions (<0.1 mg/l)
- No Fe^{2+} and Fe^{3+} ions with non negligible levels of dissolved oxygen must be present. Dissolved iron < 5 mg/l with dissolved oxygen < 5 mg/l.
- Dissolved silica: silica is an acid element of water and can also lead to corrosion risks. Content < 1 mg/l.
- Water hardness: > 0.5 mmol/l. Values between 1 and 2.5 can be recommended. This will facilitate scale deposit that can limit corrosion of copper. Values that are too high can cause piping blockage over time. A total alkalimetric titre (TAC) below 100 is desirable.
- Dissolved oxygen: Any sudden change in water oxygenation conditions must be avoided. It is as detrimental to deoxygenate the water by mixing it with inert gas as it is to over-oxygenate it by mixing it with pure oxygen. The disturbance of the oxygenation conditions encourages destabilisation of copper hydroxides and enlargement of particles.
- Electric conductivity 10-600 µS/cm
- pH: Ideal case pH neutral at 20-25 °C 7.5 < pH < 9.

If the water circuit must be emptied for longer than one month, the complete circuit must be placed under nitrogen charge to avoid any risk of corrosion by differential aeration.

ATTENTION: Filling, completing and draining the water circuit charge must be done by qualified personnel, using the air purges and materials that are suitable for the products.

Charging and removing heat exchange fluids should be done with devices that must be included on the water circuit by the installer. Never use the unit heat exchangers to add heat exchange fluid.

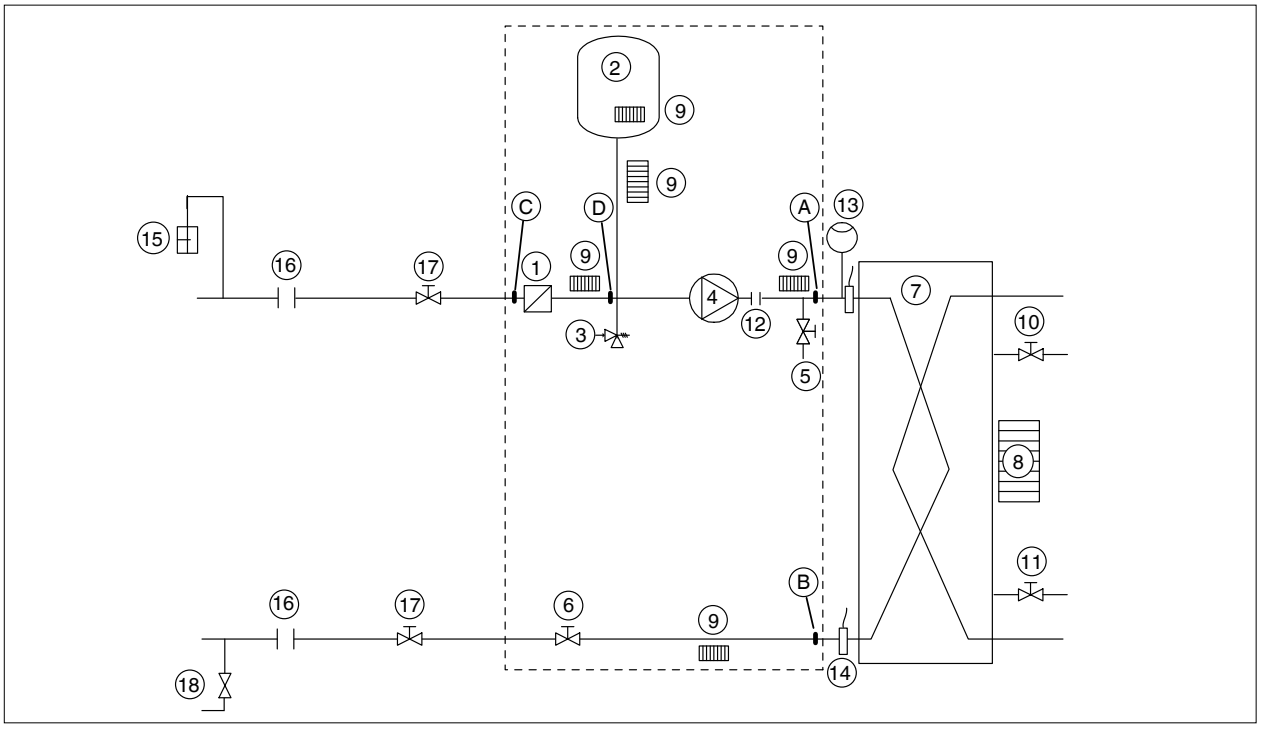
7.2 - Victaulic water connections

Inlet/outlet diameters without hydraulic module

30XB(E/P)ZE		200	230	250	300	350	400	450	500	550
Standard & option 6										
Nominal diameter	in	5	5	5	5	5	5	5	6	6
Actual outside diameter	mm	141,3	141,3	141,3	141,3	141,3	141,3	141,3	168,3	168,3
Options 5, 100A										
Nominal diameter	in	4	4	4	4	4	4	5	5	5
Actual outside diameter	mm	114,3	114,3	114,3	114,3	114,3	114,3	141,3	141,3	141,3

30XB(E/P)ZE		600	630	700	750	900	950	1050	1150	1200
Standard & option 6										
Nominal diameter	in	6	6	6	8	6	6	6	6	6
Actual outside diameter	mm	168,3	168,3	168,3	219,1	168,3	168,3	168,3	168,3	168,3
Options 5, 100A										
Nominal diameter	in	5	5	5	6	6	6	6	6	6
Actual outside diameter	mm	141,3	141,3	141,3	168,3	168,3	168,3	168,3	168,3	168,3

Typical water circuit diagram



Legend

Components of the unit and hydraulic module

A Pressure sensor (A-B = ΔP evaporator)
B Pressure sensor
C Pressure sensor (C-D = ΔP water filter)
D Pressure sensor
1 Victaulic screen filter
2 Expansion tank (option)
3 Relief valve
4 Available pressure pump
5 Drain valve
6 Flow control valve
7 Evaporator
8 Evaporator defrost heater (option)
9 Hydraulic module defrost heater (option)
10 Air vent (evaporator)
11 Water drain (evaporator)
12 Expansion compensator (flexible connections)
13 Flow switch
14 Water temperature sensor

Installation components

15 Air vent
16 Flexible connection
17 Shut-off valve
18 Charge valve
--- Hydraulic module (option)

7.3 - Flow control

Evaporator flow switch and chilled water pump interlock

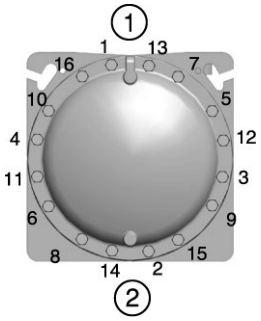
IMPORTANT: On 30XB(E/P)ZE units, the unit water flow switch must be energised. Failure to follow this instruction will void the Carrier guarantee.

The water flow switch is installed on the evaporator water inlet and adjusted by the control, based on unit size and application. If adjustment is necessary, it must be carried out by qualified personnel trained by Carrier Service.

7.4 - Evaporator water box bolt tightening

The evaporator (and condenser) are of the shell and tube type with removable water boxes to facilitate cleaning. Re-tightening or tightening must be done in accordance with the illustration below.

Water box tightening sequence



Legend:
1 Sequence 1: 1, 2, 3, 4
Sequence 2: 5, 6, 7, 8
Sequence 3: 9, 10, 11, 12
Sequence 4: 13, 14, 15, 16
2 Tightening torque
Bolt size M16 - 171 - 210 Nm

NOTE: Before this operation we recommend draining the circuit and disconnecting the pipes to be sure that the bolts are correctly and uniformly tightened.

7.5 - Frost protection

7.5.1 - Standard machine

If the chiller or the water piping is in an area where the ambient temperature can fall below 0 °C it is recommended to add an antifreeze solution to protect the unit and the water piping to a temperature of 10 K below the lowest temperature likely to be reached at the installation site. Use only antifreeze solutions, approved for heat exchanger duty. If the system is not protected by an antifreeze solution and will not be used during the freezing weather conditions, draining of the cooler and outdoor piping is mandatory. Damage due to freezing is not covered by the warranty.

IMPORTANT: Depending on the climatic conditions in your area you must:

- ***Add ethylene glycol with an adequate concentration to protect the installation up to a temperature of 10 K below the lowest temperature likely to occur at the installation site.***
- ***If the unit is not used for an extended period, it is recommended to drain it, and as a safety precaution add ethylene glycol to the heat exchanger, using the water entering purge valve connection (a purge connection is available somewhere on the heat exchanger water box in case the machine is not perfectly level).***
- ***At the start of the next season, refill the unit with water and add an inhibitor.***
- ***For the installation of auxiliary equipment, the instal-ler must comply with basic regulations, especially for minimum and maximum flow rates, which must be between the values listed in the operating limit table (application data).***

7.5.2 - Optional evaporator frost protection (30XBEZE & 30XBPZE)

In cases where it is not possible to apply the recommendations in paragraph 7.5.1, the units can be equipped with heaters to protect the evaporator against frost (option 41A or 41B).

The antifreeze solution and the heaters can be combined.

Protecting units with a hydraulic module against frost requires water circulation in the hydraulic circuit. The unit pump will start up automatically at regular intervals.

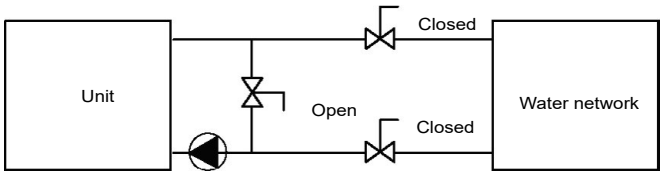
Combination of options for the periods when the machine is in standby mode

Ambient unit temperature range	30XBEZE/30XBPZE 200-1200	30XBEZE/30XBPZE 200-400
	without option 116	with option 116
> 0 °C	-	-
-20 °C to 0 °C	Option 41A or Appropriate antifreeze solution (for example glycol)	Option 41B(1) or Appropriate antifreeze solution (for example glycol)(1)

(1) Allow the pumps to circulate. If there is a valve, install a bypass (see diagram for winter position).

If the system is isolated by a valve, it is imperative to install a bypass as indicated below.

Winter position



7.6 - Operation of two units in master/slave mode (option 58)

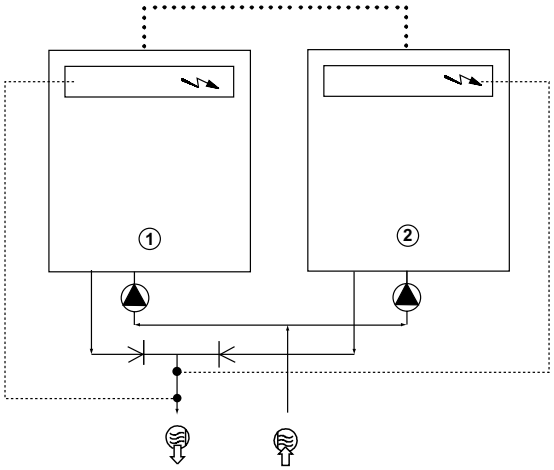
The control of a master/slave assembly is in the entering water and does not require any additional sensors (standard configuration). It can also be located in the leaving water. In this case two additional sensors must be added on the common piping.

All parameters, required for the master/slave function must be configured using the Service Configuration menu. All remote controls of the master/slave assembly (start/stop, set point, load shedding etc.) are controlled by the unit configured as master and must only be applied to the master unit.

Each unit controls its own water pump. If there is only one common pump, in cases with variable flow, isolation valves must be installed on each unit. They will be activated at the opening and closing by the control of each heat pump (in this case the valves are controlled using the dedicated water pump outputs). Refer to the SmartVu™ control manual for a more detailed explanation.

WARNING : To permit Master/ Slave operation both units must be equipped with option 58.

30XB(E/P)ZE with configuration: Leaving water control



Legend

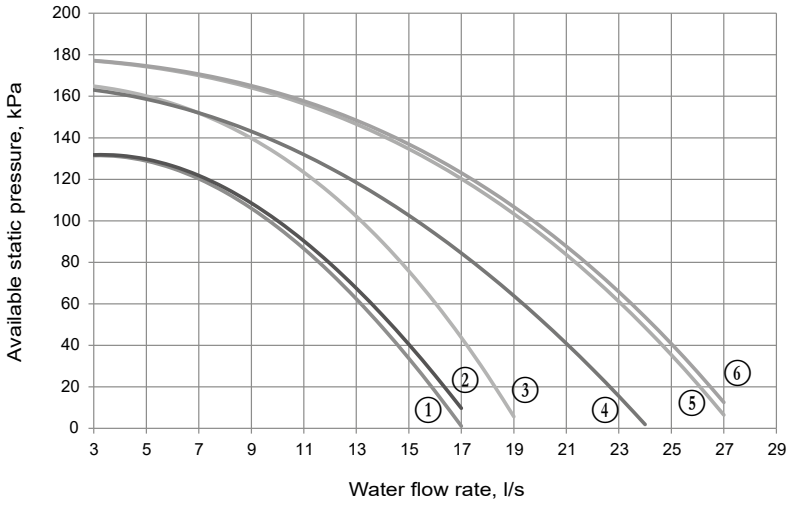
1 Master unit
2 Slave unit
Control boxes of the master and slave units
Water inlet
Water outlet
Water pumps for each unit (included as standard for units with hydraulic module)
Additional sensors for leaving water control, to be connected to channel 1 of the slave boards of each master and slave unit
CCN communication bus
Connection of two additional sensors

7.7 - Pump characteristics

7.7.1 - Available external static pressure (hydraulic module option)

Data applicable for:
- Fresh water 20°C
- In case of use of glycol, the maximum water flow is reduced
- When glycol is used, concentration is limited to 40%

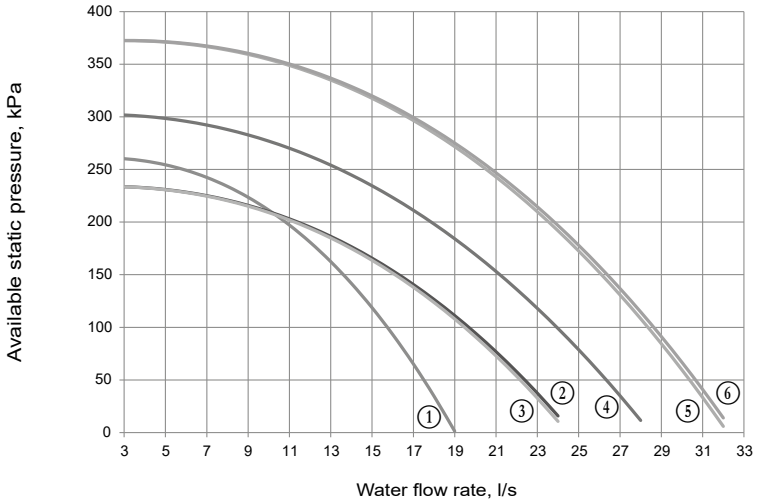
Dual pump low pressure (116U)



Legend

1 30XB(E/P)ZE0200
2 30XB(E/P)ZE0230
3 30XB(E/P)ZE0250
4 30XB(E/P)ZE0300
5 30XB(E/P)ZE0350
6 30XB(E/P)ZE0400

Dual pump high pressure (116S)



Legend

1 30XB(E/P)ZE0200
2 30XB(E/P)ZE0230
3 30XB(E/P)ZE0250
4 30XB(E/P)ZE0300
5 30XB(E/P)ZE0350
6 30XB(E/P)ZE0400

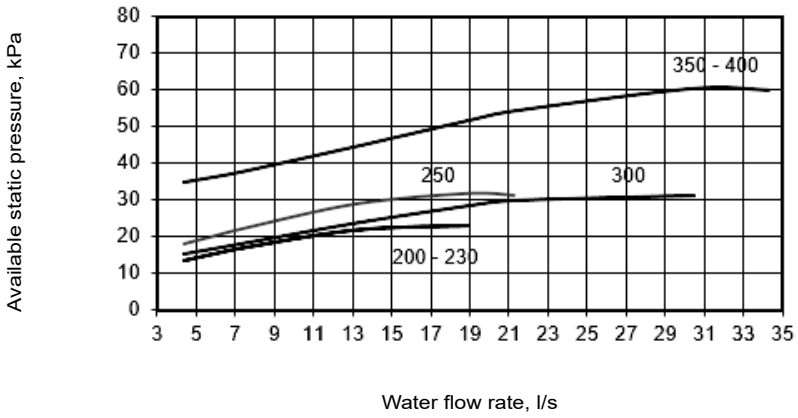
7.7.2 - Net positive suction head (NPSH) required, hydraulic module option

Size the hydraulic circuit to ensure a net positive suction head that is higher than or equal to the required NPSH + 50 kPa.

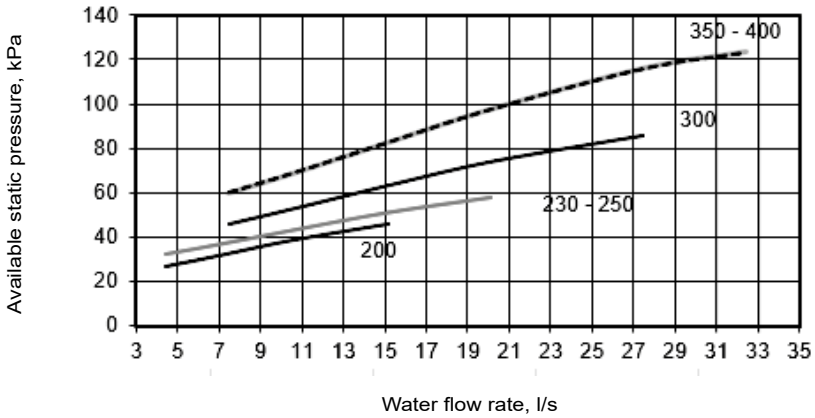
Data applicable for:

- Fresh water 20 °C
- In case of use of glycol, the maximum water flow is reduced.
- When glycol is used, concentration is limited to 40%

Low-pressure pumps (116U)



High-pressure pumps (116S)



8 - HEAT RECLAIM CONDENSER OPTIONS (OPTIONS 50 & 50C)

8.1 - Physical data with heat reclaim condenser options

Physical data, 30XBEZE & 30XBPZE units with heat reclaim condenser - option 50

30XB(E/P)ZE		200	230	250	300	350	400	450	500	550	600	630	700	750
Operating weight (1)	kg	3381	3413	3432	4102	4244	4421	5546	5691	6050	6366	6550	7125	7398
Condenser diameter	in	10	10	10	12	14	14	12+12	12+12	14+12	14+12	14+12	14+14	14+14
Refrigerant charge														
Circuit A	kg	39	37	37	52	53	59	60	61	69	69	75	72	79
Circuit B	kg	40	38	39	40	40	36	61	64	61	67	67	74	83
Heat reclaim condenser		Flooded multi-pipe condenser												
Water volume	l	38	38	38	55	68	68	55+55	55+55	68+55	68+55	68+55	68+68	68+68
Water connections		Type Victaulic												
Nominal diameter	in	3	3	3	4	4	4	4	4	4	4	4	4	4
Actual outside diameter	mm	88,9	88,9	88,9	114,3	114,3	114,3	114,3	114,3	114,3	114,3	114,3	114,3	114,3
Max. water-side operating pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

(1) Weights are for guidance only

Physical data, 30XBEZE & 30XBPZE units with heat reclaim condenser on circuit B only - option 50C

30XB(E/P)ZE		900	950	1050	1150	1200
Operating weight (1)	kg	8526	8619	9385	9460	9797
Condenser diameter	in	14	14	14	14	14
Refrigerant charge						
Circuit A	kg	80	80	115	121	124
Circuit B	kg	121	126	121	127	130
Heat reclaim condenser						
Water volume	l	82	82	82	82	82
Water connections		Type Victaulic				
Nominal diameter	in	4	4	4	4	4
Actual outside diameter	mm	114,3	114,3	114,3	114,3	114,3
Max. water-side operating pressure	kPa	1000	1000	1000	1000	1000

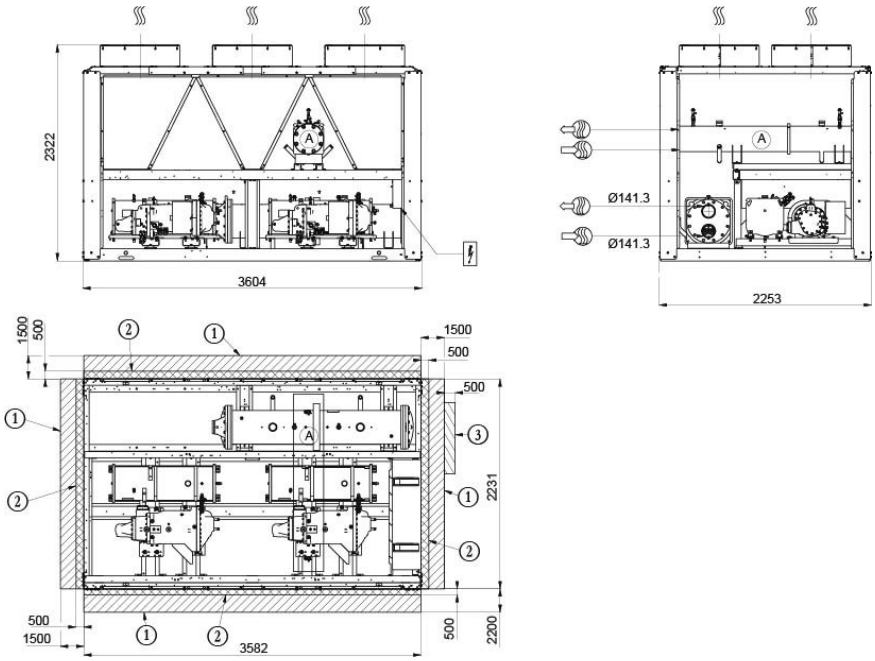
(1) Weights are for guidance only

NOTE:

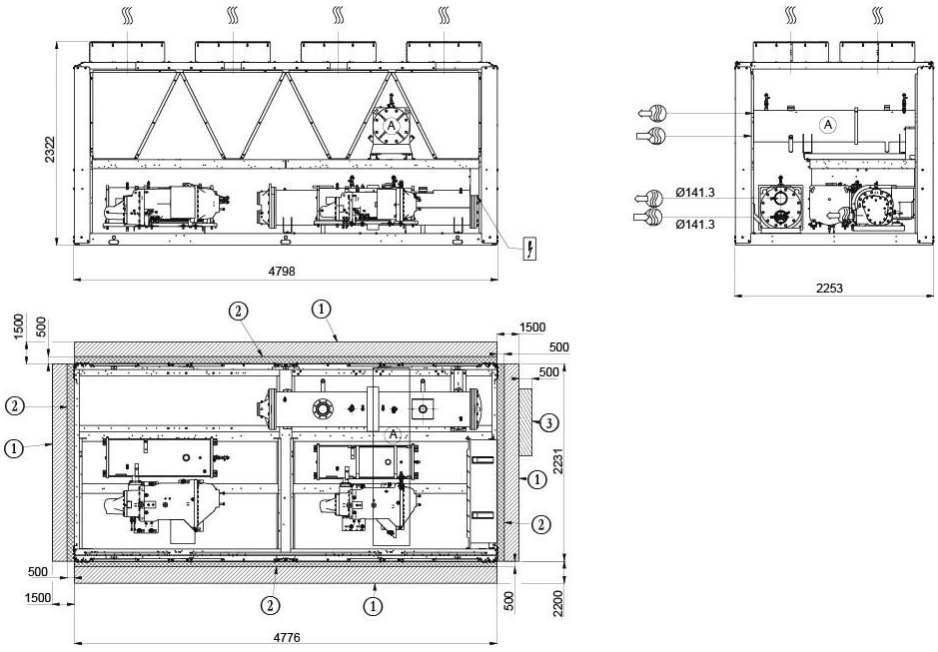
- **Option 50: both circuits are equipped with a reclaim condenser. This option is available on the units 30XB(E/P)ZE 0200 to 750.**
- **Option 50C: only one circuit (B) is equipped with a reclaim condenser. This option is available on the biggest sizes (900 to 1200).**

8.2 - Dimensions, clearances

8.2.1 - 30XB(E/P)ZE 0200 to 250 - option 50



8.2.2 - 30XB(E/P)ZE 0300 & 350 - option 50



Legend

All dimensions are given in mm

(1) Required clearances for maintenance (see note)

(2) ATEX zone around the unit

(3) Recommended space for evaporator tube removal

Water inlet for standard unit – for options 100A, 107, 5, 6 refer to the certified drawing

Water outlet for standard unit – for options 100A, 107, 5, 6 refer to the certified drawing

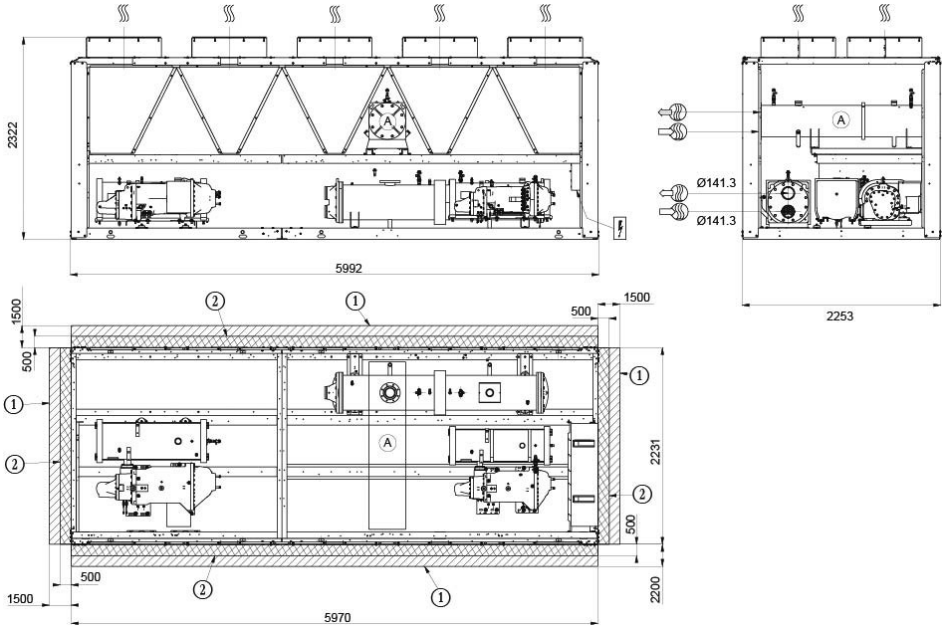
Air outlet – do not obstruct

Power supply and control connection

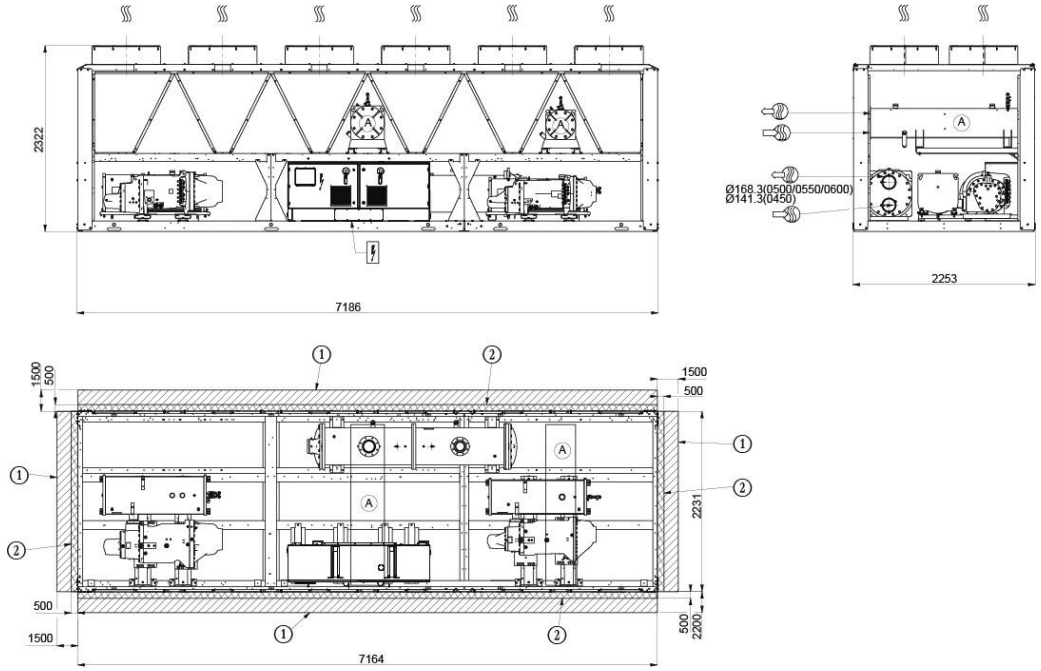
NOTES:

- **Drawings are not contractually binding.**
- **Refer to unit nameplate for unit weight information**
- **Before designing an installation, consult the certified dimensional drawings, provided with the unit (Appendix4).**
- **If the installation includes several units or if this (these) is (are) close to walls, please refer to chapters "Multiple chiller installation" and "Distance to the wall" of the installation manual to determine the space required**

8.2.3 - 30XB(E/P)ZE 0400 - option 50



8.2.4 - 30XB(E/P)ZE 0450 to 600 - option 50



Legend

All dimensions are given in mm

(1) Required clearances for maintenance (see note)

(2) ATEX zone around the unit

(3) Recommended space for evaporator tube removal

Water inlet for standard unit – for options 100A, 107, 5, 6 refer to the certified drawing

Water outlet for standard unit – for options 100A, 107, 5, 6 refer to the certified drawing

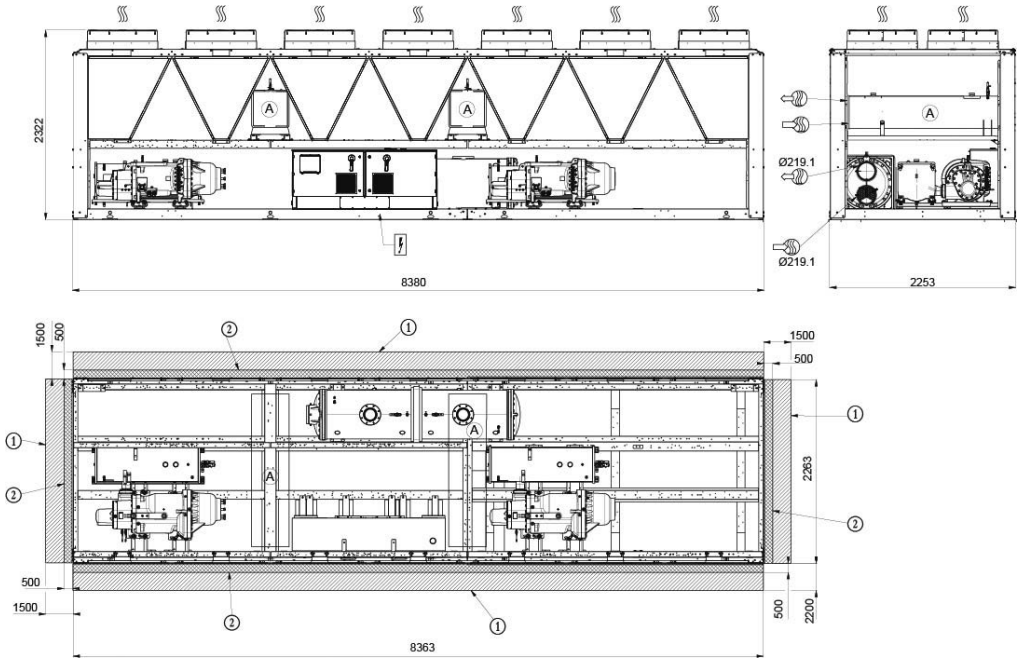
Air outlet – do not obstruct

Power supply and control connection

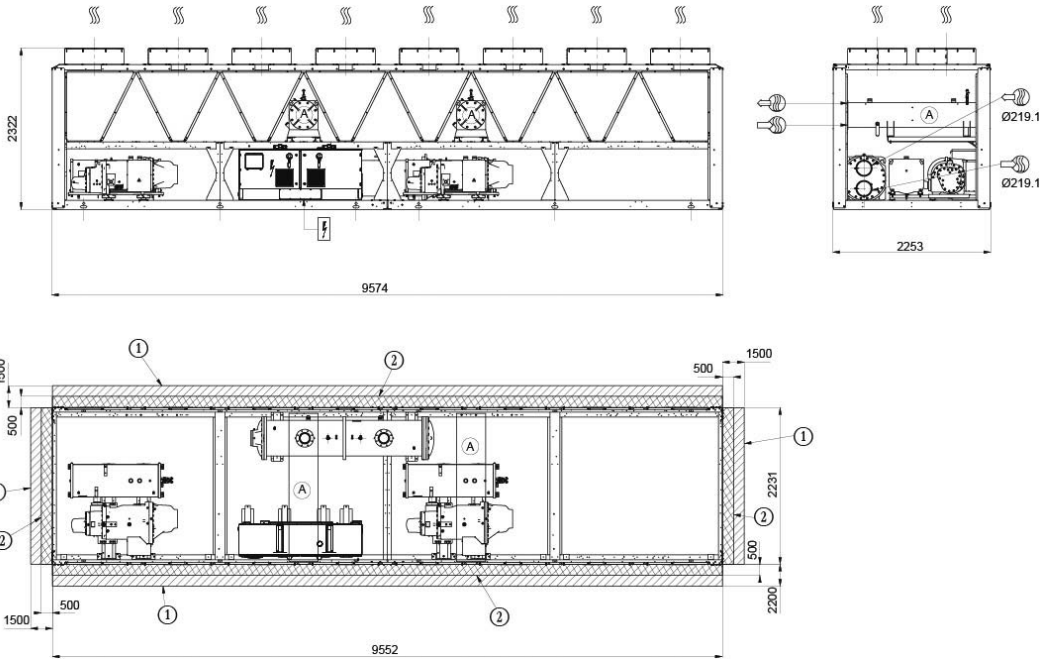
NOTES:

- **Drawings are not contractually binding.**
- **Refer to unit nameplate for unit weight information**
- **Before designing an installation, consult the certified dimensional drawings, provided with the unit (Appendix4).**
- **If the installation includes several units or if this (these) is (are) close to walls, please refer to chapters "Multiple chiller installation" and "Distance to the wall" of the installation manual to determine the space required**

8.2.5 - 30XB(E/P)ZE 0630 & 700 - option 50



8.2.6 - 30XB(E/P)ZE 0750 - option 50



Legend

All dimensions are given in mm

(1) Required clearances for maintenance (see note)

(2) ATEX zone around the unit

(3) Recommended space for evaporator tube removal

Water inlet for standard unit – for options 100A, 107, 5, 6 refer to the certified drawing

Water outlet for standard unit – for options 100A, 107, 5, 6 refer to the certified drawing

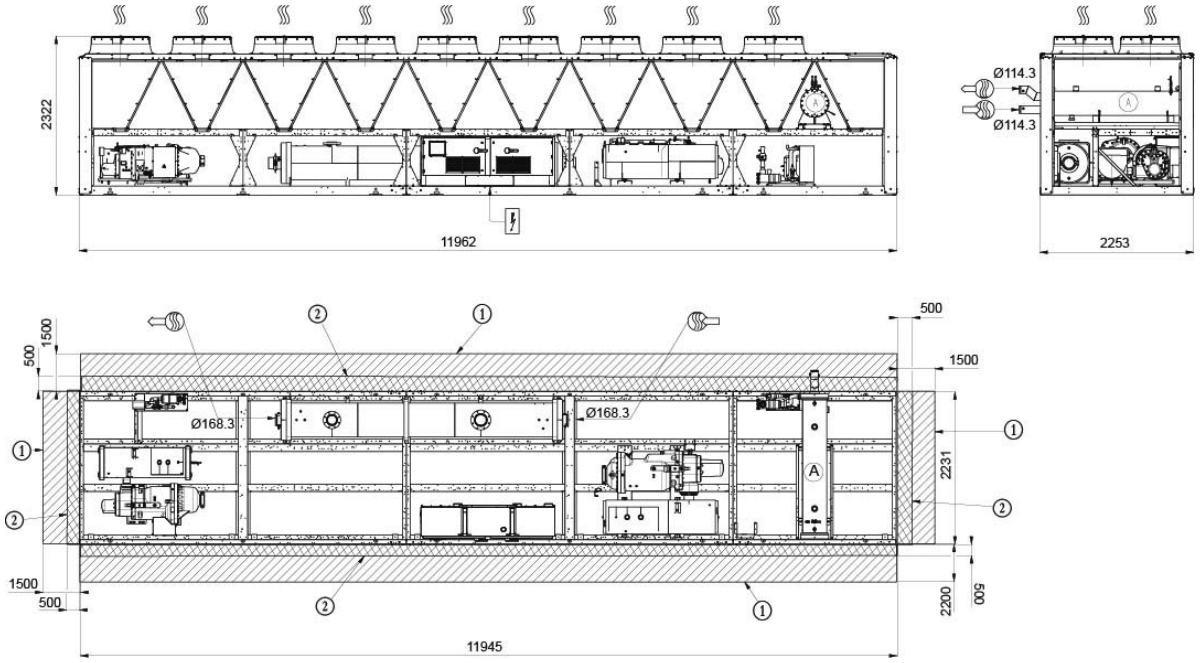
Air outlet – do not obstruct

Power supply and control connection

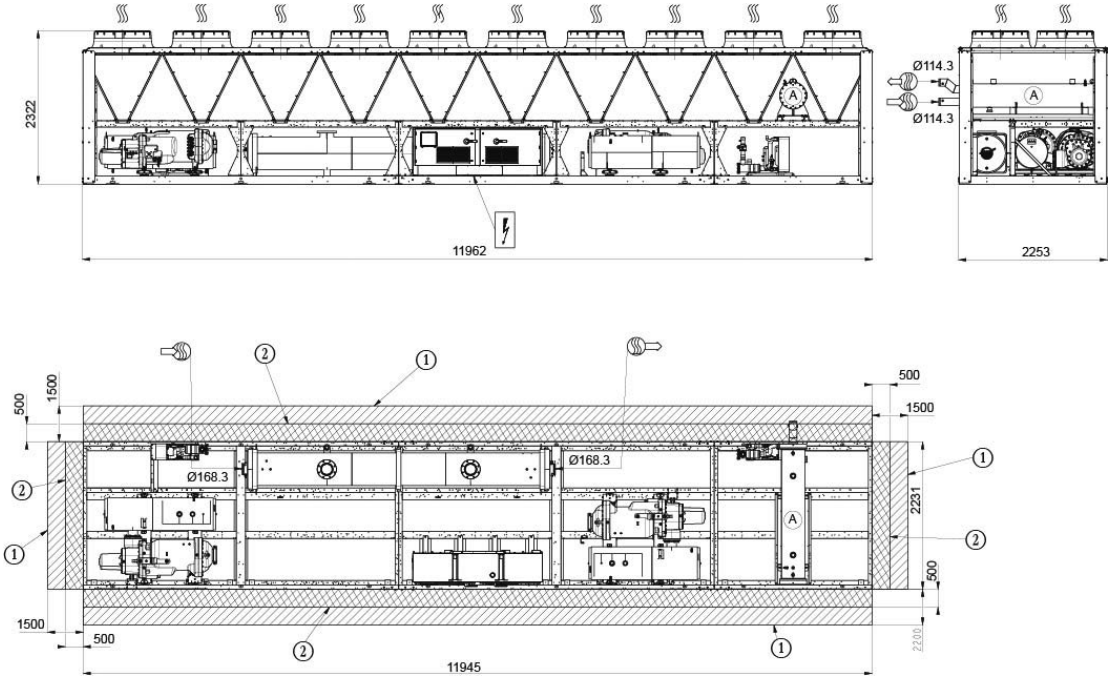
NOTES:

- **Drawings are not contractually binding.**
- **Refer to unit nameplate for unit weight information**
- **Before designing an installation, consult the certified dimensional drawings, provided with the unit (Appendix4).**
- **If the installation includes several units or if this (these) is (are) close to walls, please refer to chapters "Multiple chiller installation" and "Distance to the wall" of the installation manual to determine the space required**

8.2.7 - 30XB(E/P)ZE 0900 & 950 - option 50C



8.2.8 - 30XB(E/P)ZE 1050 & 1150 - option 50C



Legend

All dimensions are given in mm

(1) Required clearances for maintenance (see note)

(2) ATEX zone around the unit

(3) Recommended space for evaporator tube removal

Water inlet for standard unit – for options 100A, 107, 5, 6 refer to the certified drawing

Water outlet for standard unit – for options 100A, 107, 5, 6 refer to the certified drawing

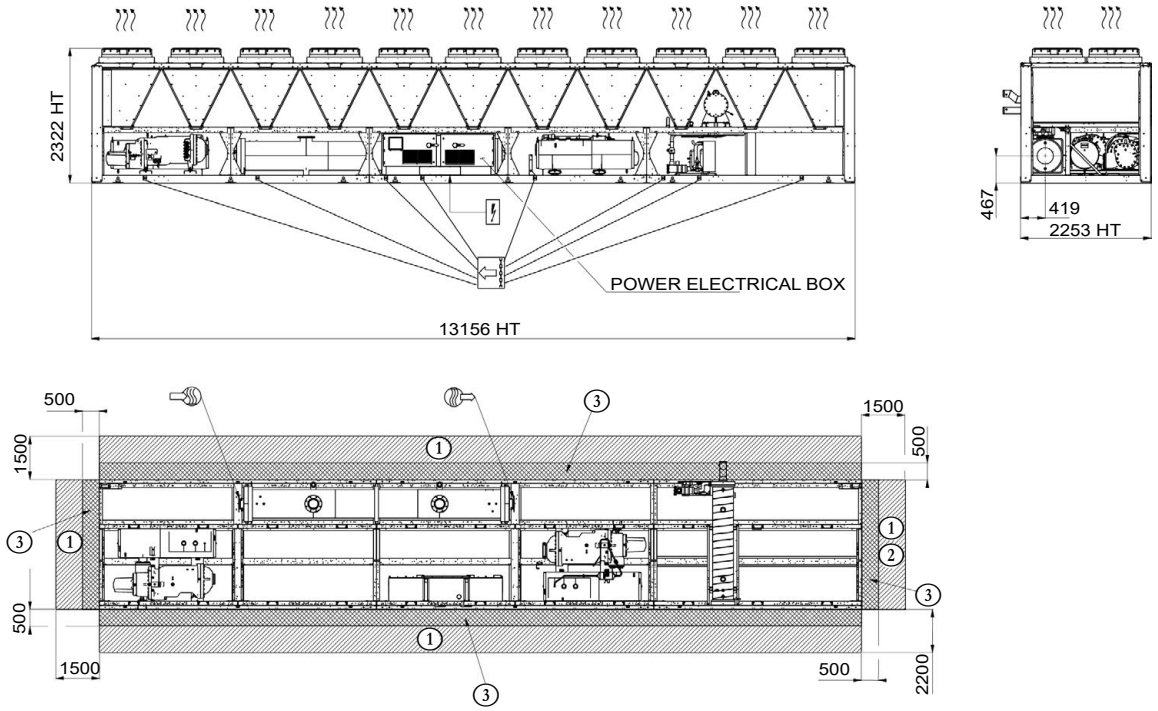
Air outlet – do not obstruct

Power supply and control connection

NOTES:

- **Drawings are not contractually binding.**
- **Refer to unit nameplate for unit weight information**
- **Before designing an installation, consult the certified dimensional drawings, provided with the unit (Appendix4).**
- **If the installation includes several units or if this (these) is (are) close to walls, please refer to chapters "Multiple chiller installation" and "Distance to the wall" of the installation manual to determine the space required**

8.2.9 - 30XB(E/P)ZE 1200 - option 50C



Legend

All dimensions are given in mm.

① Required clearances for maintenance (see note)

② Recommended space for evaporator tube removal

③ ATEX zone around the unit

Water inlet for standard unit - for options 100A, 100C, 107 refer to the certified drawing.

Water outlet for standard unit - for options 100A, 100C, 107 refer to the certified drawing.

Air outlet – do not obstruct

Power supply and control connection

Slinging points

NOTES:

- **Drawings are not contractually binding.**
- **Refer to unit nameplate for unit weight information**
- **Before designing an installation, consult the certified dimensional drawings, provided with the unit (Appendix4).**
- **If the installation includes several units or if this (these) is (are) close to walls, please refer to chapters "Multiple chiller installation" and "Distance to the wall" of the installation manual to determine the space required**

8.3 - Condenser location

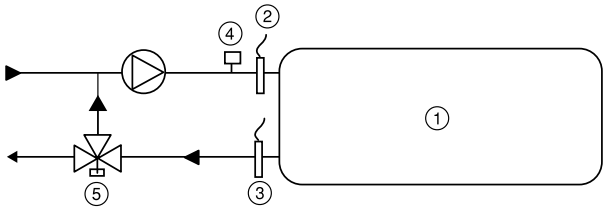
All heat reclaim condensers are located between the air-cooled condensers on the upper part of the chassis, supported by two cross rails. The water inlet and outlet are on the same side.

8.4 - Condensers water connections

8.4.1 - Units with one heat reclaim condenser

Units: 30XB(E/P)ZE0200 to 400 and 30XB(E/P)ZE0900 to 1200

The water flow switch must be installed at the water inlet of the installation that arrives at the heat reclaim condenser.



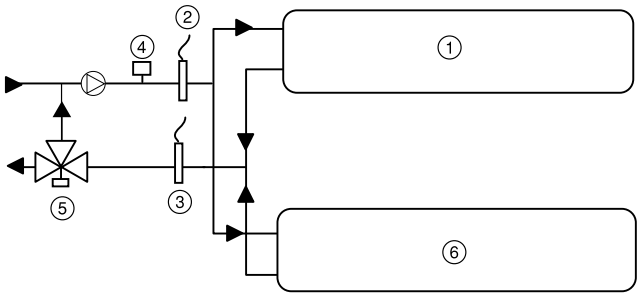
Legend
1 Heat reclaim condenser
2 Entering water temperature sensor (supplied)
3 Leaving water temperature sensor (supplied)
4 Condenser water flow switch (supplied)
5 Three-way valve (not supplied)

8.4.2 - Units with two heat reclaim condensers

Units: 30XB(E/P)ZE0450 to 750

The two condensers must be installed in parallel in the water system of the installation. The water flow switch and the entering/ leaving water temperature sensors must be installed in the line that is common to both heat reclaim circuits and as close as possible to the condensers. A T-piece must be provided by the installer at the water inlet and outlet of the condensers.

The maximum cable length of the temperature sensors and of the flow switch (7.5m) is designed to allow connection to the common inlet or outlet in a radius of 4.5 m after routing along the width of the unit.



Legend
Please refer to the legend in chapter 9.4.1 opposite, noting that items 2, 3 and 4 - flow switch and sensors - are placed on the common sections.

8.4.3 - Three-way valves

It is strongly recommended to install a three-way valve in the system (not supplied with the unit). A 0-10 V output is available on the unit electronic board to control this valve. The valve allows bypassing of the heat reclaim condenser entering/leaving circuit to ensure unit operation with heat reclaim at low entering water temperature (< 12.5 °C). It also ensures an optimal and controlled leaving water temperature.

8.5 - Operating limits for stable operation (no mode changeover)

Please refer to the earlier chapters in this manual:
6.1 - Operating range
6.7 - Evaporator water flow rate

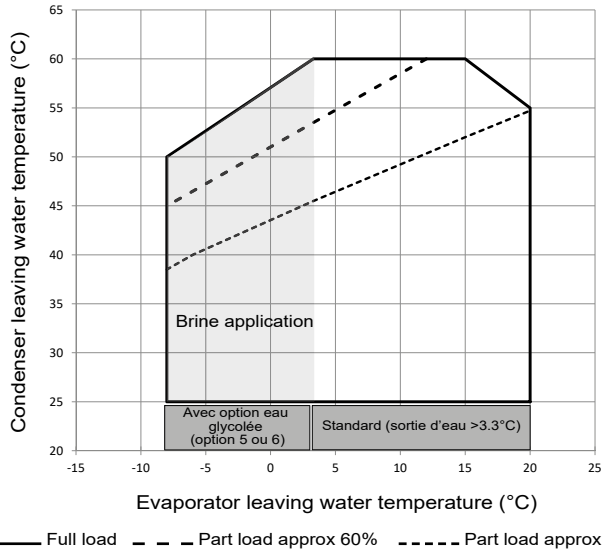
8.5.1 - Heat reclaim mode

Condenser Water temperatures		Minimum	Maximum
Entering temperature at start-up	°C	12,5(1)	55
Entering temperature during operation	°C	20	55
Leaving temperature during operation	°C	25	60
Evaporator Water temperatures		**Minimum**	**Maximum**
Entering temperature at start-up	°C	-	45
Entering temperature during operation	°C	6,8 (2)	25
Leaving temperature during operation	°C	3,3 (2)	20

(1) The entering water temperature must not be lower than 12.5°C. For installations with a lower temperature, a three-way valve must be used.
(2) Fresh water application

NOTE:
if the temperature at the evaporator is below 4 °C, a glycol/water solution or the frost protection option must be used.

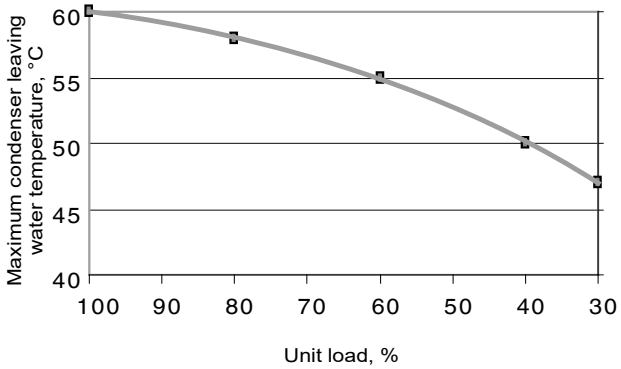
In part-load operation, the limitation of the condenser leaving water temperature is due to the operating range of the screw compressor. If the condenser leaving water temperature is above the limit value given in the curves below, the unit will automatically change over to the mode without heat recovery:



NOTE

- **Range is given as a guide. Check the operating range from Carrier electronic catalogue.**

Part load operating limits (evaporator leaving water temperature = 7 °C)



8.6 - Operating limits for changeover between modes

From cooling only to heat reclaim and vice versa.

Condenser water & ambient temperatures		Minimum	Maximum
Entering water temperature	°C	125(1)	57,5
Ambient operating temperature	°C	-20	45

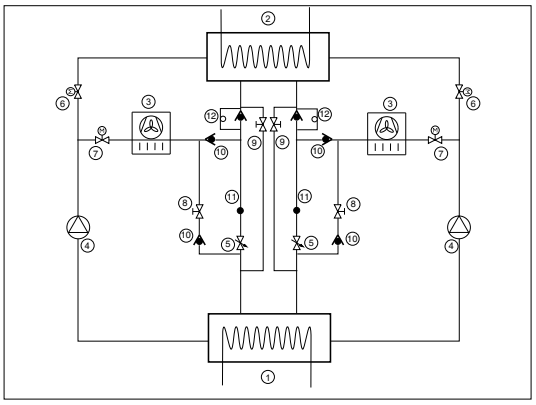
(1) The entering water temperature must not be lower than 12.5°C. For installations with a lower temperature, a three-way valve must be used.

NOTE:
if the temperature at the evaporator is below 4 °C, a glycol/water solution or the frost protection option must be used.

8.7 - Flow control

The water flow switch supplied needs to be installed at the heat reclaim condenser water inlet and protects the condenser loop against low water flow conditions. When the heat reclaim mode is required, a signal from the additional board output activates the system pump. Once the pump is started, flow detection takes place for one minute. If no flow is detected by the end of this time:

1. Changeover to the heat reclaim mode is not permitted
2. Mode is changed to cooling only mode when the water flow rate is low, accompanied by a water flow detection alarm.



Legend
1 Evaporator
2 Heat reclaim condenser
3 Air condenser (coils)
4 Compressor
5 Expansion device (EXV)
6 Motorised valve - heat reclaim mode
7 Motorised valve - cooling only mode
8 Solenoid valve - charge recovery in heat reclaim mode
9 Solenoid valve - charge recovery in cooling only mode
10 Check valve
11 Pressure and temperature measurement to calculate the liquid sub-cooling to optimise the charge recovery
12 Check valve with capillary

8.8 - Heat reclaim operation

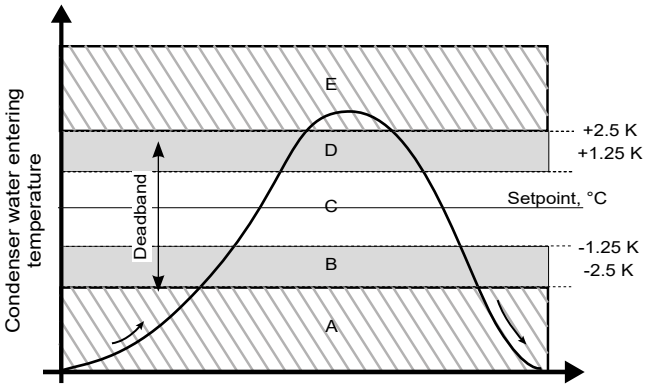
The heat reclaim condenser option is only available on units with two circuits. It has been designed with one or two single or two-circuit shell-and-tube heat exchangers, depending on the unit size.

The two circuits are independently controlled. One circuit can be in cooling only and the other in heat reclaim mode.

Changeover from one mode to the other (changeover from heat exchange at the air condenser to heat exchange at the water condenser and vice versa) is ensured by motorised two-way valves located upstream of the air and water condensers.

ATTENTION: Mode changes may lead to higher sound levels than the levels at stable operation.

Depending on the mode selected (heat reclaim or cooling), the logic compares the water entering temperature required with the setpoint. Depending on this difference the unit circuits are either activated or deactivated in heat reclaim mode (one or two together), as shown in the following diagram and table.



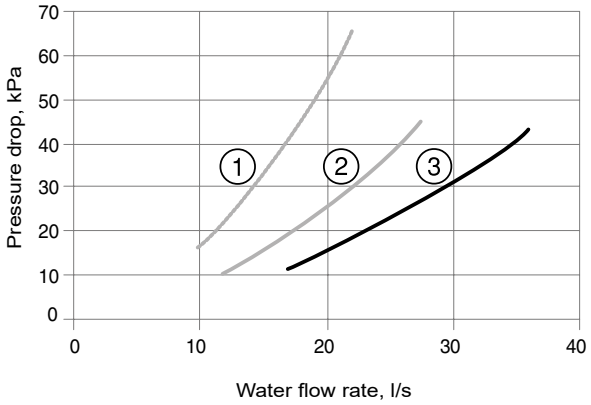
The deadband of 5 K is controlled by default.

For more details on the heat reclaim operation logic, please refer to the SmartVu™ control manual.

8.9 - Condenser pump selection

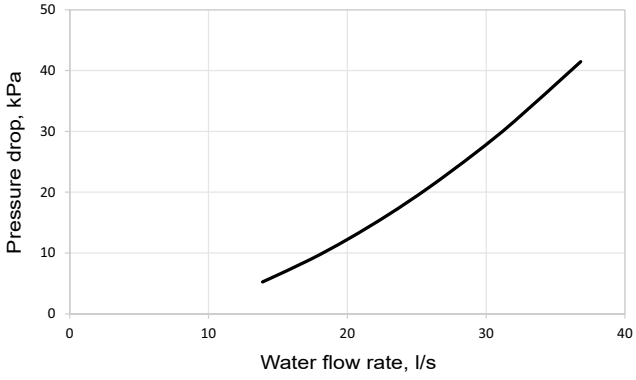
Heat reclaim condenser water flow rate / pressure drop characteristic curves are shown in the following graphs.

Option 50: heat reclaim condenser pressure drop in water flow function



1 Condenser 10” (water volume = 38 litres)
2 Condenser 12” (water volume = 55 litres)
3 Condenser 14” (water volume = 68 litres)

Option 50C: heat reclaim condenser pressure drop in water flow function



Condenser 14’’ (water volume = 82 litres)

8.10 - Frost protection

The heat reclaim condenser is equippped with electric heaters to protect the condenser against frost. These are activated if the condenser entering and leaving water temperatures are below 3 °C and deactivated, if they are higher than 4.3 °C.

9 - FANS WITH AVAILABLE PRESSURE (OPTION 10)

If this option has been selected, the fans with available pressure are equipped with discharge connection flanges to facilitate the duct connection.
NOTE: Each fan must be individually ducted.

10 - UNIT OPERATION WITH A FREE COOLING DRYCOOLER (OPTION_313)

10.1 - Unit operation with a free cooling drycooler (optional)

10.1.1 - Operating principle

The units have been designed to optimise the operation of systems, using drycoolers as a free cooling system (method using low outdoor air temperatures to chill the water in the air conditioning system).

This system allows substantial energy and cost savings, which is at its most effective when the outdoor air temperature is low.

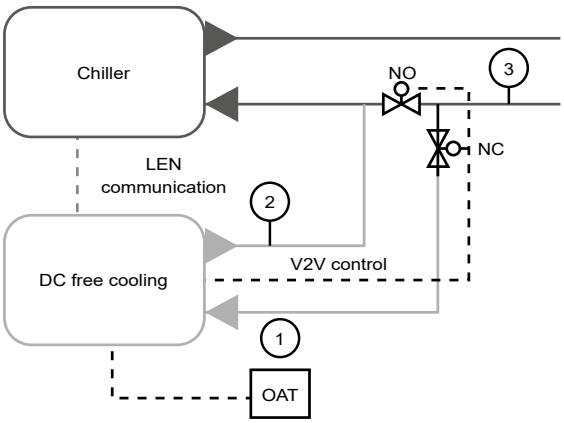
The unit's SmartVu™ control system includes algorithms which enable continuous automatic optimisation of the following:

- the operation of the drycooler fans,
- the variation of the flow rate in the water loop,
- the cooling capacity (the drycooler and chiller can operate independently or simultaneously),
- the positions of the valves, depending on the operating mode.

The control defines the optimal configuration, taking the water setpoint value, outdoor air temperature, and water loop temperature into account (the control will give priority to the drycooler).

Parallel control of the fans and of the variable flow rate of the water loop enable the system to operate at outdoor temperatures of down to -20°C without any additional control.

Warning: the drycooler and chiller both need to be equipped with the Free cooling management option.



For an optimal free cooling operation, the chiller has to be configurated:

- using the water inlet temperature control,
- using the delta temperature control for the variable speed pump option.

10.1.2 - Communication to control the drycooler

When the option is selected, a specific electronic board is integrated in the drycooler control panel. "A" LEN communication bus connected between the drycooler (AUX1 board) and the chiller is needed for overall control of the system.

This cable must be a 3-point Wago type cable (5 mm spacing or equivalent) and must be shielded.

The board integrated in the drycooler control panel has analogue inputs for the outside air temperature (item 1), water loop return (item 3), and drycooler water outlet temperature (item 2) sensors, as well as digital outputs for controlling the fans.

The option works as a system split in two parts:

The chiller (with free cooling option):

Dedicated control algorithms supplied with the LEN connector to control the drycooler.

The drycooler (with free cooling option):

- AUX board with the I/O
- room air temperature sensor to be placed outdoors,
- drycooler water outlet temperature sensor (factory-fitted),
- water loop temperature sensor (to be fitted on the common pipe upstream of the valve),
- Control & 230V power supply for 2 two-way valves or one three-way valve

The difference between the drycooler outdoor air temperature and the water loop sensor temperature determines whether or not it is possible to activate free cooling mode.

10.1.3 - Configuration of the fan control

To set the configuration corresponding to the drycooler installed (number of fans, control type – fixed or variable speed), please refer to the instructions in the SmartVu™ control manual. Following these parameters, the SmartVu™ control will activate the adequate number of digital outputs to control the fans.

SmartVu™ controls the automatic switching of all fans, based on operating time and number of start-ups, to ensure the fan motors provide a long service life.

Compatible fans configuration:

- 1 to 20 fans,
- fixed speed or variable speed
- fans in one l or 2 lines

Refer to the drycooler wiring diagram to see the arrangement of the fan stages.

10.1.4 - Valves on the water loop

The free cooling system requires two two-way valves (one normally open, one normally closed) or a three-way valve, not supplied with the unit or the drycooler.

A two-way valve kit is available in the list of accessories for the drycooler.

The drycooler control panel has a 230 V power supply for two two-way valves.

Recommended motor valve (per default): 230V 3 points

See the drycooler wiring diagram for cabling the valves to the customer terminal strip.

10.1.5 - Guidelines for system installation

For the physical properties, dimensions and performances: see the drycooler documentation.

For the electrical connections, see the electrical wiring diagram supplied with the drycooler.

For software configuration information, refer to the control documentation of the chiller.

For correct installation of the drycooler, the rules for calculation and sizing relating to the following areas must be observed:

- sizing of the water piping;
- pressure drops (check the operating pressure of the unit's pump is sufficient in relation to the pressure drops in the pipes and valves - perform this check for all operating modes);
- maximum height of the drycooler (in relation to the unit's relief valve);
- suitable positioning of the temperature sensors: outdoor air temperature and water loop temperature.

11 - MAJOR SYSTEM COMPONENTS AND OPERATION DATA

11.1 - Direct-drive twin-screw compressor with variable capacity slide valve

- 30XB(E/P)ZE units use 06T geared twin-screw compressors equipped with a variable capacity slide valve for continuous control between 30% and 100% of full load.
- Nominal capacities range from 100 to 600. The ten models used in the 30XBEZE & 30XBPZE range are economised.

11.1.1 - Oil filter

The 06T screw compressor has an independent oil filter attached to the oil separator. This filter is field replaceable.

11.1.2 - Refrigerant

The 30XBEZE & 30XBPZE range units must operate with R1234ze(E) refrigerant.

11.1.3 - Lubricant

The 06T screw compressor is approved for use with the following lubricant (Carrier specification PP47-38).

CAUTION : Too much oil in the circuit can cause the unit to malfunction.

NOTE : Never use oils which have been exposed to air.

11.1.4 - Oil supply solenoid valve

An oil supply solenoid valve is installed on the oil return line as standard to isolate the compressor from oil flow when the compressor is not operating. The oil solenoid valve is field replaceable.

11.1.5 - Suction and economizer screens

To increase the reliability of the compressor, a screen has been incorporated as a standard feature into suction and economizer inlets of the compressor.

11.1.6 - Capacity control system

The 06T screw compressor has an unloading system that is standard on all compressors. This unloading system consists of slide valve that permits changing the length of the screw used for the refrigerant compression. This valve is controlled by the action of a piston controlled by two solenoid valves on the oil return line.

11.2 - Pressure vessels

General

Monitoring during operation, re-qualification, re-testing and re-testing dispensation:

- Follow the regulations on monitoring pressurised equipment.
- It is normally required that the user or operator sets up and maintains a monitoring and maintenance file.
- If there are no regulations or to complement them follow the control programmes of EN 378.
- If they exist follow local professional recommendations.
- Regularly inspect the condition of the coating (paint) to detect blistering resulting from corrosion. To do this, check a non-insulated section of the container or the rust formation at the insulation joints.
- Regularly check for possible presence of impurities (e.g. silicon grains) in the heat exchange fluids. These impurities maybe the cause of the wear or corrosion by puncture.
- Filter the heat exchange fluid check and carry out internal inspections as described in EN 378.
- In case of re-testing please refer to the maximum operating pressure given on the unit nameplate.
- The reports of periodical checks by the user or operator must be included in the supervision and maintenance file.

Repair

Any repair or modification, including the replacement of moving parts:

- Must follow local regulations and be made by qualified operators and in accordance with qualified procedures, including changing the heat exchanger tubes.
- Must be made in accordance with the instructions of the original manufacturer. Repair and modification that necessitate permanent assembly (soldering, welding, expanding etc.) must be made using the correct proce-dures and by qualified operators.
- An indication of any modification or repair must be shown in the monitoring and maintenance file.
- Never attempt to repair or modify a plate heat exchanger.

Recycling

The unit is wholly or partly recyclable. After use it contains refrigerant vapours and oil residue. It is coated by paint.

Operating life

This unit is designed for:

- Prolonged storage of 15 years under nitrogen charge with a temperature difference of 20 K per day.
- 10,000 cycles (start-ups) during the whole lifetime.

Corrosion allowances:

Gas side: 0 mm

Heat exchange fluid side: 1 mm for tubular plates in lightly alloyed steels, 0 mm for stainless steel plates or plates with copper-nickel or stainless steel protection.

Water-box : 1 mm

Parts painted : 0 mm

If any part of the piece (with 0mm of acceptable corrosion) shows corrosion, change the piece.

Unit PED classifications

The unit PED classification depending are presented in the following tables. The unit classification is driven by the the highest PED class equipment.

30XB(E/P)ZE	200	230	250	300	350	400	450	500	550
Standard unit									
PED Category	III	III	III	III	III	III	III	III	IV

30XB(E/P)ZE	600	630	700	750	900	950	1050	1150	1200
Standard unit									
PED Category	IV	IV	IV	IV	IV	IV	IV	IV	IV

11.2.1 - Evaporator

30XB(E/P)ZE chillers use a flooded multi-tube evaporator. The water circulates in the tubes and the refrigerant is on the outside in the shell. One vessel is used to serve both refrigerant circuits. There is a centre tube sheet which separates the two refrigerant circuits. The tubes are 3/4" diameter copper with an enhanced surface inside and out. There is just one water circuit, and depending on the size of the chiller, there may be one, two or three water passes.

The units have three refrigerant circuits with two evaporators connected in series on the heat transfer fluid.

The maximuum standard operating pressures are 2100 kPa relative for the refrigerant side and 1000 kPa relative for the water-side.

The evaporator has a thermal insulation of 19 mm thick polyurethane foam, an aluminium sheet (option) and is equipped with a water drain and purge.

The water connection of the heat exchanger is a Victaulic connection. As an option the evaporator is available with frost protection (evaporator frost protection option).

The products that may be added for thermal insulation of the containers during the water piping connection procedure must be chemically neutral in relation to the materials and coatings to which they are applied. This is also the case for the products originally supplied by Carrier.

11.2.2 - Oil separator

In these units, the oil separator is a pressure vessel that is mounted under the outside vertical condenser coils. Dis-charge gas at the compressor outlet is directed towards the bottom of the oil separator ring and most of the oil separates from the gas by strong deceleration and by gravity. The gas then flows through a wire mesh screen where the remaining oil is separated by coalescence and flows to the bottom of the ring. The gas is now free from oil and leaves the ring at the top towards the condenser.

The oil separator is equipped with a trace heater regulated by the control.

11.2.3 - Economiser function

The economiser function includes a liquid line valve, a filter drier, two EXVs, a plate heat exchanger as well as protection devices (fuse or valve).

At the condenser outlet a part of the liquid is expanded via the secondary EXV in one of the heat exchanger circuits and then returns as gas at the compressor economiser. This expansion permits increase of the liquid sub-cooling of the rest of the flow that penetrates the evaporator via the principal EXV. This permits increasing the cooling capacity of the system as well as its efficiency.

11.3 - High pressure safety buckle (SRMCR)

11.3.1 - General description

The device is equipped with a high pressure safety loop, also known as safety related measurement control and regulation system (SRMCR), consisting of

- 2 PZHH type high pressure switches (HPS) with manual reset located at the outlet of each compressor
- A control relay on the compressor board.
- 2 compressor main contactors

See the wiring diagram and bill of material of the unit for details of identification and references.

This safety loop is designed according to EN 61508 for:

SIL level (Safety Integrity): 2.

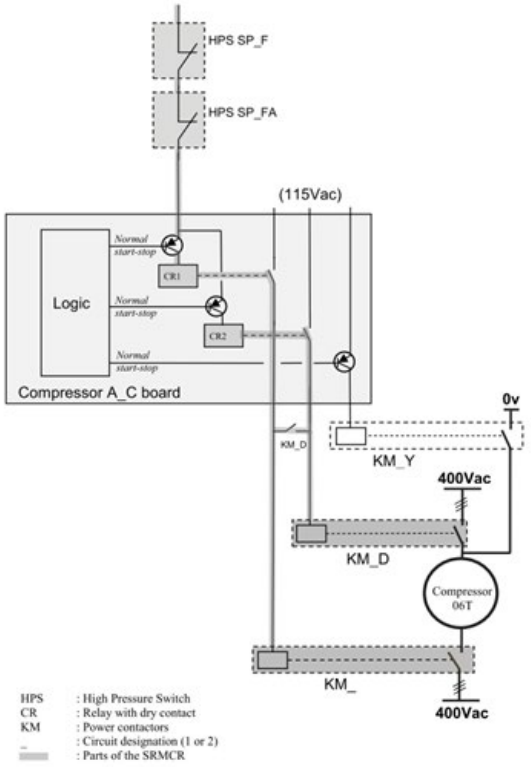
Demand mode: high and low.

Mission Time: 20 years.

Periodic test: The safety loop operation must be tested at least once a year to maintain its integrity.

11.3.2 - Function description and reset

Diagram below describes the description of operation: refer to the machine documentation to obtain the detailed wiring diagram



The HPS switches are wired in series to the control relays of the A_C board which controls the KM and KM-D main contactors. Both switches are closed during continuous operation of the compressor. When one of the HPS switches opens, the control relay interrupts the supply voltage of the KM-and KM-D contactor coil: the main contactor opens, which causes the compressor to lose power and stop .

The operation of this safety loop is electromechanical: it is not based on software or an electronic component.

11.3.3 - Restart after high pressure detection

After detecting the overpressure, it is necessary to manually reset the switched HPS (s). Using a dull tool with a diameter of less than 6 mm if the PZHH HPS is deactivated.

11.3.4 - Checks in case of apparent failure of the safety accessory

If the operating pressure of the unit appears to have been exceeded (for example: after opening of the relief valves), the unit must be stopped immediately. The unit and the safety loop must pass all periodic checks before any possible restart.

If the test reveals any malfunctions that could have led to exceed the maximum allowable pressure (PS) of the device, a complete check of all pressure equipment must be performed to verify their mechanical integrity.

11.3.5 - High pressure safety loop periodic test

In order to verify the full integrity of the safety loop, the following checks have to be performed periodically:

- Contactors check
- Complete loop operation check

11.3.5.1 - Power contactor check procedure

This procedure shall be applied for each compressor of the unit.

1. Switch off the power of the electrical equipment.

   Apply all safety procedures for access to equipment with hazardous voltage.

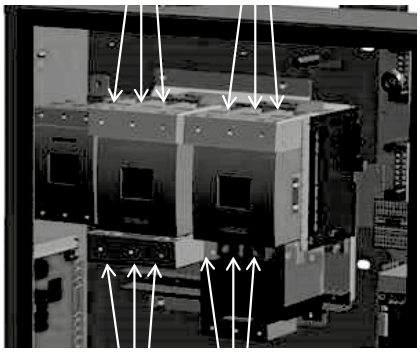
2. Measure the resistance between upstream and downstream terminals of the main power contactors KM- and KM-D for each phase.

Note: calibrated Ohmmeter shall be used for this task.

3- Confirm resistance is more than 1.0 MOhm.

A resistance lower than 1.0 MOhm, indicates that contactor KM_ or KM_D is defective: further investigations and replacement of the failed part is required.

Downstream terminals of KM- and KM-D contactors



Upstream terminals of KM- and KM-D contactors

11.3.5.2 - Complete safety loop test

The purpose of this periodic test is to verify the proper functioning and setting of the high-pressure safety loop of a refrigerant circuit.

In order to reach the triggering pressure of the loop, the pressure and temperature thresholds activating the discharge of the compressor by the regulation system are raised.

This procedure must be repeated for each circuit of the unit.

1. Set up a calibrated pressure gauge on the high pressure part of the circuit (compressor discharge)
2. Reset all activated alarms
3. Activate the HP test mode for the corresponding circuit via the control interface.

   Enable Quick Test Mode (Quick Test Menu> [QCK_TEST] parameter active)

   Activate the high pressure test for the desired circuit (Menu Quick Test> parameter [HP_TEST] to 0 for circuit A or 1 for the B circuit. The corresponding circuit starts to perform the HP test.
4. Getting Started Machine
5. For water-cooled units, stop the circulation of the secondary circuit to the condenser in order to stop the condensation and cause the increase in pressure (this operation is managed by the control on air-cooled machines)
6. Record the trigger value
7. C heck that both HPS were triggered

   If both HPS have tripped, go to step 10

   If only one of the HPS has tripped,go to step 8
8. Replace the triggeredg HPS with another system whose trigger value is adequate .

   Alternatively, an emergency stop button can be installed.
9. Repeat steps 2 to 6
10. Check if the trigger values are correct

    The release values should be between -1.4 / +0 bars of nominal values indicated on the unit.
11. Reset all alarms
12. Reset all HPS

Note: Access to the maintenance functions can be protected by a password. Contact your dealer or the manufacturer's service department for more information.

For step 8 , the electrical disconnection of the triggered HPS and its substitution must be performed in an environment with live parts .All the procedures and authorization provided for this type of intervention must be respected.

The type of connector must be WAGO 231-302 or equivalent.

11.4 - Condensers

30XB(E/P)ZE coils are all-aluminium micro-channel condensers.

11.5 - Fans

The fans are axial Flying Bird fans equipped with rotating shroud and made of composite recyclable material. Each motor is fixed with transverse supports. The motors are three-phase, with permanently lubricated bearings and insulation class F (level IP55).

11 -MAJOR SYSTEM COMPONENTS AND OPERATION DATA

According to regulation No. 327/2011 implementing directive 2009/125/EC with regard to eco-design requirements for fans driven by motors with an electric input power between 125 W and 500 kW.

30XB(E/P)ZE		30XBEZE	30XBPZE
Overall efficiency	%	40,1	47,3
Measurement category		A	A
Afficiency category		static	static
Target effciency level ERP2015		N(2015) 40	N(2015) 40
Effciency level at optimum efficiency point		44,6	52,2
Variable speed drive		YES	YES (embedded)
year of manufacture		See label on the unit	See label on the unit
Fan manufacturer		Simonin	Simonin
Motor manufacturer		Leroy Somer	EBM Papst
Fan PN		00PSG002630700A	00PSG002630700
Motor PN		00PPG000558700A	00PSG002696800A
Nominal power of the motor	kW	1,96	1,68
Flow rate	m^3/s	4,22	4,24
Pressure at optimum energy efficiency	Pa	174,2	174,6
Nominal speed	rpm	948	959
specifica ratio		1,002	1,002
Relevant information to facilitate the disassembly, recycling or removal of the product at the end of life		See the maintenance manual	See the maintenance manual
Relevant information to minimise theimpact on the environment		See the maintenance manual	See the maintenance manual

Regulation 2019/1781 repealing 640/2009, governs the requirements relating to ecodesign applicable to electric motors and to speed regulators in accordance with the directive 2009/125/EC.

30XB(E/P)ZE		30XBEZE	30XBPZE
Number of poles		6	6
Nominal input frequency	Hz	50	50/60
Nominal voltage	V	400	380/480
Number of phases		3	3
Motor included in the application domain of the regulation 2019/1781		No	NO
Rationale for exemption		Article 2,1	Article 2,1
Ambient air temperature for which the motor is specifically designed	°C	70	70

Above data for fans and motors, which are mandatory regarding eco-design regulation, are provided for a stand-alone component (not included in the chiller system).

11.6 - Electronic expansion valve (EXV)

The EXV is equipped with a stepper motor (2785 to 3690 steps, depending on the model) that is controlled via the EXV board. The EXV is also equipped with a sightglass that permits verification of the mechanism movement and the presence of the liquid gasket.

11.7 - Moisture indicator

Located on the EXV, permits control of the unit charge and indicates moisture in the circuit. The presence of bubbles in the sight-glass indicates an insufficient charge or non-con-densables in the system. The presence of moisture changes the colour of the indicator paper in the sight-glass.

11.8 - Filter drier

The role of the filter drier is to keep the circuit clean and moisture-free. The moisture indicator shows, when it is necessary to change the element. A difference in temperature between the filter inlet and outlet shows that the element is dirty.

11.9 - Sensors

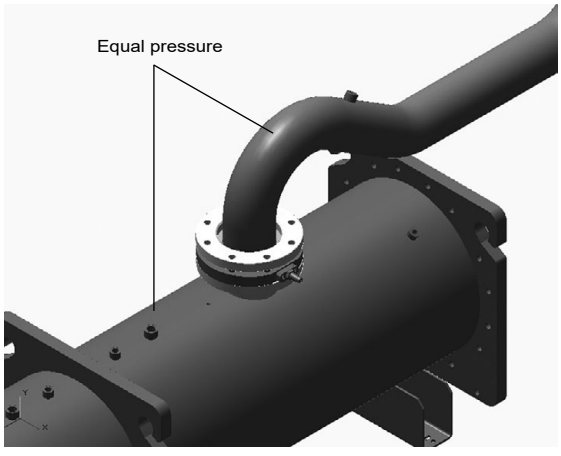
The units use thermistors to measure the temperature, and pressure transducers to control and regulate system operation. Refer to the SmartVu™ control manual for a more detailed explanation.

11.10 - Service valve (option 92)

The unit can be equipped with optional service valves to facilitate maintenance and repair operations.

If option 92 is ordered, each refrigerant circuit will be supplied with shut-off valves on the compressor economiser, discharge and suction lines.

ATTENTION: The compressor suction valve must be used without pressure difference at the terminals. If there is a pressure difference, leak-tightness at the valve may be lost and the valve can even fail altogether.



11.11 - Power factor correction capacitors (option 231)

They garantee a minimum power factor performance of 0.95 when unit operates at a condition that involves a power input that exceeds the Eurovent standard condition.

A fix capacitor bank is switched at start of each compressor. It provides individual power factor correction for each machine refrigerant circuit.

Capacitors are dry type : no risque of leakage.

The capacitors are selected for each compressor as per below table:

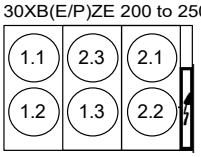
Compressor	Capacitor (kVAR)	Ir (A)
06TSA155	15	22
06TSA186	20	29
06TTA266	35	51
06TTA301	35	51
06TTA356	35	51
06TUA483	45	65
06TUA554	45	65

CAUTION:

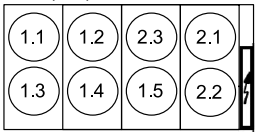
- ***Operation of the unit without capacitors results in raise of the unit absorbed current . This is likely to happen if the internal thermostat is active if the ambient temperature is too high or if the cooling system is defective.***
- ***The safe operation of the capacitors requires that they are checked periodically : refer to the document dedicated for this purpose***

30XB(E/P)ZE fan arrangement

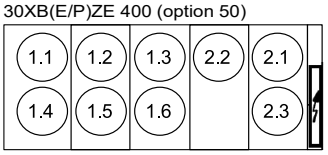
30XB(E/P)ZE 200 to 250



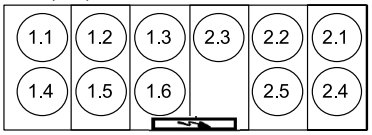
30XB(E/P)ZE 300 to 400



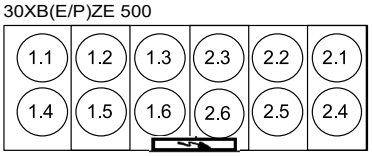
30XB(E/P)ZE 400 (option 50)



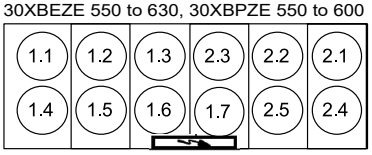
30XB(E/P)ZE 450



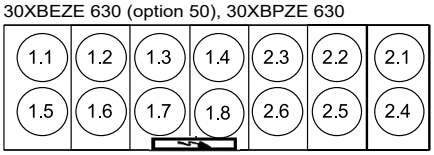
30XB(E/P)ZE 500



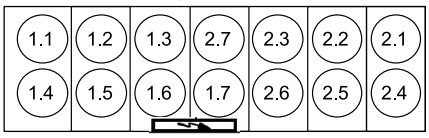
30XBEZE 550 to 630, 30XBPZE 550 to 600



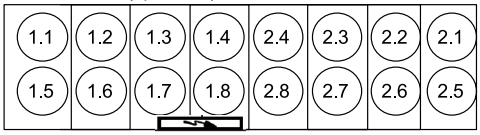
30XBEZE 630 (option 50), 30XBPZE 630



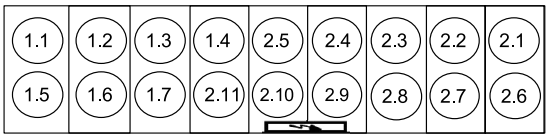
30XBEZE 700 to 750, 30XBPZE 700



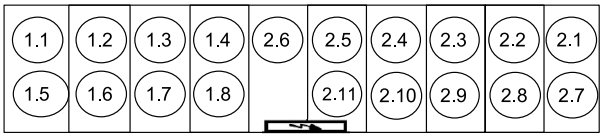
30XBEZE 750 (option 50), 30XBPZE 750



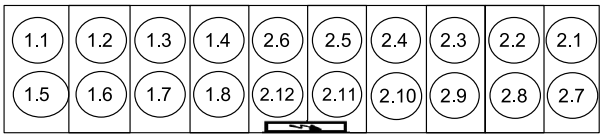
30XBEZE 900 to 950



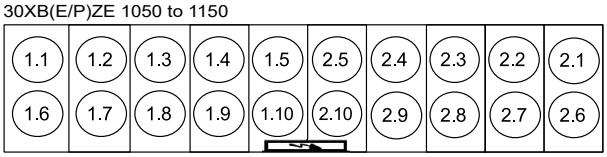
30XBPZE 0900



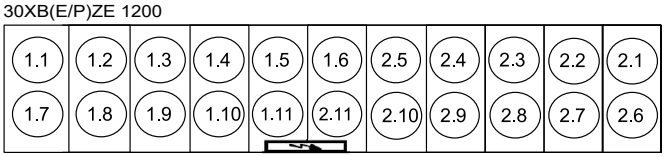
30XBPZE 0950



30XB(E/P)ZE 1050 to 1150



30XB(E/P)ZE 1200



NOTE: The values above do not correspond to the fan designation. The fan designation and position are given on the unit drawings and wiring diagrams supplied with the unit.

12 - MAIN OPTIONS

Options	No.	Description	Advantages	Use for 30XBEZE / 30XBPZE
Medium-temperature brine solution	5	Implementation of new control algorithms and redesigned evaporator to allow chilled brine solution production down to -6°C when ethylene glycol is used (0°C with propylene glycol)	Covers specific applications such as ice storage and industrial processes	30XB(E/P)ZE 200-1200
Low-temperature brine solution	6	Implementation of new control algorithms and redesigned evaporator to allow chilled brine solution production down to -12°C when ethylene glycol is used (-10°C with propylene glycol)	Covers specific applications such as ice storage and industrial processes	30XB(E/P)ZE 200-1200
Unit equipped for air discharge ducting	10	Fans equipped with discharge connection flanges - maximum available pressure 60 Pa	Facilitates connections to the discharge ducts	30XB(E/P)ZE 200-1200
Low noise level	15	Aesthetic and sound absorbing compressor enclosure	Noise level reduction	30XB(E/P)ZE 200-1200
Very low noise level	15LS	Sound absorbing & aesthetic compressor enclosure and oil separator, evaporator and suction line acoustic treatment, combined with low-speed fans	Noise level reduction in sensitive environments	30XB(E/P)ZE 200-1200
Ultra low noise level	15LS+	Acoustic compressor enclosure, low-speed fans and enhanced sound insulation of main noise sources	Noise level reduction for sensible site	30XB(E/P)ZE 350-1200
Tropicalisation	22	Unit control box suitable for tropical climates	Reduced relative humidity in the control boxes for operation in tropical climates (warm and humid)	30XB(E/P)ZE 200-1200
Grilles and enclosure panels	23	Metallic protection grilles and side enclosure panels	Improves aesthetics, protection against intrusion to the unit interior, coil and piping protection against impacts.	30XB(E/P)ZE 200-1200
Enclosure panels	23A	Side enclosure panels	Improves aesthetics and piping protection against impacts.	30XB(E/P)ZE 200-1200
Low inrush current	25C	compressor loading and unloading sequence to limit the unit start-up current	Reduced start-up current	30XB(E/P)ZE 200-1200
Water exchanger frost protection	41A	Electric resistance heater on the water exchanger and discharge valve	Water exchanger frost protection down to -20°C outside temperature	30XB(E/P)ZE 200-1200
Evaporator & hydraulic module frost protection	41B	Electric resistance heater on water exchanger, discharge valve and hydraulic module	Water exchanger and hydraulic module frost protection down to -20°C outside temperature	30XB(E/P)ZE 200-400
Total heat recovery	50	Unit equipped with additional heat exchanger in parallel with the condenser coils.	Production of free hot-water simultaneously with chilled water production	30XB(E/P)ZE 200-750
Total heat recovery on one circuit	50C	Unit equipped with additional heat exchanger in parallel with the condenser coils on one circuit only	Production of free hot-water simultaneously with chilled water production	30XB(E/P)ZE 900-1200
Master/slave operation	58	Unit equipped with supplementary water outlet temperature sensor kit (to be field installed) allowing master/slave operation of two units connected in parallel	Optimised operation of two units connected in parrallel operation with operating time equalisation	30XB(E/P)ZE 200-1200
Single power connection point	81	Unit power connection via one main supply connection	Quick and easy installation	30XB(E/P)ZE 900-1200
Evap. and pumps with aluminum jacket	88A	Evaporator and pumps covered with an aluminum sheet for thermal insulation protection	Improved resistance to aggressive climate conditions	30XB(E/P)ZE 200-400
Service valve set	92	Liquid line valve (evaporator inlet) and compressor suction line valve	Allow isolation of various refrigerant circuit components for simplified service and maintenance	30XB(E/P)ZE 200-1200
Compressor discharge valves	93A	Shut-off valve on the compressor discharge piping	Simplified maintenance	30XB(E/P)ZE 200-1200
Evaporator with one pass more	100A	Evaporator with one pass more on the water side	Optimise chiller operation when the chilled water circuit is designed with low waterflows (high evaporator delta T)	30XB(E/P)ZE 200-1200
21 bar evaporator	104	Reinforced evaporator for extension of the maximum water-side service pressure to 21 bar (standard 10 bar)	Covers applications with a high water column evaporator side (typically high buildings)	30XB(E/P)ZE 200-1200
Reversed evaporator water connections	107	Evaporator with reversed water inlet/outlet	Easy installation on sites with specific requirements	30XB(E/P)ZE 200-1200
HP dual-pump hydraulic module	116S	Hydraulic module equipped with water filter, two high pressure pumps, drain valve and pressure transducers (expansion tank & aluminum jacket not included).	Easy and fast installation (plug & play).	30XB(E/P)ZE 200-400
LP dual-pump hydraulic module	116U	Hydraulic module equipped with water filter, two low pressure pumps, drain valve and pressure transducers (expansion tank & aluminum jacket not included).	Easy and fast installation (plug & play).	30XB(E/P)ZE 200-400

12 - MAIN OPTIONS

Options	No.	Description	Advantages	Use for 30XBEZE / 30XBPZE
Lon gateway	148D	Bi-directional communication board complying with Lon Talk protocol	Connects the unit by communication bus to a building management system	30XB(E/P)ZE 200-1200
Bacnet over IP	149	Bi-directional high-speed communication using BACnet protocol over Ethernet network (IP)	Easy and high-speed connection by ethernet line to a building management system. Allows access to multiple unit parameters	30XB(E/P)ZE 200-1200
Modbus over IP and RS485	149B	Bi-directional high-speed communication using Modbus protocol over Ethernet network (IP)	Easy and high-speed connection by ethernet line to a building management system. Allows access to multiple unit parameters	30XB(E/P)ZE 200-1200
Energy Management Module	156	EMM Control board with additional inputs/ outputs. See Energy Management Module option chapter	Extended remote control capabilities (Set-point reset, ice storage end, demand limits, boiler on/off command...)	30XB(E/P)ZE 200-1200
7” user interface	158A	Control supplied with a 7 inch colour touch screen user interface	Enhanced ease of use.	30XB(E/P)ZE 200-1200
Refrigerant leak detection	159	0-10 V signal to report any refrigerant leakage in the unit directly on the controlller (the leak detector itself must be supplied by the customer)	Immediate customer notification of refrigerant losses to the atmosphere, allowing timely corrective actions	30XB(E/P)ZE 200-1200
Dual relief valves on 3-way valve	194	Three-way valve upstream of dual relief valves on the shell and tubes evaporator	Valve replacement and inspection facilitated without refrigerant loss. Comforms to European standard EN378/BGVD4	30XB(E/P)ZE 200-1200
Compliance with Swiss regulations	197	Additional tests on the water heat exchangers: supply (additional of PED documents) supplementary certificates and test certifications	Conformance with Swiss regulations	30XB(E/P)ZE 300-1200
Compliance with Russian regulations	199	EAC certification	Conformance with Russian regulations	30XB(E/P)ZE 200-1200
Compliance with Australian regulations	200	Unit approved to Australian code	Conformance with Australian regulations	30XB(E/P)ZE 200-1200
Insulation of the evap. in/out ref.lines	256	Thermal insulation of the evaporator entering/ leaving refrigerant lines with flexible, UV resistant insulation	Prevents condensation on the evaporator entering/leaving refrigerant lines	30XB(E/P)ZE 200-1200
Enviro-Shield anti-corrosion protection	262	Coating by conversion process which modifies the surface of the aluminum producing a coating that is integral to the coil. Complete immersion in a bath to ensure 100% coverage. No heat transfer variation, tested 4000 hours salt spray per ASTM B117	Improved corrosion resistance, recommended for use in moderately corrosive environments	30XB(E/P)ZE 200-1200
Super Enviro-Shield anti-corrosion protection	263	Extremely durable and flexible epoxy polymer coating applied on micro channel heat exchangers by electro coating process, final UV protective topcoat. Minimal heat transfer variation, tested 6000 hours constant neutral salt spray per ASTM B117, superior impact resistance per ASTM D2794	Improved corrosion resistance, recommended for use in extremely corrosive environments	30XB(E/P)ZE 200-1200
Welded evaporator connection kit	266	Victaulic piping connections with welded joints	Easy installation	30XB(E/P)ZE 200-1200
Compressor enclosure	279a	Compressor enclosure	Improved aesthetic, compressor protection against external elements (dust, sand, water…)	30XB(E/P)ZE 200-1200
Evaporator with aluminum jacket	281	Evaporator covered with an aluminum sheet for thermal insulation protection	Improved resistance to aggressive climate conditions	30XB(E/P)ZE 200-1200
230V electrical plug	284	230V AC power supply source provided with plug socket and transformer (180 VA, 0,8 Amps)	Permits connection of a laptop or an electrical device during unit commissioning or servicing	30XB(E/P)ZE 200-1200
Expansion tank	293	6 bar expansion tank integrated in the hydraulic module (requires hydraulic module option)	Easy and fast installation (plug & play), & Protection of closed water systems from excessive pressure	30XB(E/P)ZE 200-1200
US screw compressor	297	Screw compressor made in US		30XB(E/P)ZE 200-1200
Variable Water Flow control	299	hydraulic control function package that permits control of the water flow rate based on different possible logics (at customer choice): constant ?T, constant outlet pressure and "fixed-speed" control	When variable-speed pumps on the primary circuit, the VWF control modulates flow rate through the evaporator, minimising pump consumption while ensuring safe/optimised chiller operation	30XB(E/P)ZE 200-400
Free-cooling dry-cooler control	313	Control & connections to a Free Cooling Drycooler 09PE or 09VE fitted with option FC control box	Easy system managment, Extended control capabilities to a dryccoler used in Free Cooling mode	30XB(E/P)ZE 200-1200

Air conditioning equipment must be maintained by profes-sional technicians, whilst routine checks can be carried out locally by specialised technicians. See the standard EN 378-4.

IMPORTANT : Before performing any work on the machine ensure it is de-energised. If a refrigerant circuit is opened, it must be evacuated, recharged and tested for leaks. Before any operation on the refirgerant circuit, it is necessary to remove the complete refrigerant charge from the unit with a refrigerant charge transfer unit.

Simple preventive maintenance will allow you to get the best performance from your HVAC unit:

- Improved cooling performance
- Reduced power consumption
- Prevention of accidental component failure
- Prevention of major time-consuming and costly inter-ventions
- Protection of the environment.

There are five maintenance levels for HVAC units, as defined by the AFNOR X60-010 standard.

13.1 - Level 1 maintenance

See note “Any deviation or non-observation ...” in chapter 13.3 - “Level 3 (or higher) maintenance”. Simple procedure can be carried out by the user:

- Visual inspection for oil traces (sign of a refrigerant leak)
- Air heat exchanger (condenser) cleaning - see chapter 13.6.1 - “Level 1”.
- Check for removed protection devices, and badly closed doors/covers
- Check the unit alarm report when the unit does not work. Refer to the SmartVu™ control manual for a more detailed explanation.
- Check the clogging state of filters of aeration openings of the control box.
- Check proper operation of the cooling fans of the control box
- Verify the temperature difference at the heat exchanger inlet and outlet is correct,
- Verify the refrigerant charge in the liquid line sight glass,
- Check the anti-corrosion coatings.

General visual inspection for any signs of deterioration.

A regular cleaning shall be carried out inside the unit and in the ATEX zone in order to remove any flammable materials (leaves, branches, cartons...).

13.2 - Level 2 maintenance

See note “Any deviation or non-observation ...” in the next column. This level requires specific know-how in the electrical, hydraulic and mechanical fields. It is possible that these skills are available locally: Existence of a maintenance service, industrial site, specialised subcontractor. In these cases, the following maintenance operations are recommended.
Carry out all level 1 operations, then:

- Electrical :
  - At least once a year tighten the power circuit electrical connections (see table 13.4).
  - Check and re-tighten all control/command connections, if required (see table 13.4).
  - Check the differential switches for correct operation every 6 months.
  - Remove the dust and clean the interior of the control boxes, if required.
  - Once a year, replace the filter of electrical boxes, especially in dusty environment.
  - Check the presence and the condition of the electrical protection devices.
  - Check the correct operation of all heaters.
  - Replace the control box cooling fans used with option 22 (with designation EF22_) every five years.
  - Check the height of the anti-vibration mountings (located between the compressor rails and the unit chassis) after 5 years of operation, and then each year. When the total minimum height of the mountings is less than 25 mm replace the mountings.
  - Check the water connections.
  - Purge the water circuit.
  - Clean the water filter.
  - Fully clean the condensers with a low-pressure jet and a bio-degradable cleaner (counter-current cleaning - see chapter 13.6.2 - “Level 2”).
  - Replace the stuffing box packing of the pump after 10000 hours of operation.
  - Check the unit operating parameters and compare them with previous values.
  - Keep and maintain a maintenance sheet, attached to each HVAC unit.
  - Units with option/QM231: proceed with the check list for the verification of the capacitors.
- Hydraulics:
  - When working on the hydraulic circuit, take care not to damage the adjacent air heat exchanger,
  - Check the condition of the expansion tank (presence of corrosion or loss of gas pressure) and replace it if required (option 293),
  - Check the operation of the flow switch,
  - Check the condition of pipe thermal insulation,
  - Check the concentration of the anti-freeze protection solution (ethylene glycol or propylene glycol),
  - Check the water flow via the heat exhanger pressure difference (option 116),
  - Check the condition of the heat-transfer fluid or the water quality,
  - Check for the corrosion of the steel pipe work.
- Refrigerant circuit :
  - Check the unit operating parameters and compare them with the previous values,
  - Check the operation of the high-pressure switches. Replace them if there is a fault,
  - Check the fouling of the filter drier. Replace it if necessary,
  - Keep an up-to-date service booklet specific to the refrigeration unit in question.
- Mechanical :
  - Check that the mounting bolts for the ventilation sub-assemblies, fans, compressors and electrics box are securely tightened.

All these operations require strict observation of adequate safety measures: Individual protection garments, compliance with all industry regulations, compliance with applicable local regulations and using common sense.

13.3 - Level 3 (or higher) maintenance

NOTE: Any deviation or non-observation of these maintenance criteria will render the guarantee conditions for the HVAC unit null and void, and the manufacturer, Carrier SCS will no longer be held responsible.

The maintenance at this level requires specific skills/approval/ tools and know-how and only the manufacturer, his representative or authorised agent are permitted to carry out these operations. These maintenance operations concern for example:

- A major component replacement (compressor, evapo-rator)
- Any intervention on the refrigerant circuit (handling refrigerant)
- Changing of parameters set at the factory (application change)
- Removal or dismantling of the HVAC unit
- Any intervention due to a missed established mainte nance operation
- Any intervention covered by the warranty.

To reduce waste, the refrigerant and the oil must be transferred in accordance with applicable regulations, using methods that limit refrigerant leaks and with materials that are suitable for the products.

The compressor oil that is covered during maintenance contains refrigerant and must be treated accordling.

Refrigerant under pressure must not be purged to the open air.

13.4 - Tightening torques for the main electrical connections

13.4.1 - Tightening torques for the main electrical connections

Component	Designation in the unit	Value (N.m)
Screw on bus bar, customer connection		
M8	-	18
M10	L1 /L2 /L3	30
Soldered screw PE, customer connection (M12)	PE	70
Tunnel terminal screw, compressor contactor		
Contactor 3RT103_		
Contactor 3RT104_		5
Contactor 3RT105_		11
Contactor 3RT106_	KM_	21
Nut on compressor contactor deck		
M8 for contactor 3RT105_		18
M10 for contactor 3RT10_7	KM_	30
Tunnel terminal screw, current transformer		
Size 2 (3RB2956_)		11
Size 3 (3RB2966_)	TI_	21
Nut on current transformer deck		
M8		18
M10	TI_	30
Compressor earth terminal in the power wiring control box		
Terminal M8	Gnd	30
Compressor phase connection terminals		
M12		25
M16	EC_	30
Compressor earth connection	Gnd sur EC_	25
Tunnel terminal screw, disconnects 3RV1011_	QF_ /QM_	1
Tunnel terminal screw, hydronic pump contactor		
Contactor 3RT101_	KM90_	1
Contactor 3RT102_		2,2

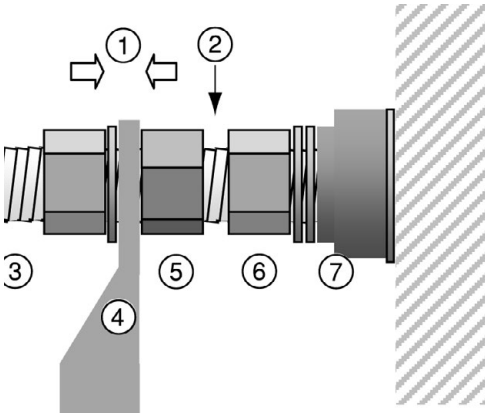
ATTENTION: The tightening of the connections at the compressor terminals requires special precautions. Please refer to the chapter below.

13.4.2 - Connection precautions for the compressor power terminals

These precautions must be applied during an intervention that requires the removal of the power conductors connected to the compressor supply terminals.

The tightening nut of terminal (6) supporting the isolator (7) must never be loosened, as ist ensures terminal tightness and compressor leak tightness.

The tightening of phase lug (4) must apply the torque between counter nut (5) and tightening nut (3): During this operation a counter-torque must be applied at counter nut (5). Counter-nut (5) must not be in contact with the tightening nut of terminal (6).



1. Torque application to tighten the lug
2. Avoid contact between the two nuts
3. Lug tightening nut
4. Flat lug
5. Counter-nut
6. Terminal tightening nut
7. Isolator

13.5 - Tightening torques for the main bolts and screws

Screw type	Use	Value (N.m)
(N·m)		
Metal screw D = 4.8	Condensing module, housing supports	4,2
Metal screw D = 6.3	Plastic volute & grill	4,2
Screw H M8	Condensing module, compressor fixing	18
Taptite screw M10	Condensing module, chassis - structure fixing, control box fixings, compressor fixings, oil separator fixing	30
Taptite screw M6	Piping support, cowling	7
Screw H M8	Piping clip	12
Screw H M6	Piping clip	10
Nut H M10	Compressor chassis	30
Nut H M10	Hydraulic pump chassis	30
Screw H M8	Filter drier cover	35
Screw H M12	Economiser port flange	40
Screw H M16	Oil separator flanges, suction flanges	110
Screw H M16	Heat exchanger water boxes	190
Screw H M20	Suction flanges	190
Nut 5/8 ORFS	Oil line	65
Nut 3/8 ORFS	Oil line	26
Nut H M12/M16	Victaulic collars on suction piping	60/130
Self-locking Nut M16	Compressor fixing	30

ATTENTION: The tightening of the connections at the compressor terminals requires special precautions. Please refer to the chapter below.

13.6 - Condenser coil

We recommend that coils are inspected regularly to check the degree of cleanliness. This depends on the environment where the unit is installed, especially urban and industrial sites, and for units installed near trees that shed their leaves. Recommendations for maintenance and cleaning of micro-channel coils (MCHE):

- Regularly cleaning the coil surface is essential for correct
- unit operation.
- Eliminating contamination and removal of harmful residue will increase the operating life of the coils and the unit.
- The maintenance and cleaning procedures below are part of the regular maintenance to increase the operating life of coils.

- Specific recommendation in case of snow: For long term storage, regularly check that no snow has accumulated on the coil.
- Clean the surface of the coil by spraying the coil regularly and uniformly from bottom to top, orienting the water jet at right angles to the surface. Do not exceed a water pressure of 6200 kPa (62 bar) or an angle of 45° to the coil. The nozzle must be at least 300 mm away from the coil surface.
- Clean and scrub the entire coil connections with a soft Nylon, PolyPro® or Tynex® brush and low pressure tap water.

13.6.1 - Level 1 cleaning:

- Remove all foreign objects or fragments/debris attached to the coil surface or wedged between the chassis and the supports.
- Use a low-pressure dry air jet to remove all traces of dust from the coil.

13.6.2 - Level 2 cleaning:

- Carry out the level 1 cleaning operations.
- Clean the coil using suitable products.

Use appropriate PPE including safety glasses and/or mask, waterproof clothes and safety gloves. It is recommended to wear clothing that covers the whole body.

Specific products approved by the manufacturer for cleaning coils are available from the manufacturer's spare parts network. The use of any other product is strictly prohibited.

After the cleaning product is applied, rinsing with water is mandatory (see manufacturer's standard RW01-25).

IMPORTANT: Never use a pressure water spray without a large diffuser.

Concentrated and/or rotating water jets are strictly forbidden.

Never use a fluid with a temperature above 45°C to clean the air heat exchangers.

Correct and frequent cleaning (approximately every three months) will prevent 2/3 of the corrosion problems. Protect the electrical cabinets, the motorised ball valve and the VFDs during cleaning operations. Don't forget to remove protections after cleaning operations.

13.7 - Evaporator maintenance

Check that:

- The insulating foam is intact and securely in place.
- The cooler heaters are operating, secure and correctly positioned.
- The water-side connections are clean and show no sign of leakage.

13.8 - Compressor maintenance

13.8.1 - Oil separator

Check the correct operation of the heaters and check that they are well attached to the oil separator ring.

13.8.2 - Integral oil filter change

As system cleanliness is critical to reliable system operation, there is a filter in the oil line at the oil separator outlet. The oil filter is specified to provide a high level of filtration (5 µm) required for long bearing life.

The filter should be checked after the first 500 hours of operation, and every subsequent 2000 hours. The filter should be replaced at any time when the pressure differential across the filter exceeds 200 kPa (2 bar).

The pressure drop across the filter can be determined by measuring the pressure at the filter service port and the oil pressure port. The difference in these two pressures will be the pressure drop across the filter, check valve, and solenoid valve. The pressure drop across the check valve and solenoid valve is approximately 40 kPa (0.4 bar), which should be subtracted from the two oil pressure measurements to give the oil filter pressure drop.

13.8.3 - Compressor rotation control

Correct compressor rotation is one of the most critical appli-cation considerations. Reverse rotation, even for a very short duration, damages the compressor.

The reverse rotation protection scheme must be able to determine the direction of rotation and stop the compressor within 300 ms. Reverse rotation is most likely to occur when-ever the wiring to the compressor terminals is disturbed.

To minimize the opportunity for reverse rotation, the follow-ing procedure must be applied. Rewire the power cables to the compressor terminal pin as originally wired.

For replacement of the compressor, a low pressure switch is included with the compressor. This low pressure switch should be temporarily installed as a hard safety on the high pressure part of the compressor. The purpose of this switch is to protect the compressor against any wiring errors at the compressor terminal pin. The electrical contact of the switch would be wired in series with the high pressure switch. The switch will remain in place until the compressor has been started and direction of rotation has been verified; at this point, the switch will be removed.

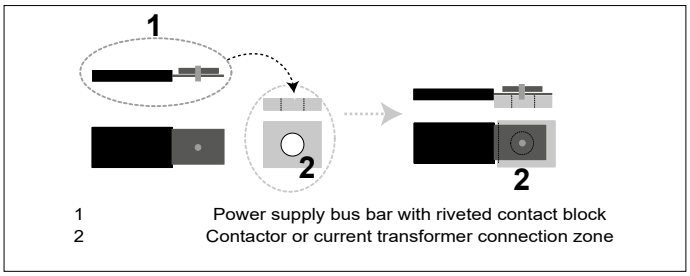
The switch that has been selected for detecting reverse rotation is Carrier part number HK01CB001. This switch opens the contacts when the pressure falls below 7 kPa. The switch is a manual reset type that can be reset after the pressure has once again risen above 70 kPa. It is critical that the switch be a manual reset type to preclude the compressor from short cycling in the reverse direction.

13.9 - Precaution for compressor power supply bus bar connection

This note applies to units using power supply bus bars with riveted contact block at the level of the connection cages in the control box. During re-connection it is imperative to:

- Engage each bus bar in the cage up to the stop
- Ensure visually that the bus bars have good contact at the connection areas: There must not be any free move-ment between the bus bar and the connection area created by the fixing rivet of the contact block.

Connection of the contactor or current transformer



1 Power supply bus bar with riveted contact block
2 Contactor or current transformer connection zone

13.10 - Check of power factor correction capacitors

The commissioning and periodical verification of the capacitor is mandatory to insure safe operation. It includes the verification of the current, voltage, capacitance and voltage distortion.

The procedure for these checks is described in a document that is dedicated for this purpose.

14 - FINAL SHUTDOWN

14.1 - Shutting down

Separate the units from their energy sources, allow them to cool then drain them completely.

14.2 - Recommendations for disassembly

Read the information relating to the presence of potentially dangerous substances in the product and their precautions for use (REACH, Regulation no. 1907/2006). This information is available on the Manufacturer's website. Use the original lifting equipment.

Sort the components according to their material for recycling or disposal, in accordance with regulations in force.

Check whether any part of the unit can be recycled for another purpose.

14.3 - Fluids to be recovered for treatment

- Refrigerant
- Heat-transfer fluid: depending on the installation, water, brine solution, etc.
- Compressor oil

14.4 - Materials to be recovered for recycling

- Steel
- Copper
- Aluminium
- Plastics
- Polyurethane foam (insulation)

14.5 - Waste Electrical and Electronic Equipment (WEEE)

At the end of its life, this equipment must be disassembled and contaminated fluids removed by professionals and processed via approved channels for waste electrical and electronic equipment (WEEE).

15 - START-UP CHECKLIST FOR 30XB(E/P)ZE LIQUID CHILLERS (USE FOR JOB FILE)

Preliminary information

Job name:.....
Location:.....
Installing contractor: .....
Distributor: .....

Unit

Model:.....

Compressors

Circuit A
Model number.....
Serial number .....
Motor number .....

Circuit B
Model number.....
Serial number .....
Motor number .....

Circuit C
Model number.....
Serial number .....
Motor number .....

Circuit D
Model number.....
Serial number .....
Motor number .....

Evaporator

Model number.....
Serial number .....

Condenser

Model number.....
Additional optional units and accessories.....
.....

Preliminary equipment check

Is there any shipping damage? ..... If so, where? .....
.....
Will this damage prevent unit start-up? .....

☐ Unit is level in its installation
☐ Power supply agrees with the unit nameplate
☐ Electrical circuit wiring has been sized and installed properly
☐ Unit ground wire has been connected
☐ Electrical circuit protection has been sized and installed properly
☐ All terminals are tight
☐ All chilled water valves are open
☐ All chilled water piping is connected properly
☐ All air has been vented from the chilled water circuit
☐ Chilled water pump (CWP) is operating with the correct rotation. Check the phase sequence of the electrical connection. If the unit is equipped with a hydraulic module, use the pump test function. Refer to the SmartVu™ manual for a more detailed explanation.
☐ Circulate chilled water in the water circuit for at least two hours, then remove, clean and replace the screen filter. After the pump test has been completed, switch the unit off again.
☐ Inlet piping to cooler includes a 20 mesh strainer with a mesh size of 1.2 mm.
☐ The compressor flange has been removed.

15 - START-UP CHECKLIST FOR 30XB(E/P)ZE LIQUID CHILLERS (USE FOR JOB FILE)

Unit start-up

☐ a. Oil heaters have been energized for at least 24 hours

☐ b. Oil level is correct

☐ c. All discharge and liquid valves are open

☐ d. All suction valves are open, if equipped

☐ e. All oil line valves and economizer discharge bubbler valves (if equipped) are open

☐ f. Checks have been carried out for any possible leaks. Unit has been leak checked (including fittings)

☐ g1 - on the whole unit

☐ g2 - at all connections

Locate, repair, and report any refrigerant leaks.....

.....

.....

☐ g. Check voltage imbalance: AB .....AC .....BC.....

Average voltage = ... V

Maximum deviation = ... V

Voltage imbalance = ...%

☐ h. Voltage imbalance is less than 2%

WARNING: Operation of the chiller with an improper supply voltage or excessive phase imbalance constitutes abuse and will invalidate the Carrier warranty. If the phase imbalance exceeds 2% for voltage, or 10% for current, contact your local electricity supply at once and ensure that the chiller is not switched on until corrective measures have been taken.

Check cooler water loop

☐ Water loop volume = ...litres

☐ Calculated volume = ...litres

☐ 3.25 litres/nominal kW capacity for air conditioning

☐ 6.5 litres/nominal kW capacity for process cooling

☐ Proper loop volume established

☐ Proper loop corrosion inhibitor included.....litres of.....

☐ Proper loop freeze protection included (if required).....litres of.....

☐ Piping includes electric heater tape, if exposed to the outside

☐ Inlet piping to cooler includes a 20 mesh strainer with a mesh size of 1.2 mm

Check pressure drop across the cooler

☐ Entering cooler = ...kPa

☐ Leaving cooler = ...kPa

☐ Leaving - entering = ...kPa

WARNING: Plot cooler pressure drop on performance data chart (in product data literature) to determine total litres per second (l/s) and find unit's minimum flow rate.

☐ Total = ...l/s

☐ Nominal kW = ...l/s

☐ Total l/s is greater than unit's minimum flow rate

☐ Total l/s meets job specified requirement of.....l/s

WARNING: Once power is supplied to the unit, check for any alarms. Refer to the SmartVu™ control manual for the alarm menu.

Note all alarms:.....

.....

Notes: .....

.....

16 - ANNEXES (ATTACHED TO THE INSTRUCTION MANUAL KIT)

16.1 - Annex 1: Conformity declaration

16.2 - Annex 2: Electrical diagram

16.3 - Annex 3: PID

16.4 - Annex 4: Dimensional drawings

CARRIER participates in the ECP programme for LCP/HP
Check ongoing validity of certificate:
www.eurovent-certification.com

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