AlfaBlue Reverse BR

Instruction manual

- Product description
- Product labels
- Transport & lifting
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- Spare parts

ORIGINAL INSTRUCTIONS

9460205367EN-01

Index

1 Important information

1.1 Disclaimer

This Instruction Manual applies to all AlfaBlue Reverse BR and is supplied in combination with the Air Cooled Liquid Coolers Product Manual AHE00050. Both manuals must be carefully examined and instructions should be followed up at all times. Alfa LU-VE does not accept liability for any damage resulting from non-compliance to the instructions as given in the manuals and order-related documents.

1.2 Intended use

Liquid coolers are partly completed machinery according to Machine Directive 2006/42/EC and intended for incorporation in cooling systems. Declarations of Incorporation are available on alfa.luvegroup.com. The units may not be put into operation until the conformity of the complete machine or cooling system has been declared according to the following standards and directives:

- Pressure Equipment Directive 2014/68/EU
- Machine Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU
- Electrical Equipment of Machines IEC 60204-1
- Electro Magnetic Compatibility 2014/30/EU
- Any applicable local or national legislation

1.3 Where to find product information

Detailed technical data for individual product models are available in order related documents, on the product label and in product data sheets. Comprehensive technical information for all Alfa LU-VE air heat exchanger products is available on-line on alfa.luvegroup.com. This includes:

- Product manuals
- Instruction manuals
- Product leaflets & brochures
- Product data sheets (selection software)
- Dimensional drawings
- Electrical wiring diagrams
- Certificates

AlfaBlue Reverse BR

Alfa LU-VE offers world-wide service and support. In case of any questions or uncertainty please contact your local Alfa LU-VE representative.
Contact addresses are available at alfa.luvegroup.com.

2 Product description

2.1 General information and application

AlfaBlue Reverse is a range of heavy-duty radiators specifically designed for cooling high temperature process fluids. With a wide range of sound pressure level alternatives, these units are particularly suited to demanding, noise sensitive environments. Dual coil models are available for simultaneous cooling of LT/HT engine circuits.
Radiators are often used for cooling water or other liquids in process, steel, chemical and food industries, (bio)diesel & gas power plants etc.

Suitable for all liquids that do not corrode copper
Capacity range: 100 up to 4400 kW (water, T_{air} = 35 °C, T_{fluid} in/out = 80/60 °C).
Design pressure: 10 bar

2.2 Standard configuration

- Coil:
  An innovative coil design provides excellent heat transfer. In standard execution BR radiators are fitted with smooth copper tubing and industrial power fins for long lasting performance.
  Fin spacing 2.1 to 3.0 mm. Fin thickness gradually increases from standard thickness at 2.1 mm fin spacing to double fin thickness at 3.0 mm spacing. Coil configuration optimized according to liquid flow. Separate connections in the D series provide the opportunity for independent operation of both coils. Flanges aluminium (UNI EN 1092-4) and stainless steel flanges (UNI EN 1092-1).
- Casing:
  Frame construction provides high rigidity for stability and protection against vibration and thermal expansion. Casing & frame of corrosion resistant pregalvanized sheet steel (corrosion resistance class C4). Mounting feet galvanized steel. Separated fan sections.
- Fan motors:
  Fan diameter 910 mm, blowing through the coil. Power supply 400/50/3. Motors with external rotor, protection class IP 54 according to DIN 40050. Integrated thermo contacts provide reliable protection against thermal overload.

2.3 Options

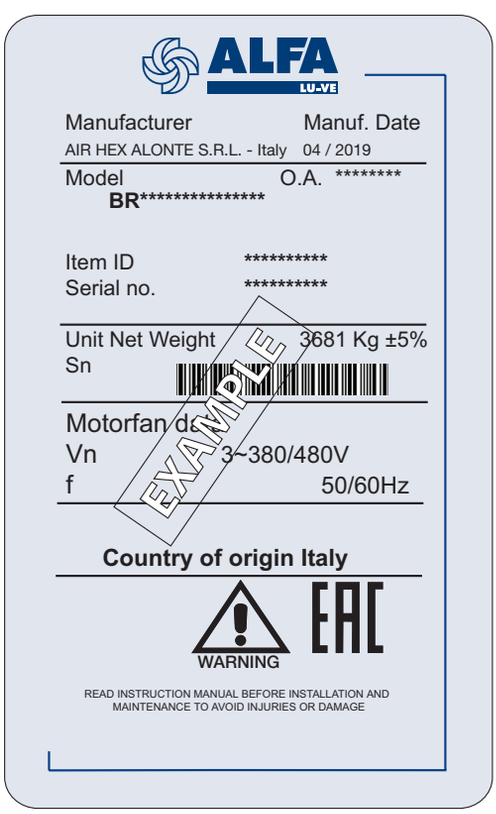
- Non-standard fin spacings
- Stainless steel tubes (SS)
- Multi-Circuiting
- Coil corrosion protection
  - Coil coating
  - Fins seawater resistent Aluminium-Magnesium alloy
- Casing epoxy coated (both sides)
- Coil protection grid
- Vibration dampers
- Electrical options
  - Safety switch (SW)
  - Motors wired to a common terminal box (CB)
  - Switchboard IP55
  - EMC approval
  - Fan step control
  - Fan speed control
  - EC motor

2.4 Code description

BR	D	6	*	S	90	5	B	D	42	P	-	*	-	AL	2.3	CU	*
1	2	3	4	5	6	7	8	9	10	11		12		13	14	15	16

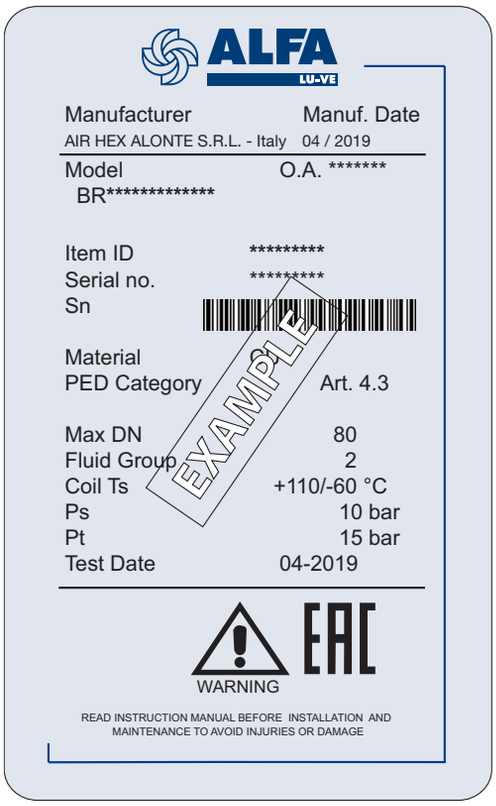
1 AlfaBlue Reverse radiator
2 Fan rows (C=single fan row compact, M=single fan row medium, D=dual fan row)
3 Tube diameter (only for BRD: default=12 mm, 6=16 mm, Y=inox)
4 LH (only for dual coil models with LT/HT circuits)
5 Sound level/fan code (T=high, S=standard, TE=high - EC motor, SE=standard - EC motor)
6 Fan diameter (90=910 mm)
7 Number of fans per fan row (1-3 for BRC/BRM, 2-6 for BRD)
8 No. of tube rows (A=2, B=3, C=4, D=5, E=6; for LT/HT: no. of LT and HT rows)
9 Fan motor connection (D=delta, Y=star)
10 No. of circuits
11 Packing (CR=crate, P=pallet, SK=container skid)
12 Electrical options
13 Fin material/coating (Al=aluminium, IF=industrial fins, EP=epoxy coating, FC=F-coat, R-fin, SWR=seawater AlMg)
14 Fin spacing (2.1, 2.3, 2.5 or 3.0 mm)
15 Tube material (CU=copper)
16 Options

3 Product labels



Product label

Model	Refer to paragraph "Code description"
Item ID Serial no.	Communicate these when ordering spare parts as they identify the unit.
O. A.	Order Acknowledgement number
Unit Net Weight	Check before any lifting operation to ensure that proper lifting tools are used.



Product label - coil

Model	Refer to paragraph "Code description"
Item ID Serial no.	Communicate these when ordering spare parts as they identify the unit.
Material	Tube material
PED Category	According to PED
Max DN	Maximum diameter of the distributor tube
Fluid Group	According to PED
Coil Ts	Range of operating temperatures for the coil
Ps	Design pressure
Pt	Test pressure
Test date	Date on which the coil has been pressure tested in the factory

General warning
Risk of malfunctioning and/or damage.

Electrical warning
Electrically powered component. Switch off power supply before any maintenance or installation activity.

Moving parts
Danger of injuries. Do not operate without protection guard mounted.

Overhead load
Never stand or walk below the load.

Do not walk
Don't walk on the headers or on the fan cowls

4 Unpacking and lifting

Always follow guidelines and instructions as given in the air cooled liquid coolers product manual AHE00050.

At the moment of delivery, carefully check the units. Any present damage must be reported on the delivery note with a description of the damage. Damaged heat exchangers, including when the damage is not externally visible, are to be reported to the shipping agent and Alfa LU-VE within 24 hours.

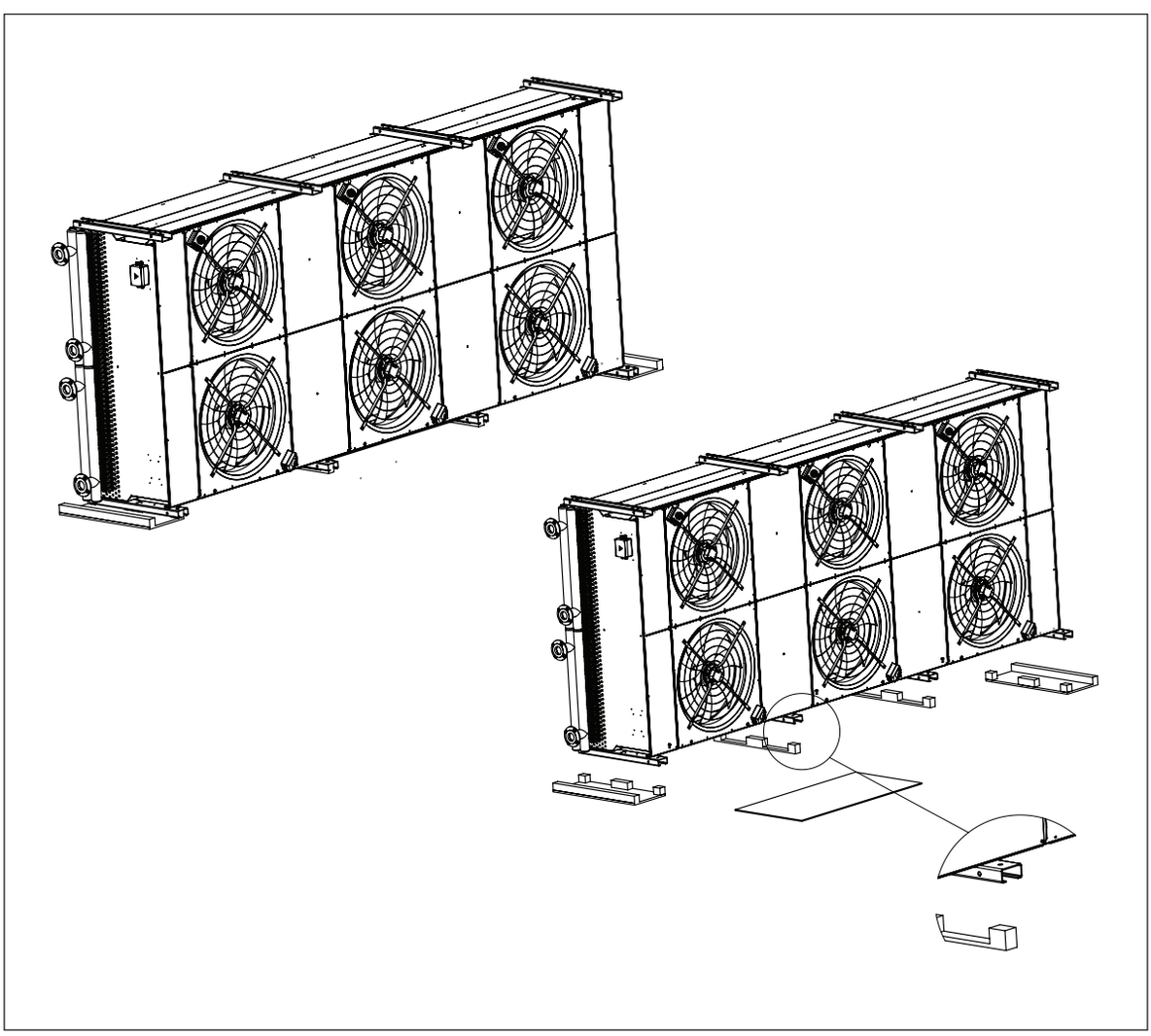
4.1 Storage

If the equipment has to be stored one or more months before its installation, it is convenient to take the following precautions:

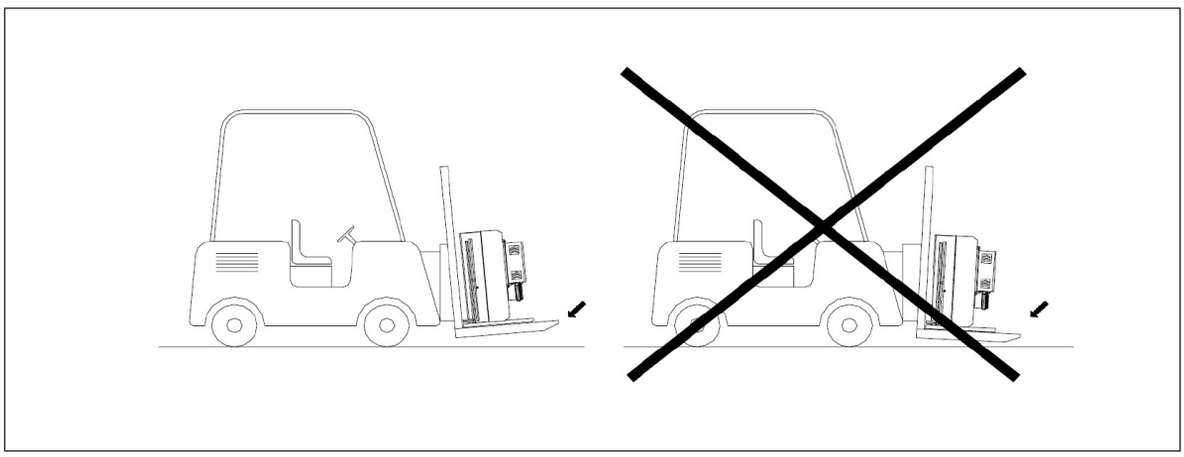
- Leave the cooler in its packing.
- Store the cooler indoors, in a room with adequate conditions, temperature (15 to 25 ºC) and humidity (50 to 70%).
- In an environment without corrosive liquids or vapours.
- If the equipment should remain without operation for long periods (three or more months), it is advisable to operate the fan(s), at least once per month, during 3 to 4 hours each time.

4.2 Unpacking

This operation should be done at the mounting site.
Take off the wrapping cover leaving the equipment on the pallet.



Lifting forks should be placed under appropriate areas of the packing for proper handling; damage may result if the forks come in direct contact with the equipment.

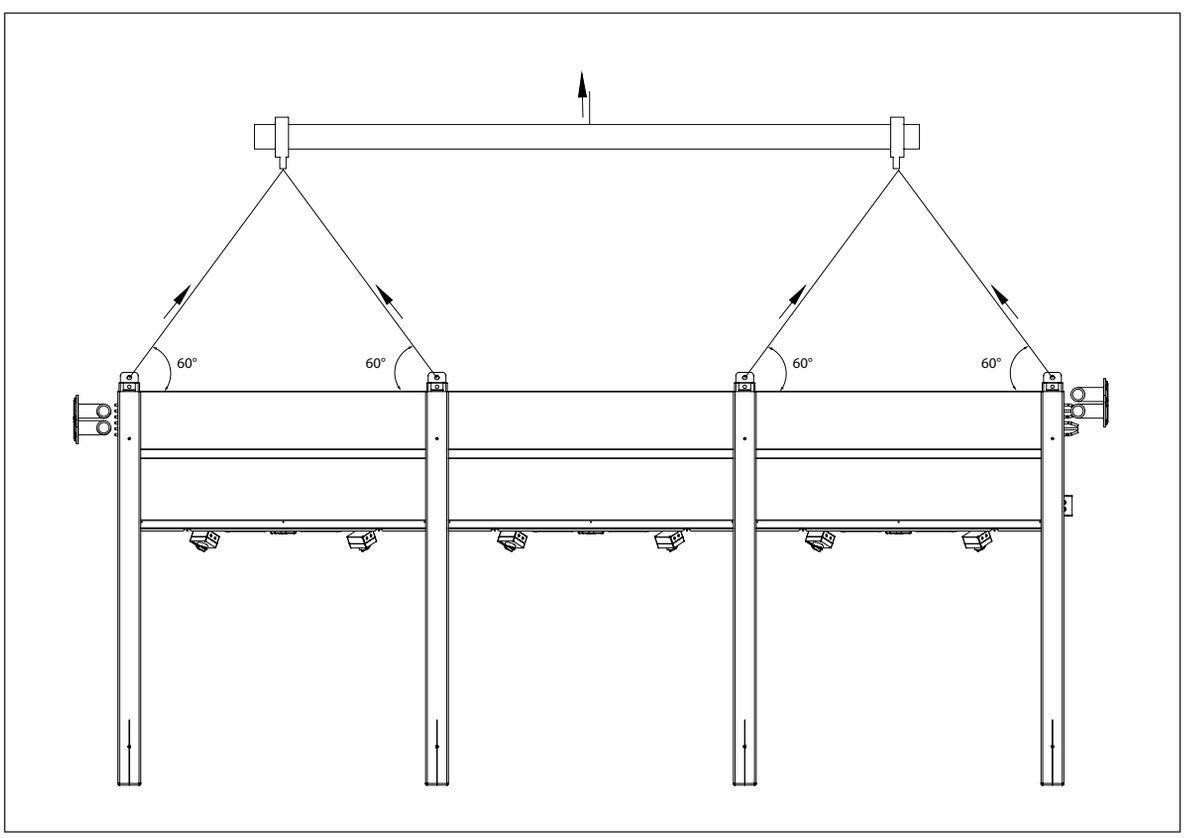


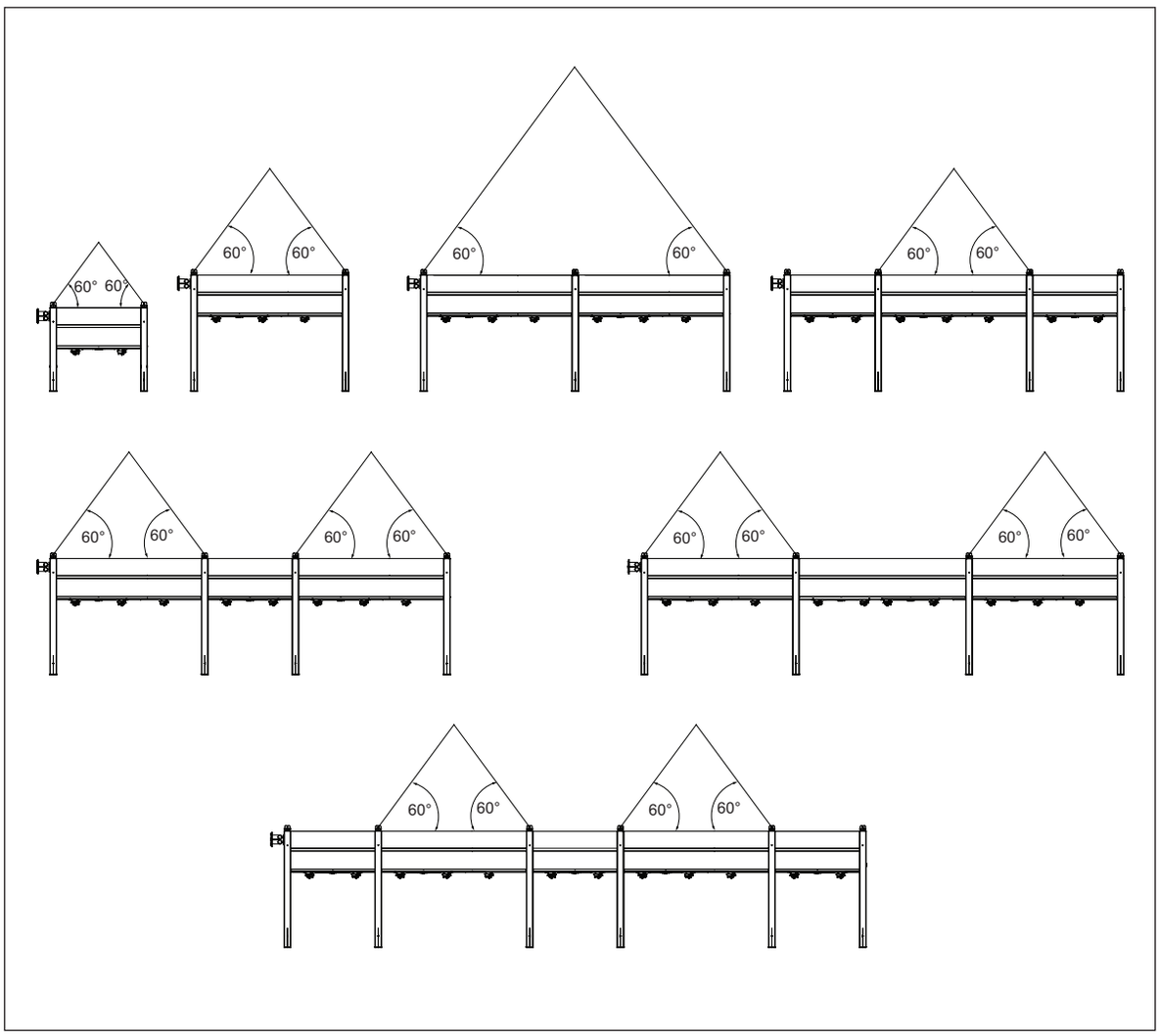
4.3 Lifting from above

Tools and accessories for lifting are not included in the scope of supply.

- Open end or combination wrenches kit (sizes from 10 to 20 mm).
- Steel chains or slings sufficient to withstand the weight of the unit.
- Lifting devices:
  - UPN 10 Steel section, length 2 to 4 meters (2, 3 and 4 Fans per row).
  - UPN 12 Steel section, length 4 to 8 meters (5, 6 and 7 Fans per row).

Use all lifting points on the unit.

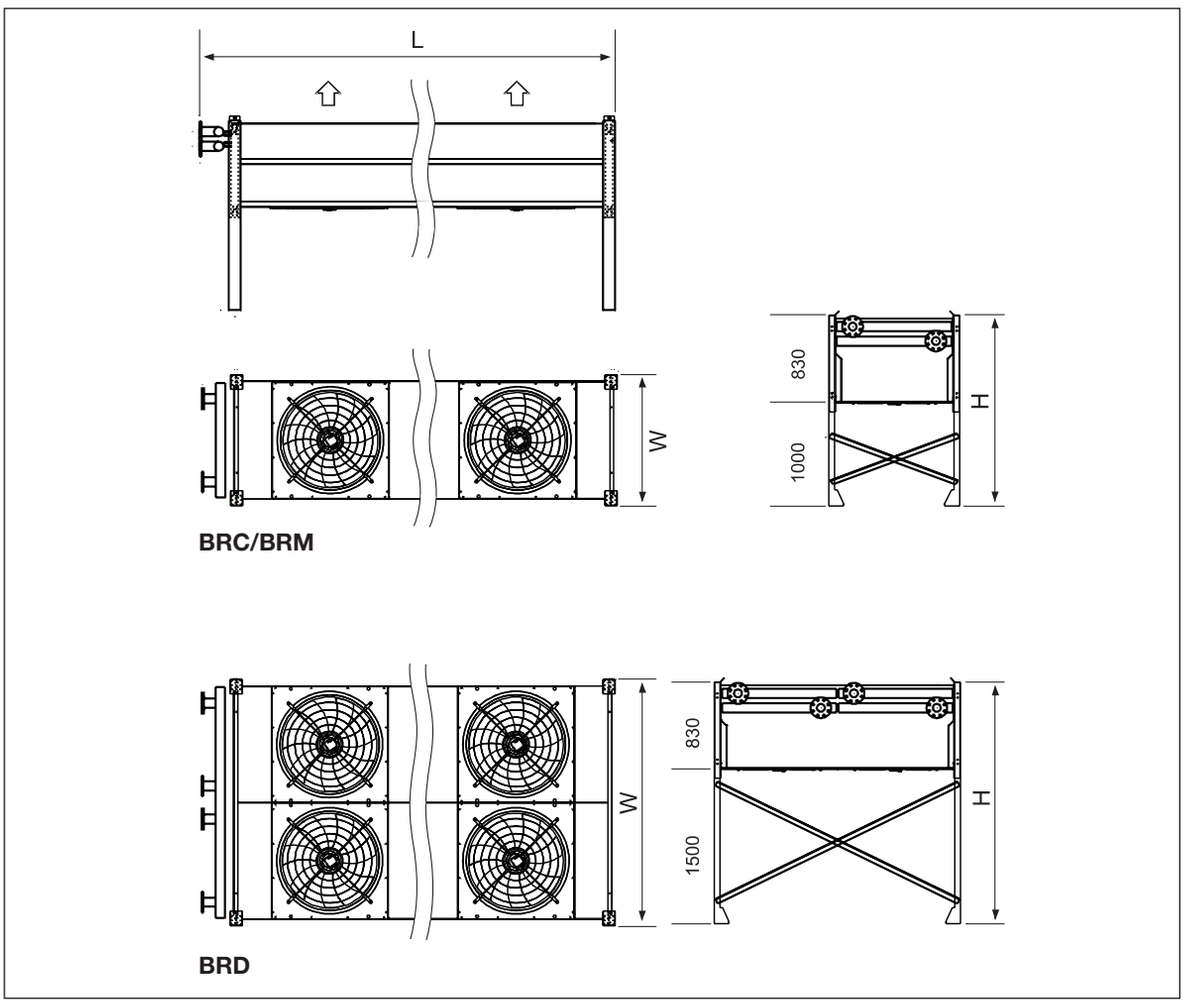




5 Installation

Always follow guidelines and instructions as given in the liquid cooler product manual AHE00050.

5.1 Mounting dimensions



		Dimensions mm		
type	fans	W	L	H
BRC 901	1	1256	2200	1830
BRC 902	2	1256	4000	1830
BRC 903	3	1256	5800	1830
BRM 901	1	1736	2200	1830
BRM 902	2	1736	4000	1830
BRM 903	3	1736	5800	1830
BRD 902	4	2376	4000	2330
BRD 903	6	2376	5800	2330
BRD 904	8	2376	7600	2330
BRD 905	10	2376	9400	2330
BRD 906	12	2376	11200	2330

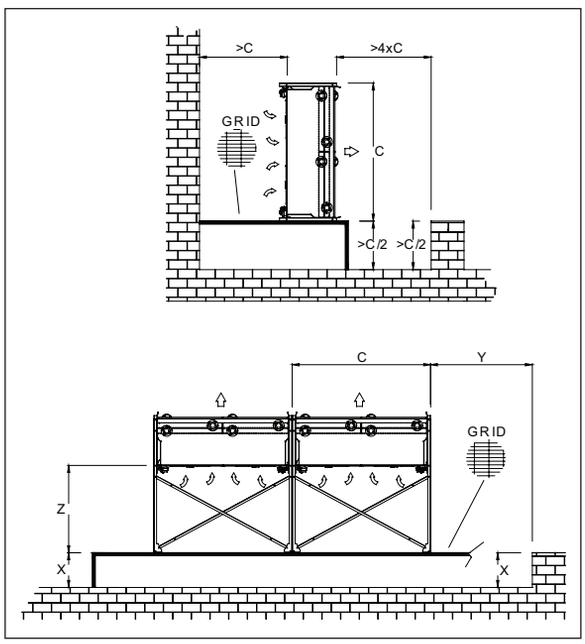
Dimensional drawings

Drawings showing all required mounting and refrigerant connection dimensions are available for download alfa.luvegroup.com

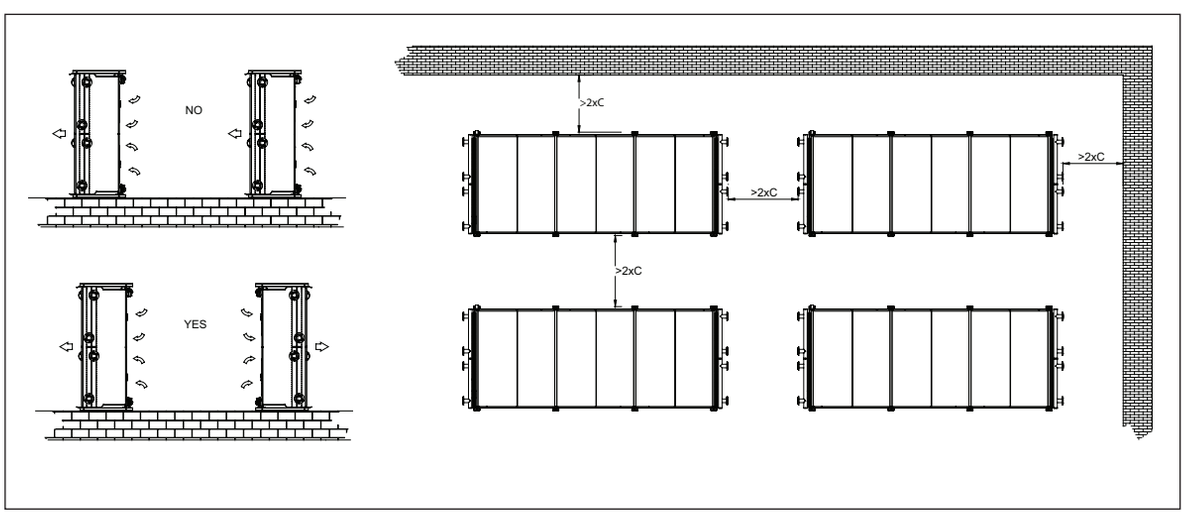
5.2 Installation layout guideline

The following aspects should be considered before mounting:

- Verify the structure supporting capacity regarding the weight of the equipment.
- Avoid the installation in closed locations.
- When walls are present, follow the distances recommended.

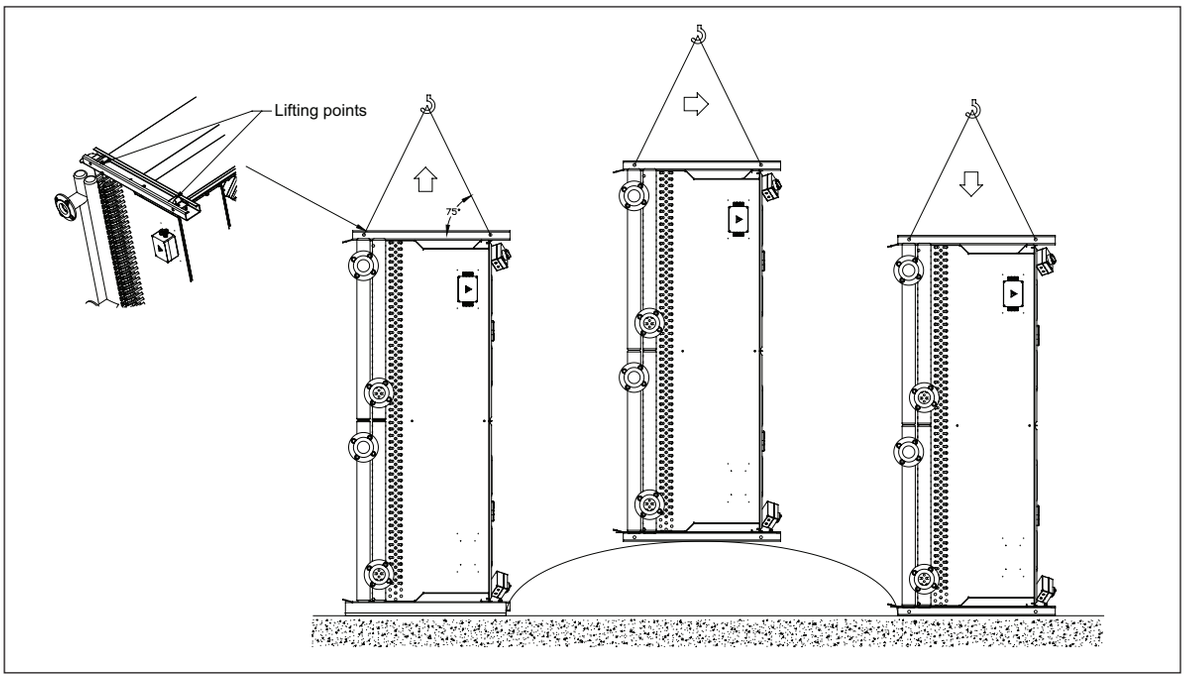


Nr. of units	x	y	z	
			BRC BRM	BRD
1	0	C	1000	1500
2	C/2	2xC	1000	1500
2	C	C	1000	1500
3	C	2xC	1000	1500

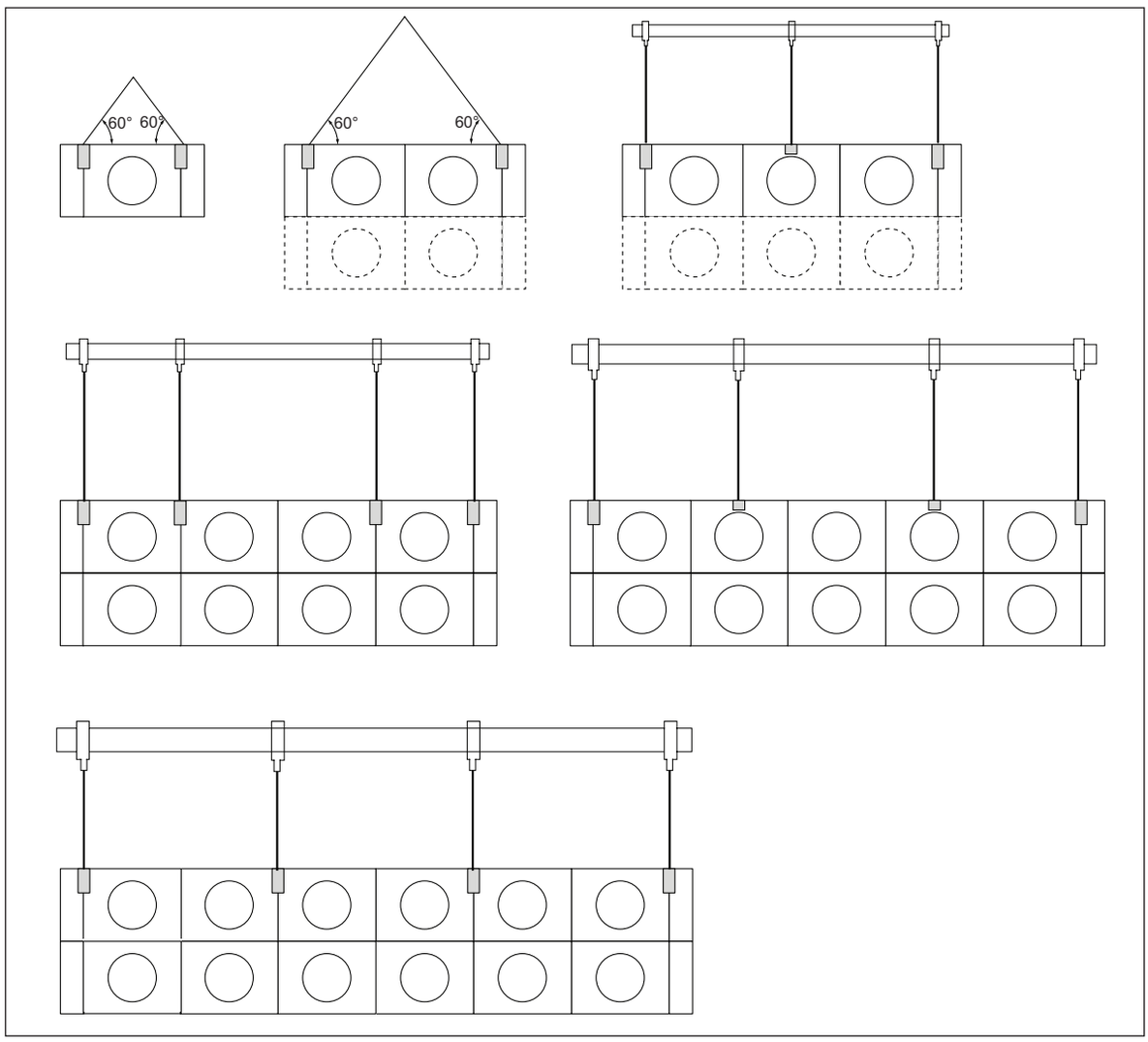


5.3 Vertical mounting

Lift the unit from above and remove the pallet.
Place the unit on the bases and anchor it to the ground.

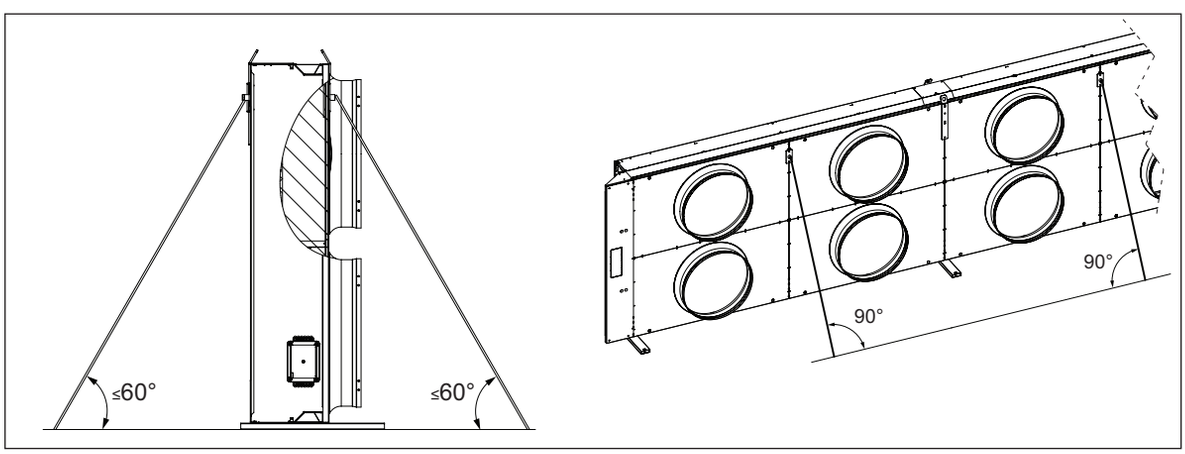


- In windy condition is not recommended to lift the unit
- Check that all ropes are equally loaded.
- Avoid violent tug.
- Lifting bar is compulsory for units with 3 or more modules.
- Chain angles as shown.
- Use all lifting points on the unit.



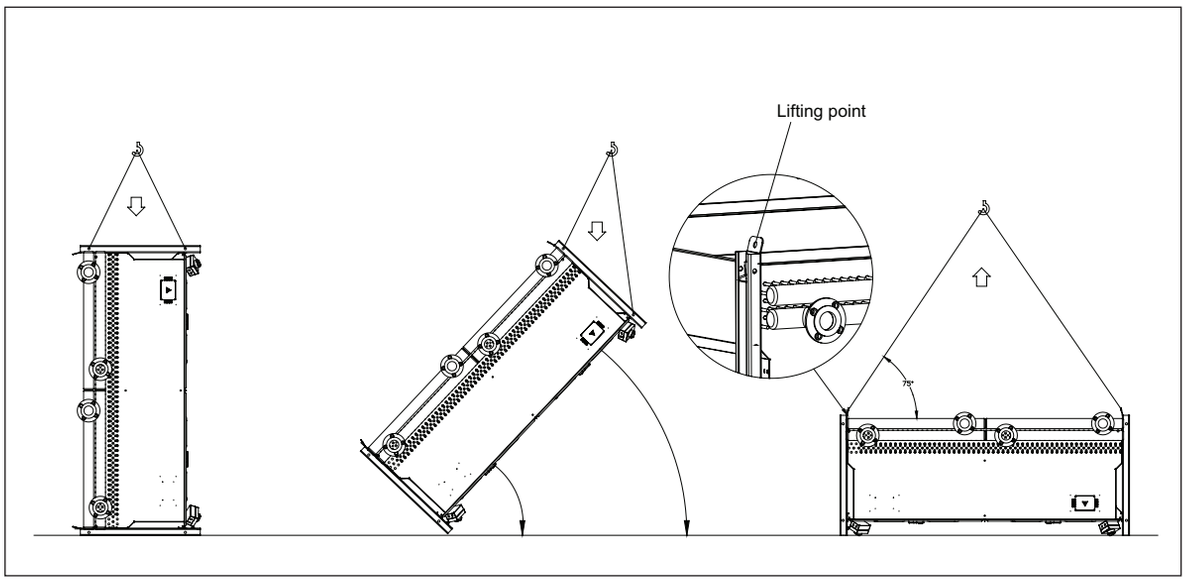
Dual fan row units with 3 or more modules can be installed with horizontal airflow **only** in sites with winds < 25 m/s. For this kind of installation it is mandatory to anchor the unit with wind braces. Fix M16 eyebolts (not included in the scope of supply) to the unit both on the coil side and on the fan side of the unit as shown. Attach a steel rope to each eye bolt. Steel ropes are not included in the scope of supply. Min Ø 11 mm or breaking load > 78,5 kN. Anchor the steel ropes to the ground or to the installation structure with M16 anchor bolts. Angle of ropes as shown.

If the installation site is exposed to winds > 25 m/s contact your local Alfa LU-VE representative for advise.



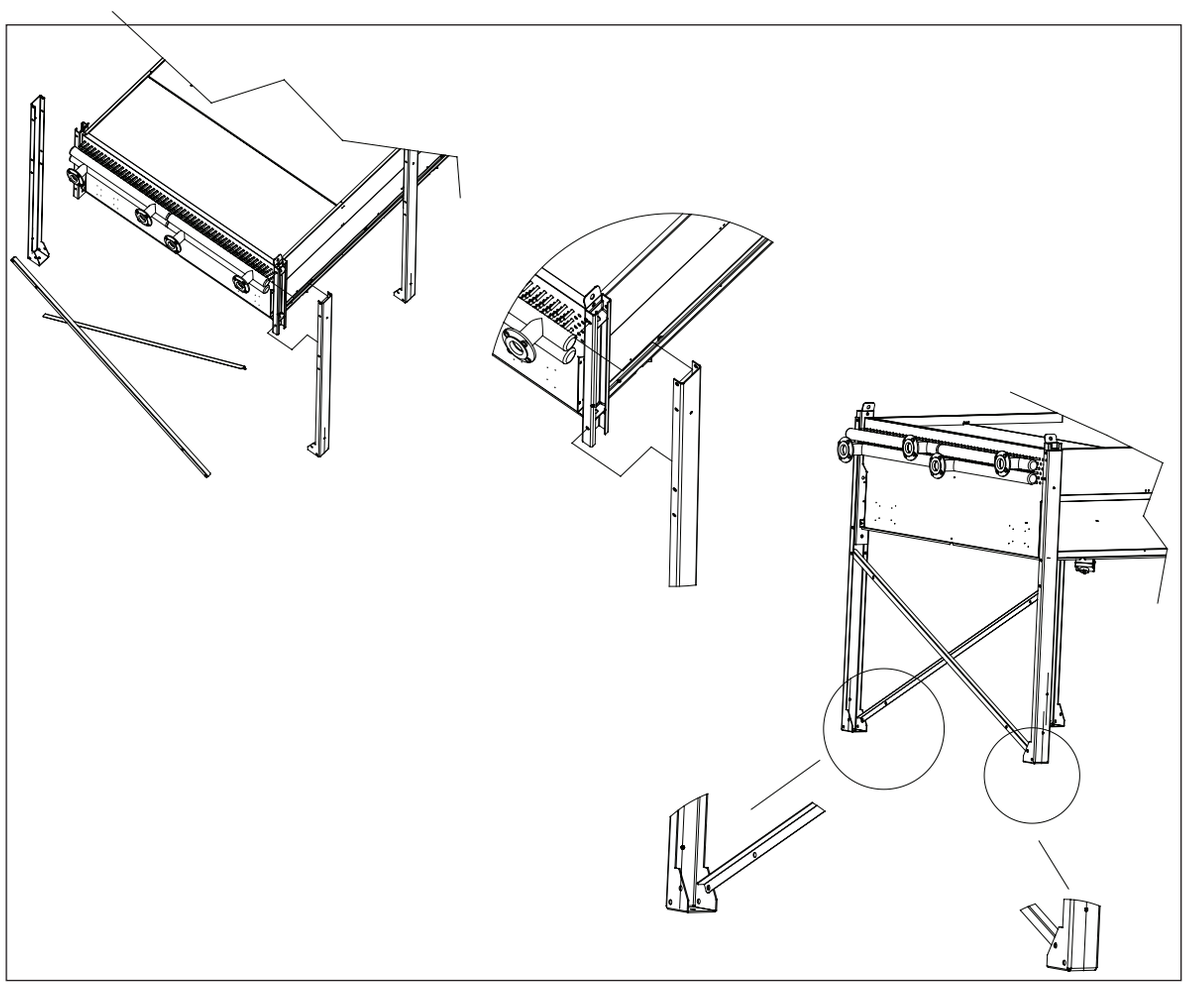
5.4 Horizontal mounting

Lift the unit from above and remove the pallet.
Incline the equipment up to lay it on the ground.



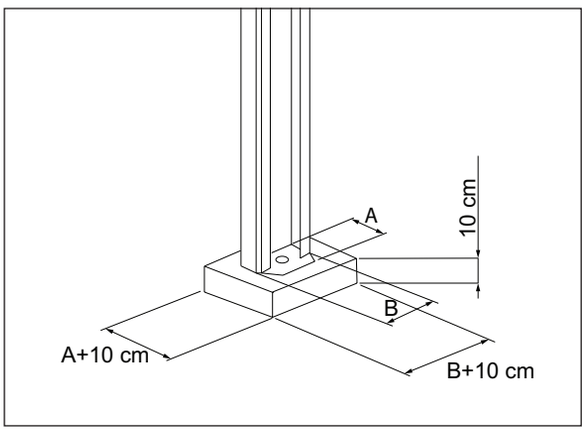
5.5 Feet mounting

Feet are to be mounted in the horizontal installation. Fix the feet and the wind braces to the unit with the provided screws and nuts.



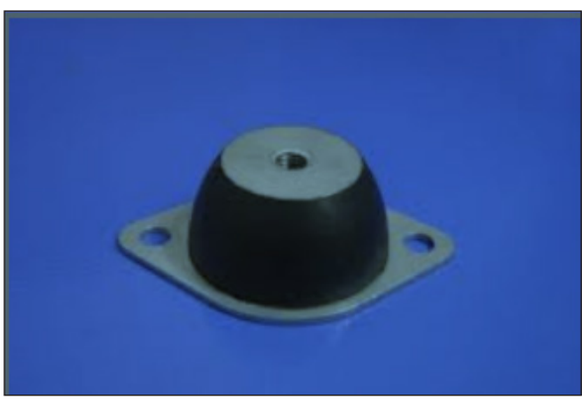
5.6 Concrete mounting base

To avoid the oxidation of the equipment feet, it is strongly recommended to mount the heat exchanger on concrete mounting bases. One base for each foot. Base minimum dimension is 10 cm height.



The basement should be oversized in relation to the plate on the foot (10 cm minimum in both directions).

5.7 Vibration dampers



For active and passive isolation of vibrations and reducing noise transmission, Alfa LU-VE strongly recommends the installation of vibration dampers. Installation of vibration dampers must be carried out before positioning the unit. Vibration dampers are to be positioned between the unit feet and the mounting base.

5.8 Expansion joint

Alfa LU-VE recommends the installation of expansion joints on both inlet and outlet connections. Expansion joints are elastic elements which, if properly installed, absorb the thermal expansions of the tubing. Expansion joints are also helpful in order to reduce vibrations in the piping.

5.9 Piping connections

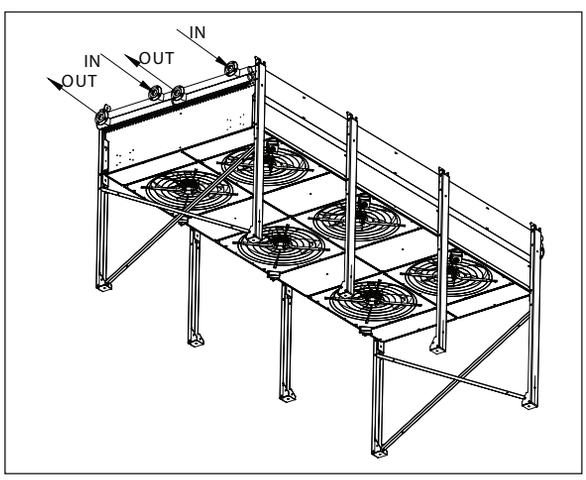
The equipment is delivered with PN 16 DIN flanged connections.

The water hammer is a pick of pressure of short duration that can appear during the starting or the shutdown of a system, making the liquids to move through a pipe like a wave at the speed of the sound. This effect can produce considerable damages to the equipment. To avoid the water hammer effect, regulating valves (preferably) should be installed at the input and output of the external circuit of the equipment. It should be mounted as close as possible to the equipment, so the normal maintenance could be carried out without draining the hydraulic installation.

To verify the operation, thermometers at the input and output of the equipment should also be installed.

Size the pipes to minimize the pressure drop and to obtain the coolant speed values to assure the oil drifting.
In the delivery line, between the pumps and the dry cooler, install an anti vibration device to reduce the noise and vibration transmission along the line.
Be sure that the line for liquid should have a minimum gradient of 1%, between the liquid discharge and the receiver.

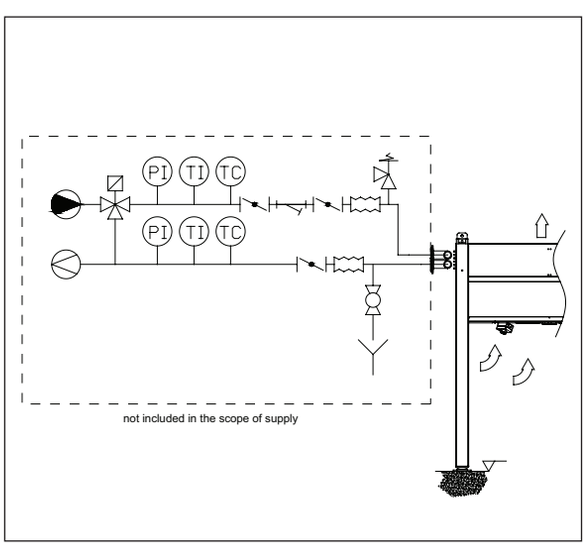
The piping size should be in accordance with the IN and OUT connection's flanges of the unit. Connect the flanges by suitable bolts interposing a proper gasket.



Suggested tightening:

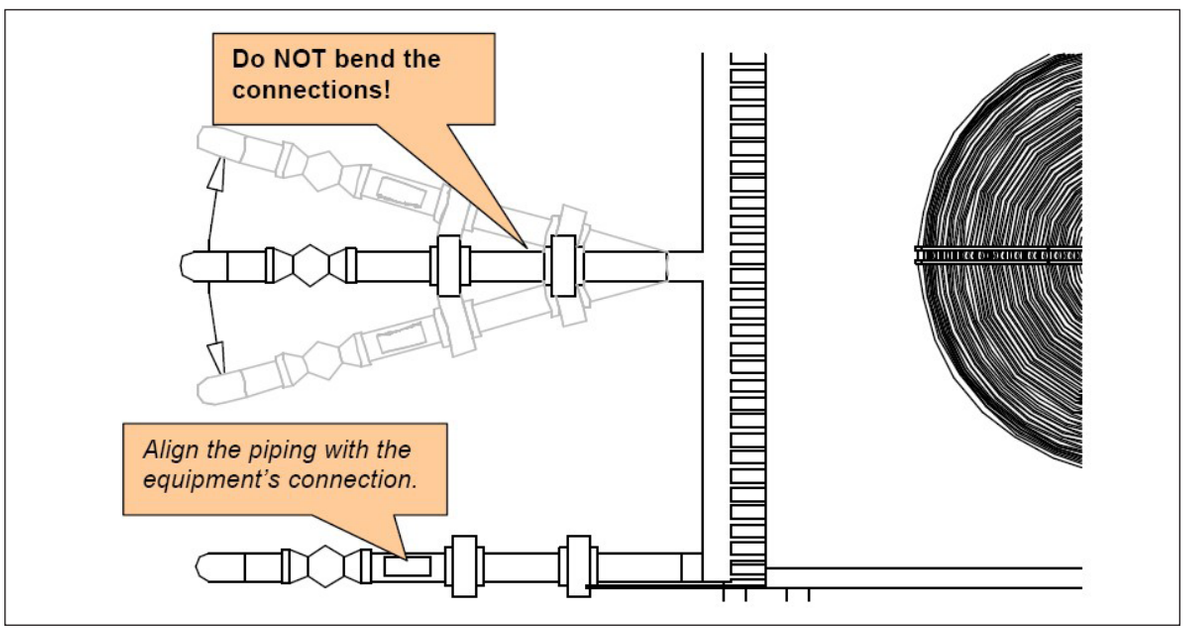
DN	PN	Tightening (Nm)
25	10/16	40
40	10/16	50
50	10/16	55
65	10/16	60
80	10/16	60
100	10/16	80
125	10/16	80
150	10/16	80

The external piping to the equipment should be made by the customer.



KEY	
TC	Temperature probe
	Ball valve
	Spring safety valve
	Expansion joint
	Butterfly valve
	Basket filter
TI	Temperature meter
PI	Pressure gauge
	3-way valve with modulating electric or magnetic servo control

Once the piping has been installed, and before connecting to the equipment, the cleaning of the pipes should be carried out before with a compressed air sweeping and after with water, in order to avoid dirt and welding residuals.
Check the alignment of the piping with the input and output ends of the equipment.



5.10 Electrical connections

The following data determine which connection diagram is to be selected and respected for electrical installation:

- Heat exchanger model indication
- Fan motor type
- Electrical options

Electrical connections

Electrical connection diagrams are available for download on alfa.luvegroup.com. When in doubt always contact your local Alfa LU-VE representative for assistance.

Power supply

Power supply is according to the purchase order-data sheet.

The verification of the conditions for protection by automatic disconnection of supply, in accordance with the requirements of point 18.2 of EN 60204-1:2006, must be carried out by the end user, in particular at his expense is the test 2 of point 18.2.2 of EN 60204-1:2006 for TN power systems. The insulation fault protection must be part of power supply of the machine and is not provided by the manufacturer of the machine.

To carry out safe maintenance operations, an ON/OFF Switch should be installed close to the equipment.

Electric fans
The fan motors (std.) have the following specifications:

Type: Induction squirrel cage
Insulation type: F class
S1: Continuous duty
Sealed ball bearings for thermal range from –40 to 100°C
Connection: 3 phase – 400 V ± 10% 50 Hz

Additional information are available in the electric motor datasheet.
For correct installation and operation of the systems for controlling the speed of the fans, follow the instructions (cable type, cable length, filters, etc.) given in the converter manual.

In addition to overload protection, provide protection against overheating of the electric motor (use the thermal contacts when present).

6 Operation

The use of the equipment in conditions different from those specified in this manual may generate serious damages.

6.1 Start-up procedure

The following procedure is to be respected at every system start-up:

- Before starting, check that all the equipment fastening screws are perfectly tightened.
- Check that the system inlet valve is closed and the outlet valve is fully open.
- First, open the unit vent valve and then start the liquid feeding pump.
- Open the system inlet valve slowly, until reaching the appropriate starting flow.
- When the whole air in the equipment has been discharged, close the unit vent valve.
- Make sure that the whole circuit, including the external piping, is now free of air.
- Once the equipment is full with liquid, start the fan(s) and check the proper fan rotation as shown in the label.
- Verify that there are no leaks in the equipment neither in the circuit.

6.2 Operating the equipment

- Check the liquid inlet and outlet temperatures.
- Check that the current load indicated on a current clamp tester is equal or slightly lower than the rated, when the fan(s) are running at rated rpm.

6.3 Shutdown

If the unit requires emptying for maintenance, system shutdown or dismounting, proceed as follows:

- Stop the system and then open the vent located on the highest part of the circuit.
- Open the drain valve (that has to be fitted by the installer) and wait until the system is empty.
- When drainage is completed, ice formation is prevented by adding to the unit the amount of anti freezing mix.

T Air (°C)	Glycol % (Kg / Kg)
0	10
- 5	20
- 10	30
- 15	35
- 20	40
< - 20	50

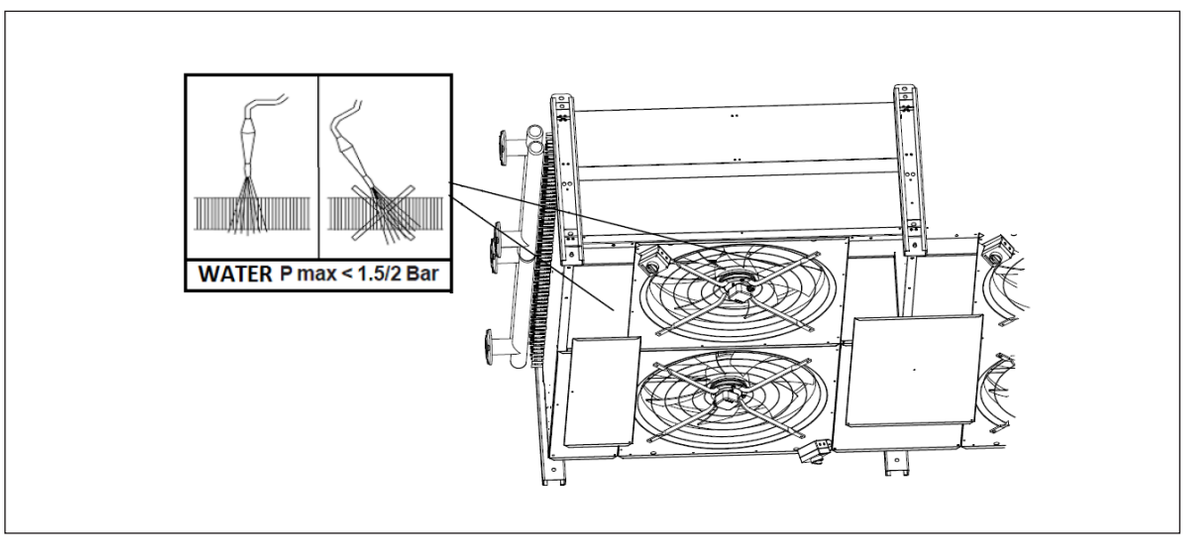
7 Maintenance

Ensure complete electrical isolation before performing any maintenance activity and always follow guidelines and instructions as given in the air cooled liquid coolers product manual AHE00050.

7.1 Cleaning

To guarantee the thermal efficiency of the equipment, it is necessary to eliminate the dirt deposited in the coils, on the suction side. Cleaning is recommended every three months, but this frequency should be defined according with the environment where the equipment is installed. Part of the casing can be removed for a better cleaning of the coil.
The fin pack can be cleaned in different ways, according to the dirty amount:

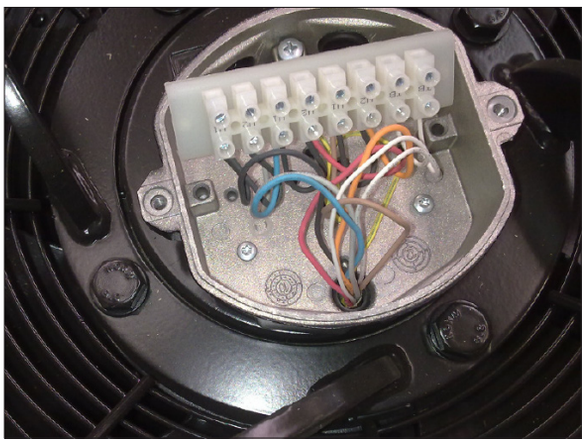
- Compressed air (air intake side) perpendicular to the battery to prevent bending or damaging of the fins.
- Vacuum cleaner (air intake side).
- Jet of water perpendicular to the battery to prevent bending or damaging of the fins.
- If the fins of the coil are bent, they can be straighten using the repairing tool (comb).



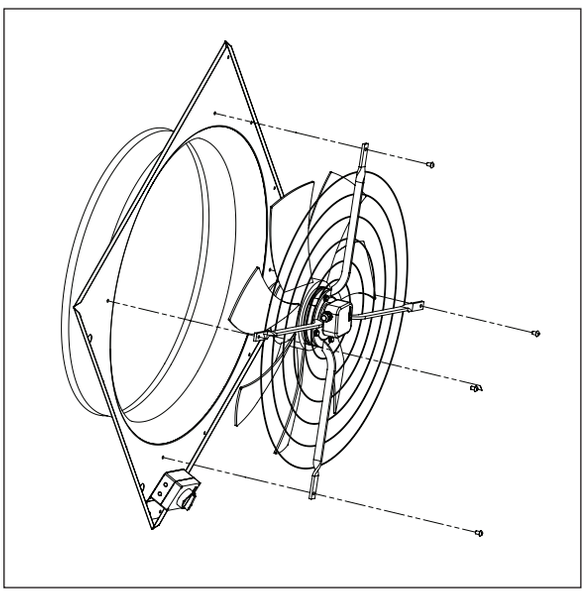
7.2 Fan replacement

Control the correct operation of the electric fans periodically.
In case of electric or mechanical failures, the motor should be replaced as follows:

Make sure that the power supply has been switched off, by placing the security switch in the OFF position.



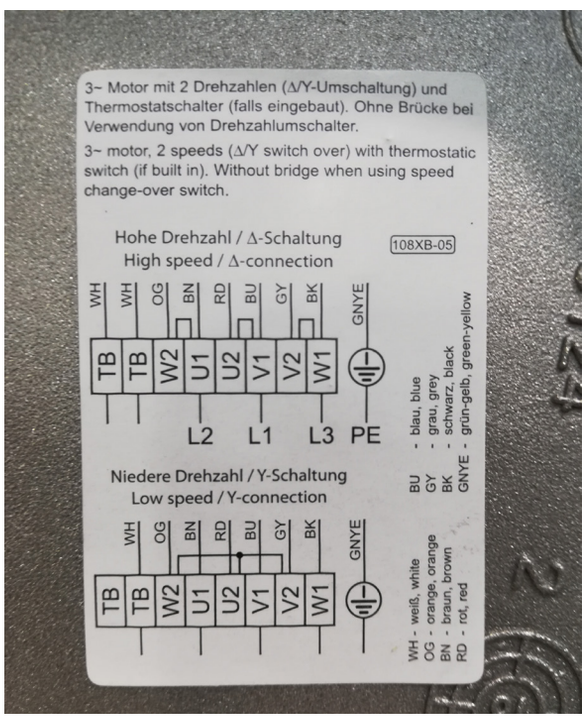
Open the electric motor derivation box, disconnect and remove the electric wires.



Unscrew the 4 fastened screws (M10) in the grid and remove the fans.
Fan standard weight max 55 kg.

Place the new fan group and fix the grid to the fan cowl fastening two opposite screws for centering reasons.

Do not damage the blades during fan handling
Avoid the direct contact between the fan support and the grid (using the pallet or wooden sticks) in order to prevent accidental damages to the paint that could lead to corrosion problems



Make the electric connection according to the wiring diagram reported on the label within the junction box of the fan.

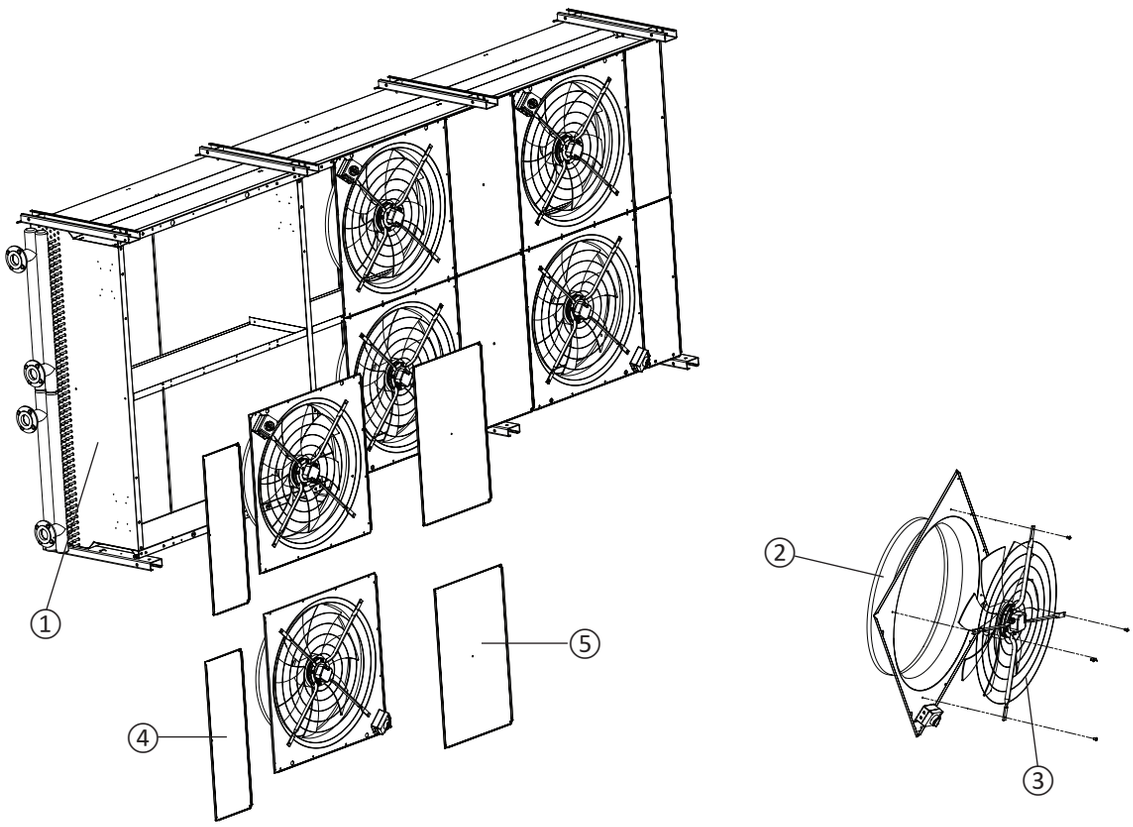
Turn the security switch to the ON position.

Check the correct rotating direction.

8 Troubleshooting

Fault	Possible cause	Required action
Outlet fluid temperature too high	Air flow to unit blocked by dirt on the coil with fins	Clean the coil
	Defective fan	Replace
	Wrong air flow direction through the coil	Invert the rotating direction of the fan, switching two of the three phases
	Air temperature too high	Contact Alfa LU-VE
Fans not running	Faulty motor	Replace
	Line voltage lower than tolerance limits	Check the voltage value between phases with a voltmeter
	Lack of a phase	Measure the voltage between phases, check the power supply line
	Overloaded motor	Check with an Ammeter
Fan(s) break	Blockage or shocked	Replace

9 Spare parts



Spare parts for AlfaBlue Reverse BR

1 Coil
2 Fan cowl
3 Fan
4 Side panel
5 Module panel

Contact your local Alfa LU-VE representative for spare parts order and assistance.

alfa.luvegroup.com