

Alfa-V ACV/ANV/VXD

Instruction manual

Product description	_____
Product labels	_____
Unpacking and lifting	_____
Installation	_____
Maintenance	_____
Spare parts	_____



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1 Important information

1.1 Disclaimer

This Instruction Manual applies to all Alfa-V industrial condensers and gas coolers and is supplied in combination with the Air Cooled Condenser and Gas Coolers Product Manual AHE00049. 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

Condensers and gas 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:

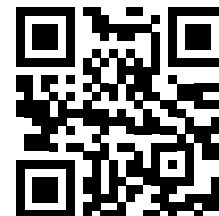
- Pressure Equipment Directive 2014/68/EU
- Machine Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU
- Electrical Equipment of Machines IEC 60204-1
- Electro Magnetic Compatibility 2014/30/EU
- Any applicable local or national legislation

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

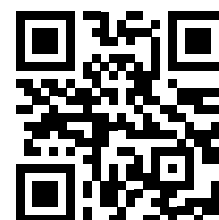
Alfa LU-VE offers world-wide service and support. In case of any questions or uncertainty please contact your local Alfa LU-VE representative. Contact addresses are available at alfa.luvegroup.com.



Alfa-V ACV



Alfa-V ANV



Alfa-V VXD

2 Product description

2.1 General information and application

The Alfa-V series is a wide range of heavy duty dual fan row V-type condensers and gas coolers for air conditioning and refrigeration applications. Alfa-V air-cooled condensers and gas coolers provide high capacities at a modest footprint.

- Refrigerants: all halocarbon (ACV), ammonia (ANV) or CO₂ (VXD)
- Capacity range ACV: 115 up to 1850 kW (T_{air} 25 °C, T_{cond} 40 °C, T_{subcool} < 3K, T_{superheating} 25 K)
- Capacity range ANV: 97 up to 1890 kW (T_{air} 25 °C, T_{cond} 40 °C, T_{subcool} < 3K, T_{superheating} 25 K)
- Capacity range VXD: 160 up to 1000 kW (air temp. 35 °C, CO₂ at 90 bar, gas temperature in/out 120/38 °C)
- Design pressure: 33 bar (ACV), 30 bar (ANV) or 120 bar (VXD).
- Each heat exchanger is leak tested with dry air and finally supplied with a nitrogen pre-charge.

2.2 Standard configuration

- Finned coil:
 - Depending on the application, condensers are fitted with cross-fin copper (ACV) or smooth stainless steel tubing (ANV). Gas coolers are fitted with K65 copper tubes.
 - Standard fin spacing 2.1 mm, available with two Alu-fin types: Turbo fins for maximized capacity, Industrial fins for long lasting performance.
 - Separate connections allow independent operation of both coils.
- Fans:
 - 2 to 9 fan pairs (2 to 6 for VXD), available in three fan diameters (ø 800 mm, ø 910 mm & ø 1000 mm) and different noise levels. ErP compliant motors with dynamically and statically balanced external rotor, protection class IP 54 according to DIN 40050 and integrated thermo contacts to provide reliable protection against thermal overload. AC power supplies 400/50/3, 400/60/3 and 460/60/3. EC power supply 380-480/50-60/3. AC/EC Fan motors manufactured in accordance with VDE 530/12.84
- Casing, supports and frame made of corrosion resistant galvanized steel (class C4-H). Separated fan sections and removable fan rings.
- Frame construction provides high rigidity for protection against vibration and thermal expansion.
- Stickers indicate fan direction and refrigerant in/out.



2.3 Options

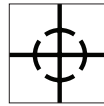
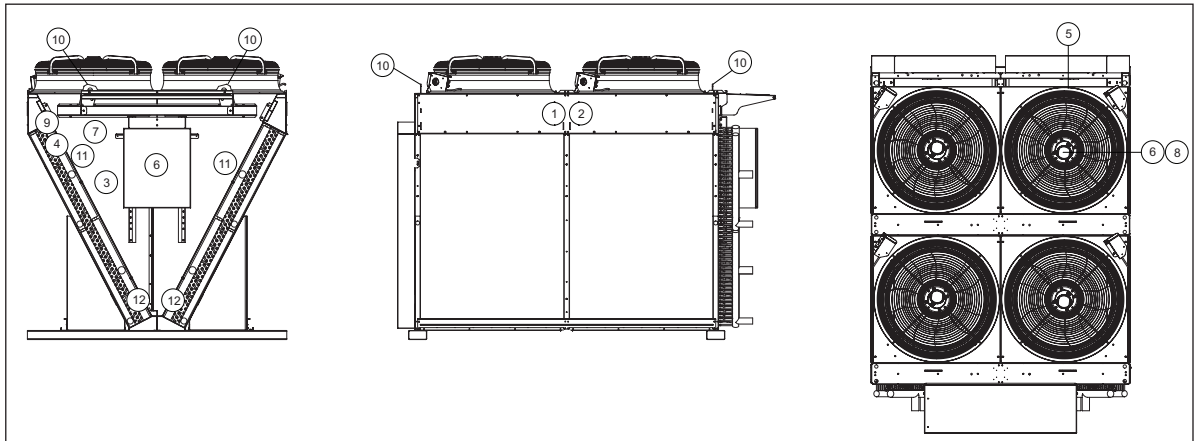
- Non-standard fin spacing (up to 3.0 mm)
- Sub-cooling circuit (SC) - ACV/ANV only
- Stainless steel header tubes for on-site welding connections - VXD only
- Coil corrosion protection:
 - Epoxy coated aluminium fins (EP)
 - F-coat (FC)
 - Seawater resistant aluminium AIMg (SWR)
- Coil protection grid (GR)
- Spray Water kit (KW)
- Water Spray System including pumping station (SWS)
- Casing coated RAL 9002
- Container skid (SK)
- Vibration dampers (VD)
- Special fan motors:
 - Protection class IP55
 - High-temperature motors
- Electrical accessories:
 - Switch on/off (SW)
 - EC Motors wired to a common terminal box (CBP=connection box, CBMP=connection box and master controller+pressure signal)
 - Switchboard IP54 (BS)
 - AC Fan step control cabinet (BSP)
 - EC fan speed control cabinet (ICM)
 - Basic EC switchboard panel (ECCB)

2.4 Code description

ACV	SE	80	3	.1	B	D	*	SK	C4	*	-	AL	2.1	CU	*	*
1	2	3	4	5	6	7	8	9	10	11		12	13	14	15	16

- 1 Alfa-V (ACV= halocarbon condenser, ANV=ammonia condenser, VXD=gaseous cooler)
- 2 Sound level/fan code (T=turbo, S-standard, L=low, Q=quiet, R=residential, E=EC fan motor)
- 3 Fan diameter (80=800, 90=910, 100=1000 mm)
- 4 Number of fan pairs (2 to 9 for ACV and ANV 2 to 6 for VXD)
- 5 Alfa-V series II
- 6 Tube rows code (A, B, C, D for ANV and ACV B, C, D, E for VXD)
- 7 Fan motor connection (D=delta, Y=star)
- 8 Number of circuits (VXD only)
- 9 Packing (SK=container skid)
- 10 Case material
- 11 Electrical accessories
- 12 Fin material (AL=aluminium, IF=industrial fins, SWR=AIMg, EP=epoxy coated aluminium, FC=F-coat, CU=copper)
- 13 Fin spacing (2.0, 2.1, 2.3, 2.5, 3.0 mm)
- 14 Tube material (CU=copper, SS=stainless steel, K65= K65 copper)
- 15 Connection dimensions (VXD only)
- 16 Options

3 Product labels



1. Centre of gravity

Forklifts can be used to lift 2 to 5 modules units only: always place the forks under the center of gravity.

2. Handle with care

When handling the unit, always take maximum care.

3. Product label

LU-VE GROUP
Manufactured by
AIR HEX ALONTE S.R.L.
via delle Albere 5, 36045, Alonte(VI)

HEAT EXCHANGER

ANVSE904.1BD C4 CBP IF 2.1 SS VD

Code: 10235786 Cust. Code: -----

Manuf. Date: 06-2021 Net Weight ±5%: 2.031 Kg

PED Category: PED CAT II

Max DN: 50 Fluid Group: 1

PS min/max: -1/30 bar PT: 45 bar

TS min/max: -60/125 °C Test Date: 06-2021

Coil Ts: -----

ELECTRICAL DATA

Fan motors qty: 8

Power Supply: 30V TT / 50

CE

EXAMPLE

7610917

MADE IN ITALY EAC

Model -----

Product code -----

Unit Net Weight -----

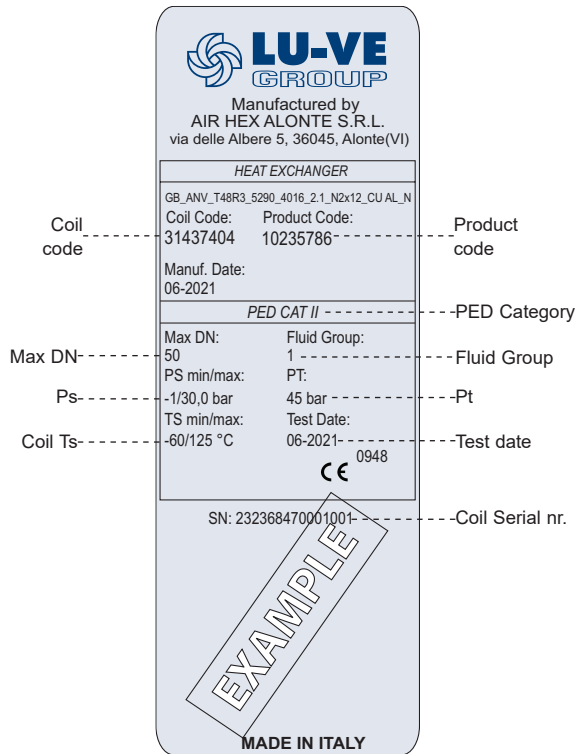
Fluid Group -----

Pt -----

Test date -----

Product Serial nr. -----

Model	Refer to paragraph "2.4 Code description"
Product code Product Serial nr.	Communicate these when ordering spare parts as they identify the unit
Unit Net Weight	Check before any lifting operation to ensure that proper lifting tools are used
PED Category	According to PED
Max DN	Maximum diameter of the tube
Fluid Group	According to PED
Ps	Design pressure
Pt	Test pressure
Test date	Date on which the coil has been pressure tested in the factory



4. Product label - coil

Product code	Communicate these when ordering spare parts as they identify the unit
PED Category	According to PED
Max DN	Maximum diameter of the 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
Coil code	Codes to identify the coil
Coil Serial nr.	



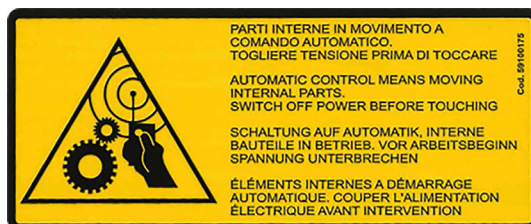
5. Fan direction

Sticker indicates fan rotation direction.



6. Electrical warning

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



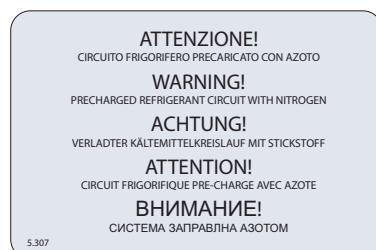
7. Moving parts

Warning: moving parts. Switch off power supply before any maintenance or installation activity.



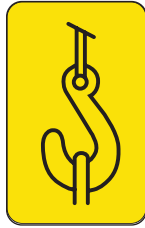
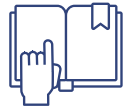
8. Fan motor

Fan motor item number.



9. Nitrogen precharge warning

Units are delivered from the manufacturer with an overpressure. Check pressure on the Schrader valve. With unpressurised unit: Immediate report to manufacturer and note on bill of delivery.



10. Lifting lug

Use all marked lifting lugs when lifting from above.

11. & 12. In/Out

Refrigerant connections inlet and outlet.

Grounding

Whenever electrical components supplied by Alfa LU-VE have this sticker, is mandatory to ground them. The yellow/green grounding wire must be left longer than the others, to ensure that it is the last one to be detached from the terminals in the event of the cable being pulled off. Grounding is designed for the electrical equipment supplied with the unit and is not to be intended as protection from external sources.

4 Unpacking and lifting



Always follow guidelines and instructions as given in the air cooled condensers & gas coolers product manual AHE00049.



Before lifting the unit, check the weight stated on the name plate, located on the inlet connection side. Verify that the lifting equipment supports the unit weight plus 10%.



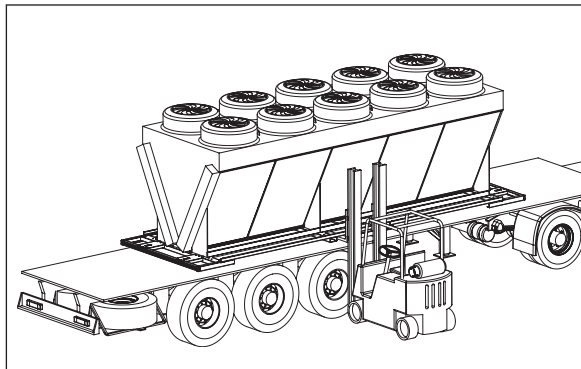
- Forklifts can be used only with 2 to 5 modules units.
- When forklifts are used, forks must be longer than 2.5 m for safe lifting and be fully inserted under the unit.

Alfa-V industrial condensers and gas coolers can be delivered either on standard trucks or in containers.



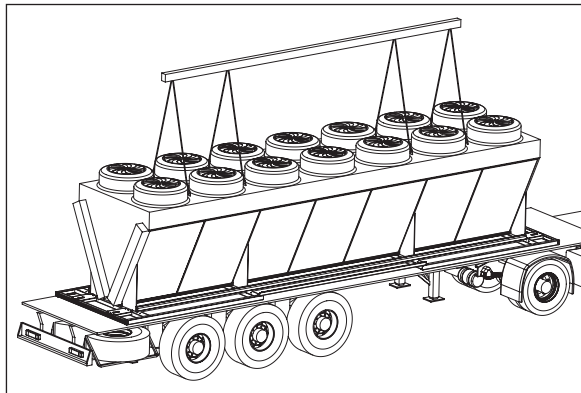
4.1 Unit delivered by standard truck

The procedure below applies to the unloading of units delivered on standard trucks.



2-5 fan pairs unit:

can be unloaded from the side of the truck with the use of a forklift.



6-9 fan pairs unit:

shall be always lifted from above.

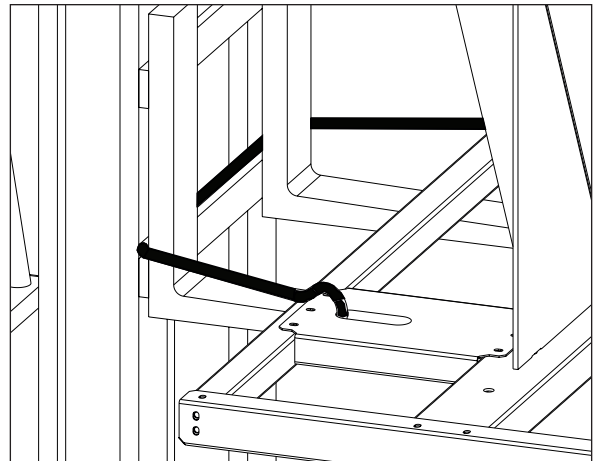
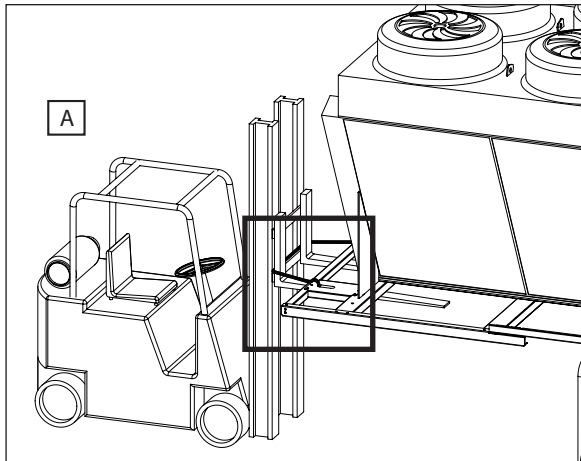
Follow the procedure described in paragraph "4.3 Lifting from above" for 6-8 modules unit. 9 fan pairs units are equipped by default with the container skid and should be unloaded following the procedure described in paragraph "4.2 Unit delivered in a container" even if they are delivered by standard truck.

4.2 Unit delivered in a container

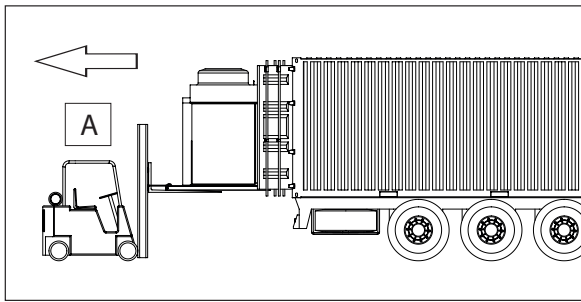
In case of container delivery, container skid option is to be selected in order to facilitate the loading and unloading operations. In case of 9 modules unit, skid is installed by default. Follow the procedure below to unload the unit:

- Remove any obstacle to allow the skid sliding out of the container.
- Ensure the truck is stopped.

Fix the chain to a forklift (identified by letter A) and the hooks in the skid holes.

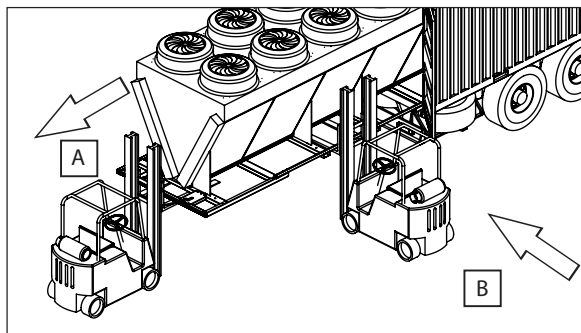


2-5 fan pairs unit



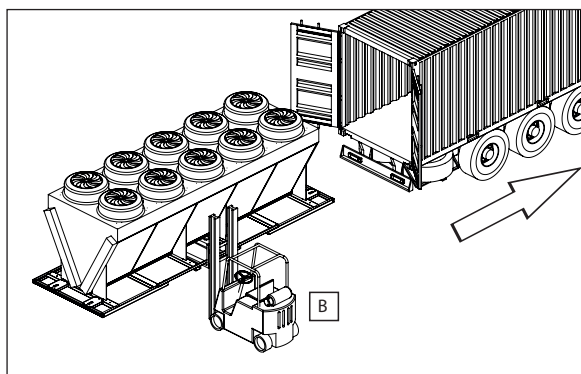
With forklift A, support the unit weight and pull it slowly out of the container. The unit must remain on the container floor for at least 1 m.

The space between the unit and the roof of the container is reduced. Contact with the roof can cause damage to the unit.



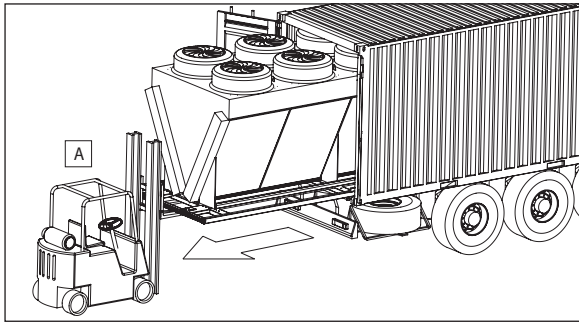
With a second forklift (identified by letter B), insert the forks (under the centre of gravity) and slightly lift the unit.

Remove hooks and chains and drive away with forklift A.



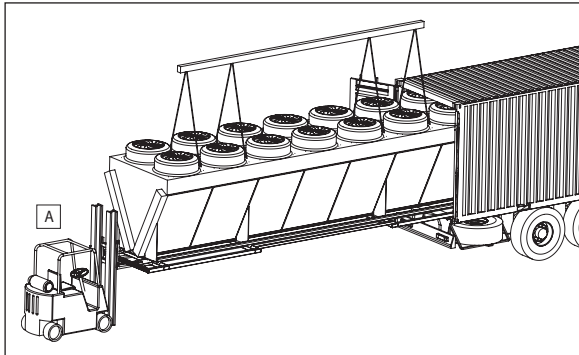
Slowly drive forward with the truck until the unit is completely outside the container.

6-9 fan pairs unit

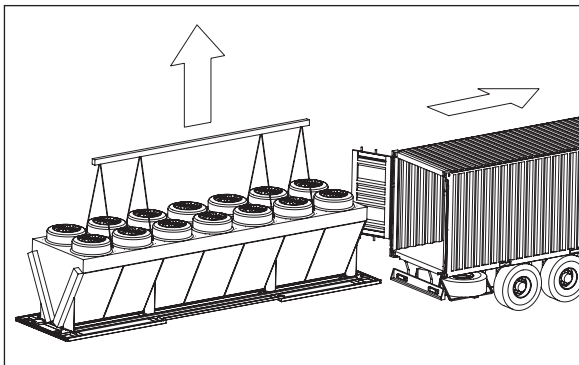


With forklift A, support the unit weight and pull it slowly out until all the lifting lugs are outside the container. The unit should remain on the container floor for at least 1 m.

The space between the unit and the roof of the container is reduced. Contact with the roof can cause damage to the unit.

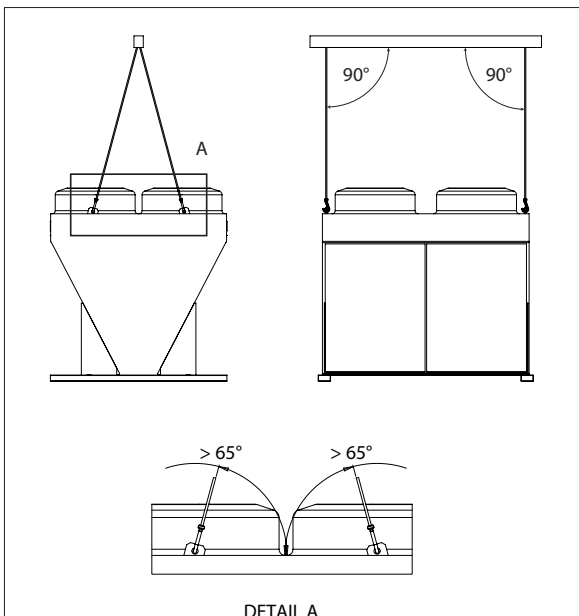


Attach all the lifting lugs to the crane hoisting beam following the procedure described in paragraph "4.3 Lifting from above".



When the crane holds up the unit, remove forklift A. Slightly lift the unit and slowly drive forward with the truck until the unit is completely outside the container.

4.3 Lifting from above



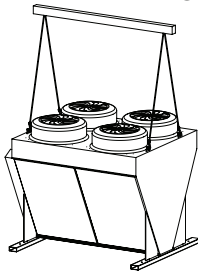
Verify that lifting lugs are safely fixed to the unit and have no signs of damage. Attach the belts or hooks only to the lifting lugs as shown in the drawing on the next page.

Angle of chains as shown for all models.

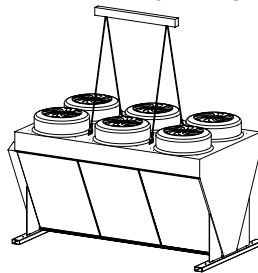
Load on the lifting chains shall be equally distributed on all the lifting points. If one chain is not fully loaded another chain will be extra loaded. This is not allowed.



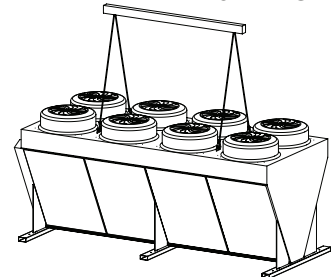
2 MOD
4 FANS



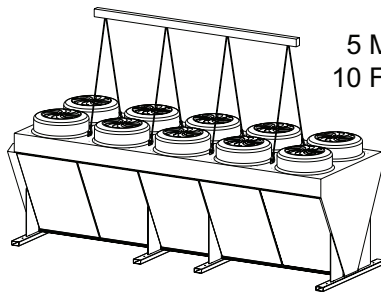
3 MOD
6 FANS



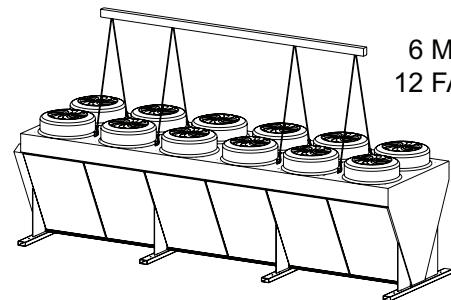
4 MOD
8 FANS



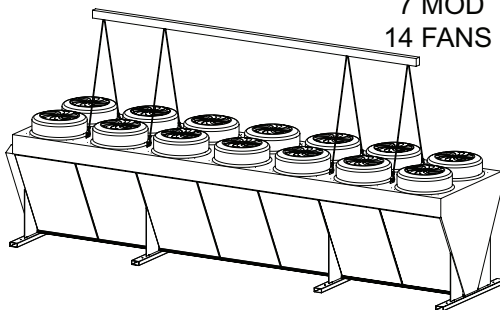
5 MOD
10 FANS



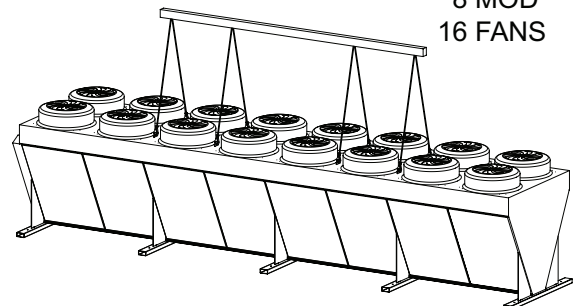
6 MOD
12 FANS



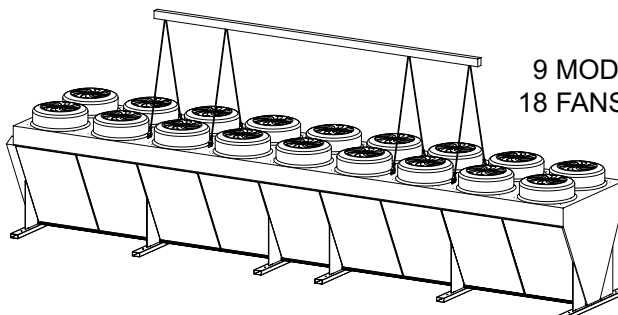
7 MOD
14 FANS



8 MOD
16 FANS



9 MOD
18 FANS



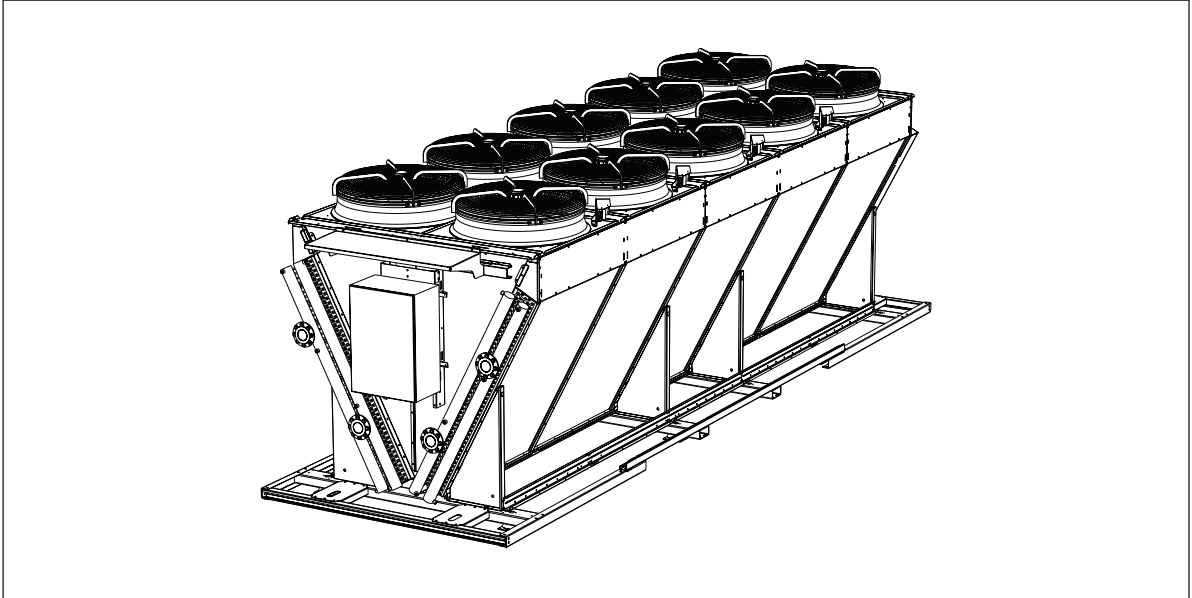
5 Installation



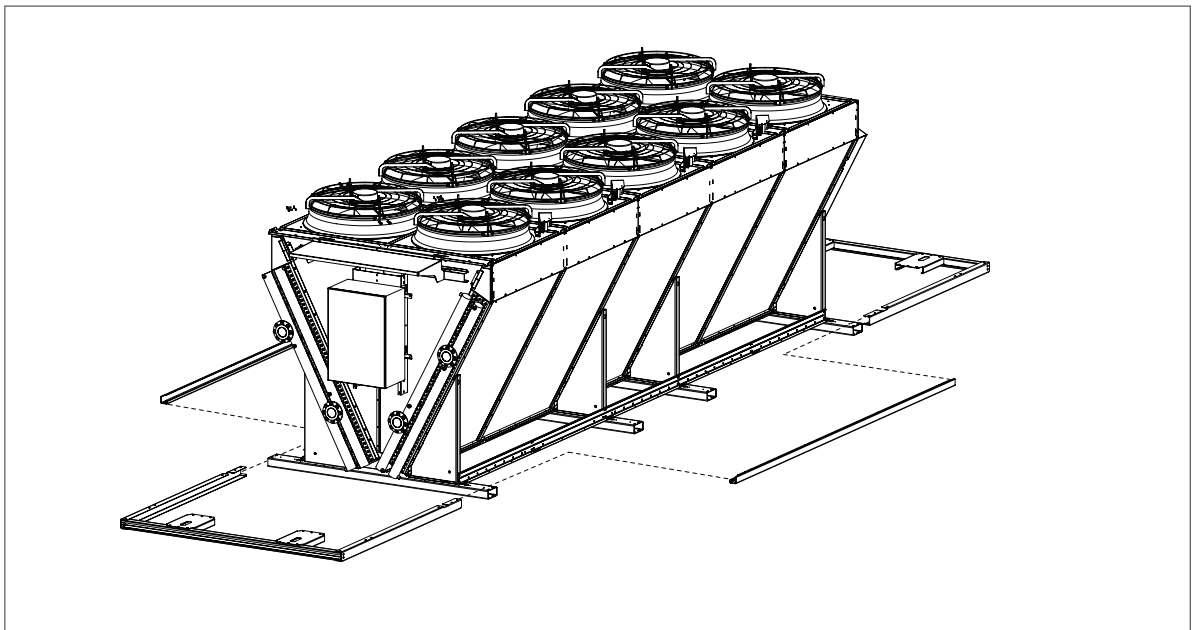
Always follow guidelines and instructions as given in the condenser & gas cooler product manual AHE00049.

5.1 Container skid removal (if present)

Container skid option is selected in order to facilitate loading and unloading operations.



Container skid shall be removed before installation. Container skid components are connected to the unit by means of screws. To remove the skid it is needed to slightly lift the unit.

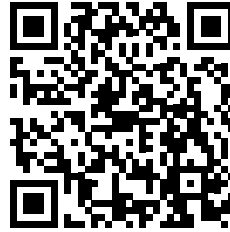


5.2 Mounting dimensions

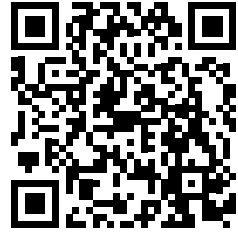
Drawings showing all required mounting and refrigerant connection dimensions are available for download on alfa.luvegroup.com.



Dimensional drawings
Alfa-V ACV



Dimensional drawings
Alfa-V ANV



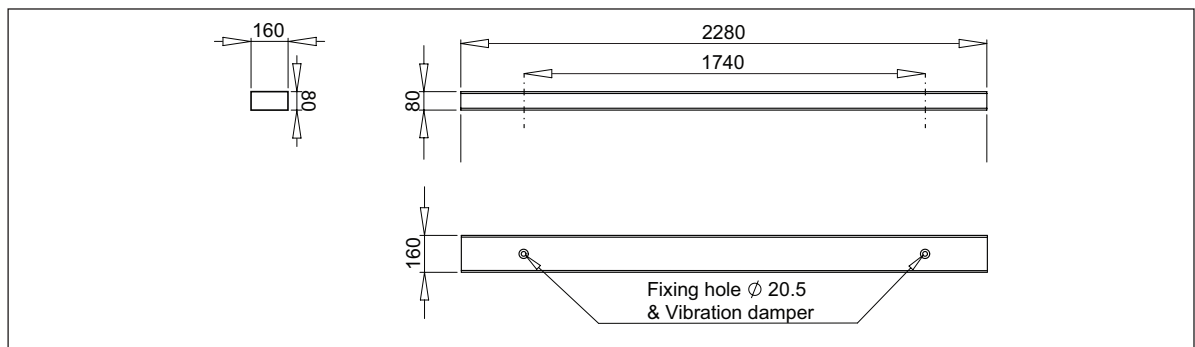
Dimensional drawings
Alfa-V VXD

5.3 Feet dimensions detail

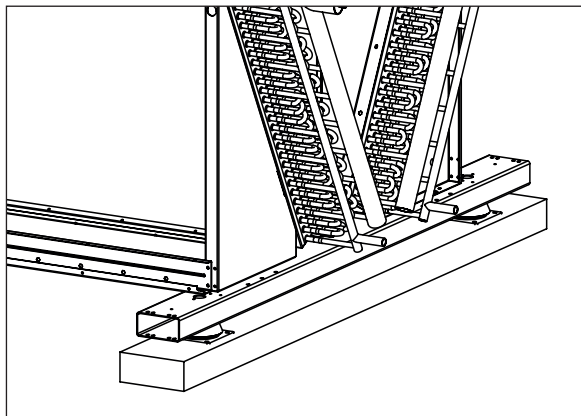
Feet dimensions are identical for all models.

Avoid any lateral torque on the feet when fixing the unit to the ground.

Fixing holes can be used to fix the unit to the ground or to a beam structure and for the installation of vibration dampers.

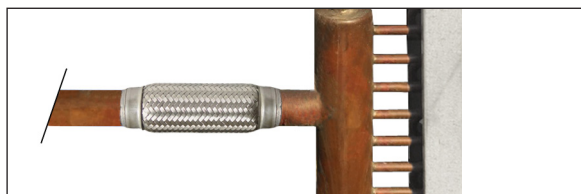


5.4 Concrete mounting base



To avoid 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 dimensions are 100 mm height and 260 mm width.

5.5 Expansion joints (only for condensers)

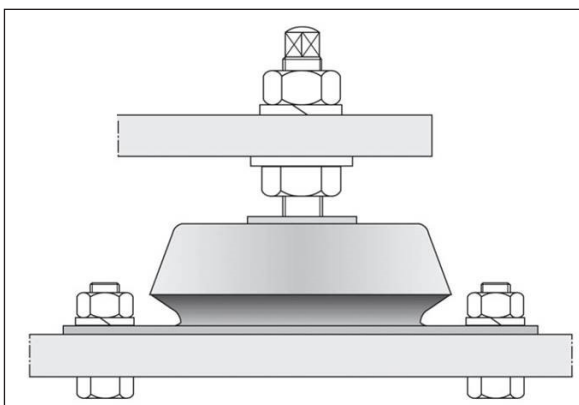
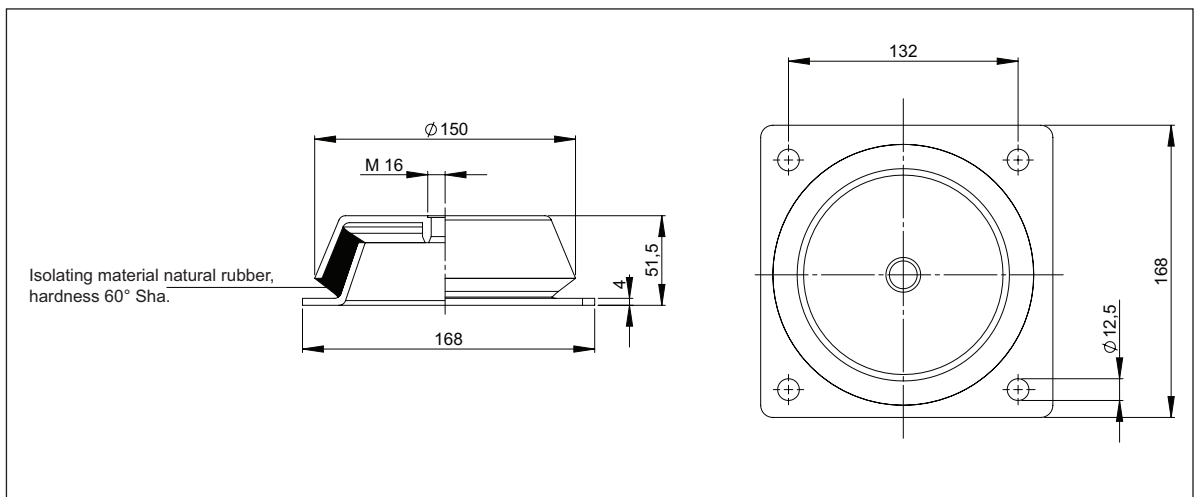


Alfa LU-VE recommends the installation of expansion joints on both inlet and outlet connections. Expansion joints are elastic elements which, if properly installed, absorb the thermal expansions of the tubing. Expansion joints are also helpful in order to reduce vibrations in the piping.

5.6 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 with the supplied M16 screw.

Fan pairs	Vibration dampers
2	4
3	4
4	6
5	8
6	8
7	8
8	10
9	12



Picture shows an installation example using threaded bar, nut, grower washer, washer and locknut (not supplied).

This way vibration dampers can be used to make the cooler level adjusting the locknut. This is particularly useful with long units or irregular basement.

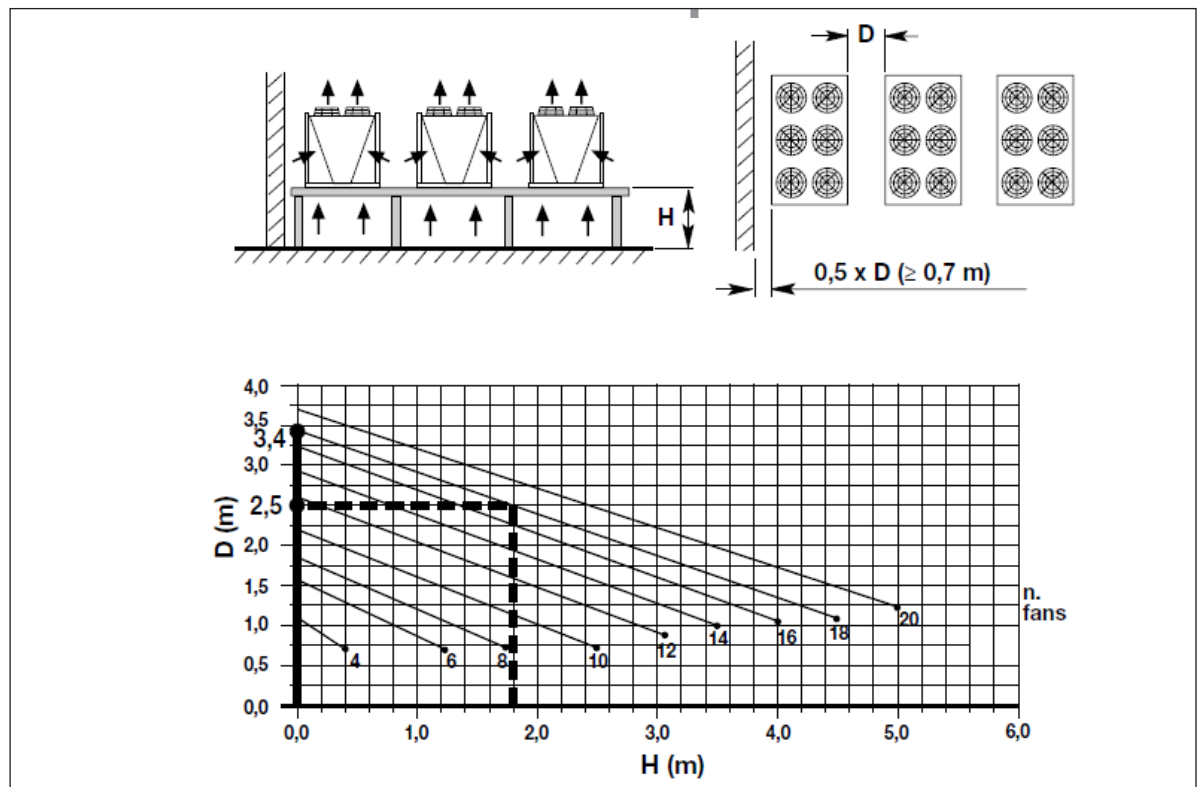
5.7 Installation layout guideline

Ensure installation is such that the following conditions are met:



- Place the unit outdoor, so that it can be monitored and controlled from all sides at all times.
- Ensure that sufficient space is available for maintenance.
- Verify the structures supporting capacity regarding the weight of the unit(s), including refrigerant.

Place the cooler so that air can pass freely over the entire coil surface and if possible so that the wind direction does not affect the evacuation air, otherwise re-circulation might occur. This applies particularly to models that have low revs. See measurement indications below.

In case of doubt, to determine optimal unit spacing for specific conditions on site please contact your Alfa LU-VE representative for advise.

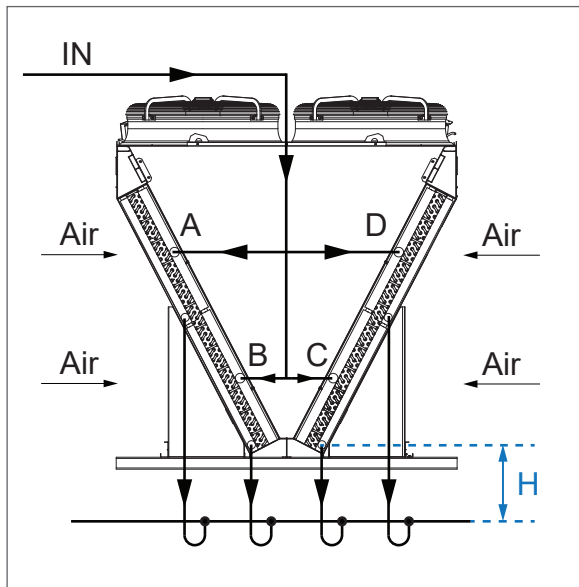


Example

		
n° fans	18	18
D (m)	3,4	2,5
H (m)	0	1,8

5.8 Pipework layout

The pressure drop on the refrigerant side must be taken into account. Always provide $H > P_{drop}$ when designing main pipeline.



5.9 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 accessories

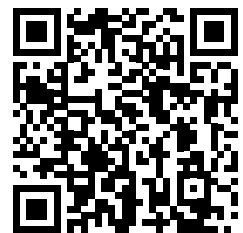
Electrical connection diagrams are available for download on alfa.luvegroup.com. When in doubt always contact your local Alfa LU-VE representative for assistance.



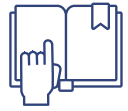
Electrical connections
Alfa-V ACV



Electrical connections
Alfa-V ANV



Electrical connections
Alfa-V VXD



6 Operation

6.1 Start-up procedure

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



- Verify there are no leaks in the refrigerant circuit and connections.
- Switch on fan power supply.
- Start the fans and verify fan direction.



- After some operating time, verify that current absorption does not exceed the value as given in the technical specifications.



6.2 Shutdown

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



- Stop refrigerant supply and switch off electrical power supply.
- Make sure neither refrigerant nor power supply can be resumed accidentally or unexpectedly.
- Drain all liquid refrigerant into a suitable vessel.
- Evacuate the coil to remove any remaining refrigerant gas.



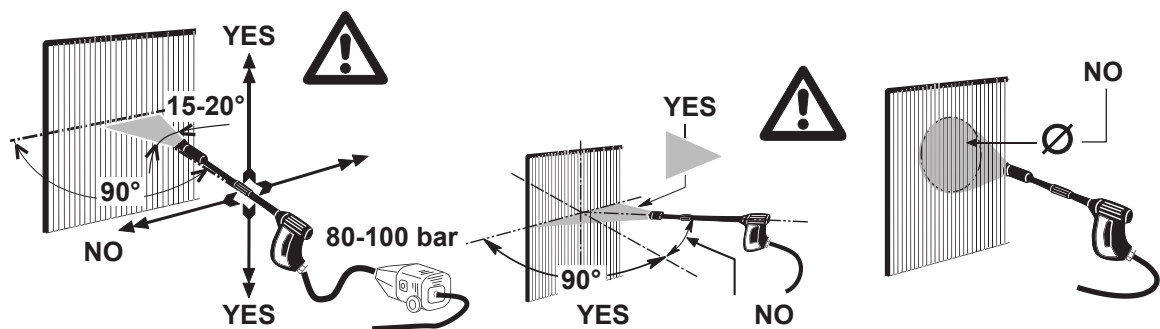
7 Maintenance

Ensure complete electrical isolation before performing any maintenance activity and always follow guidelines and instructions as given in the condenser and gas cooler product manual AHE00049.

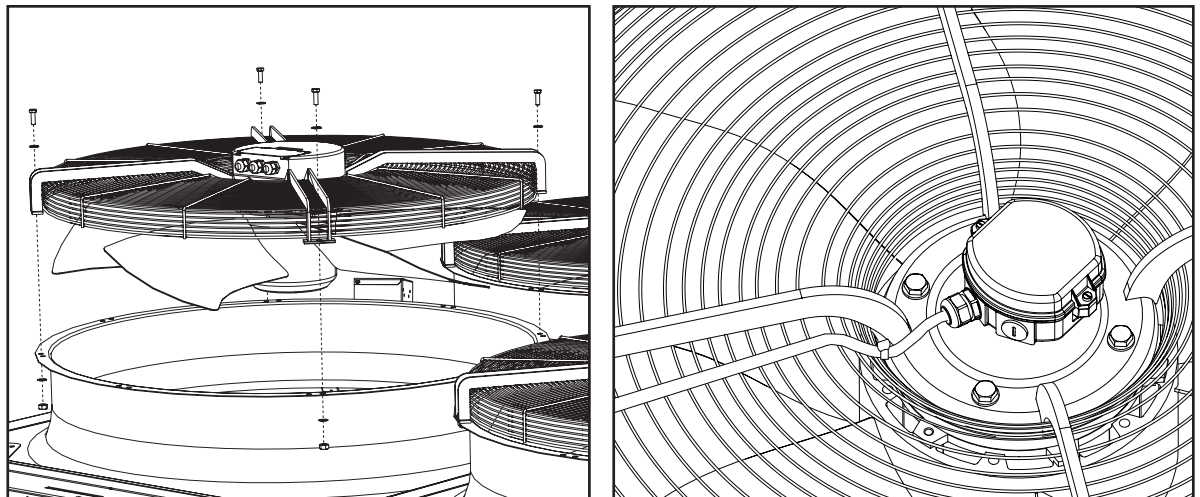
7.1 Cleaning

A coil block should be kept clean to guarantee it works well. The frequency of checks will depend on the site location and specific operating conditions. All Alfa-V coils can be washed by pressurized water up to 100 bar spraying, with flat fan jet perpendicular to fin direction to prevent bending or damaging. Care must be taken not to direct the water jet directly onto fan motors or electric control panels.

Cleaning can be performed from outside the finned block without risk to collect water and dirtiness inside, thanks to the design of the bottom part of the frame that allows easy water and melted dirtiness flowing.



7.2 Fan replacement

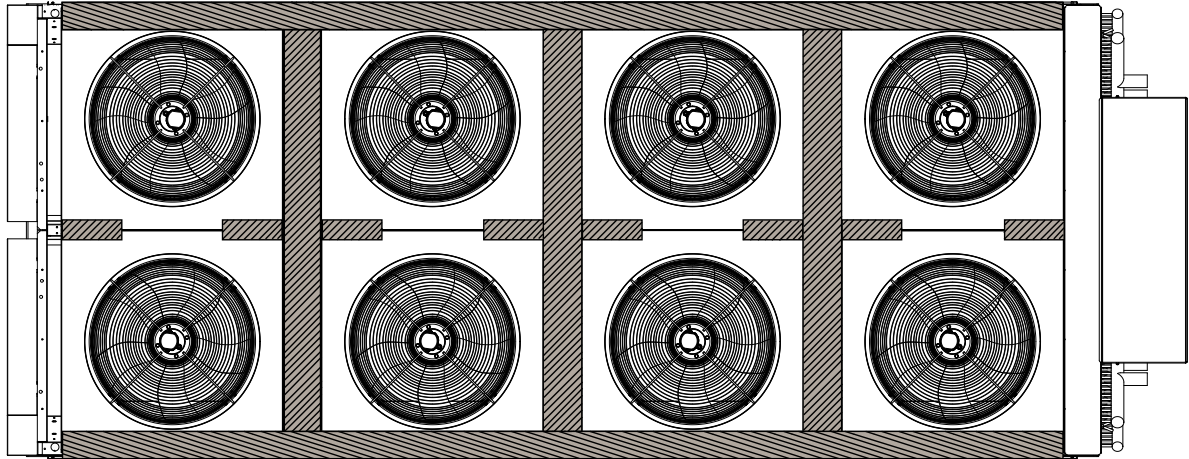


- Open the connection box. Disconnect fan cabling.
- Unscrew fixing bolts and remove old fan.
- Mount new fan assembly in identical position. Remount fasteners. Use an anti-corrosion coating like Geomet or comparable when remounting using new fixing bolts.
- Restore the electric connections (water trap as shown).
- Check for correct fan direction.



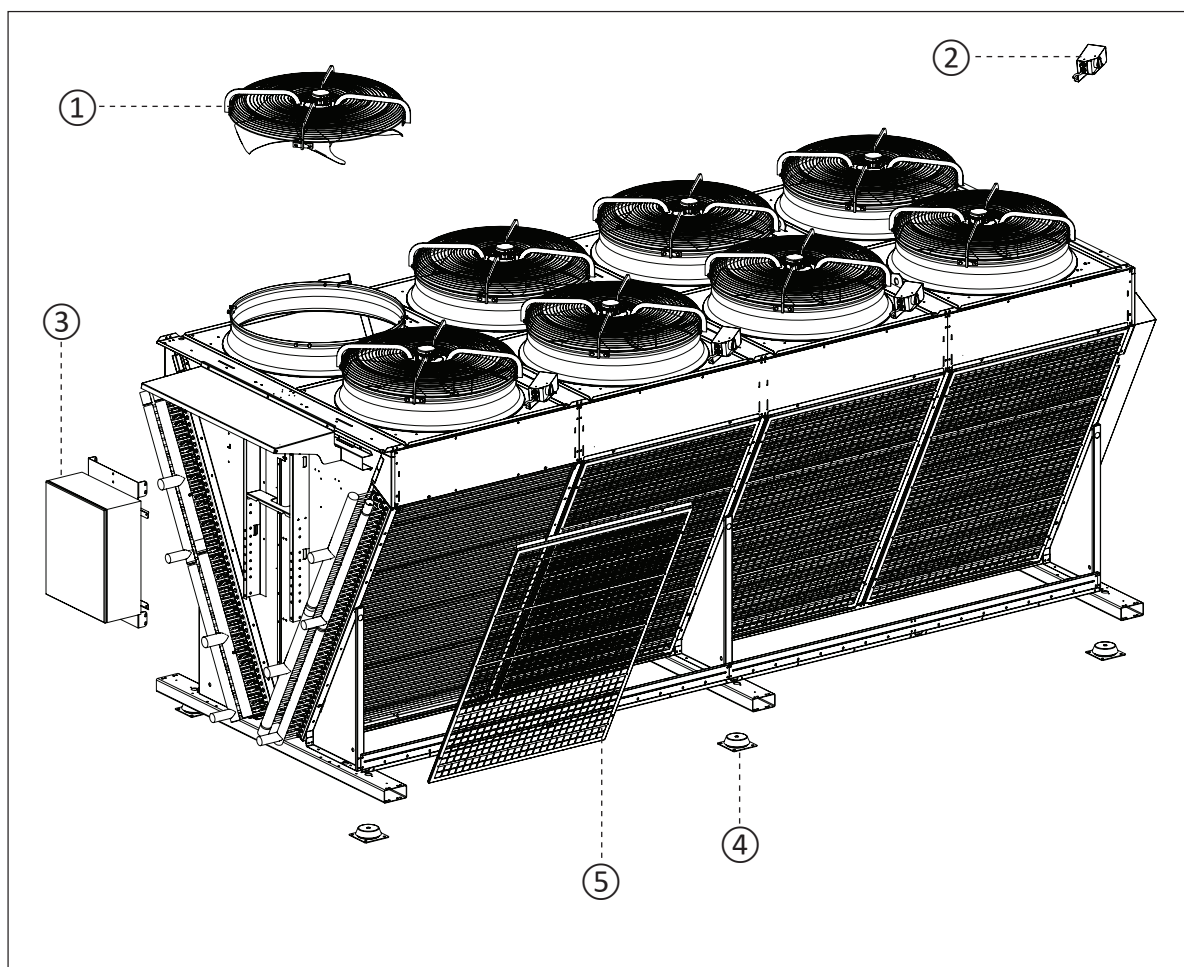
7.3 Stepping on the unit

If for maintenance purposes it is required to step on the on the unit, always wear safety shoes. It is not allowed to step on the unit while it is working. Proper protection against falling shall be arranged with railings and safely fixed ladders. If the units do not have railings a safety device that prevents falling shall be used. Never step on the fan grids and on the liquid connections. It is not allowed to step outside the areas highlighted in the example below.



 = Walkable areas

8 Spare parts



Spare parts for Alfa-V ACV/ANV/VXD

- ① Fan
- ② Switch on/off
- ③ Switchboard
- ④ Vibration damper
- ⑤ Protection grids (available on request)

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



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