CoolPhase Condenser

Outdoor Heat Rejection

OAC017-095, R513A

User Manual

English, 10062694MAN_ENG, rev. A.08 - 09.12.2025

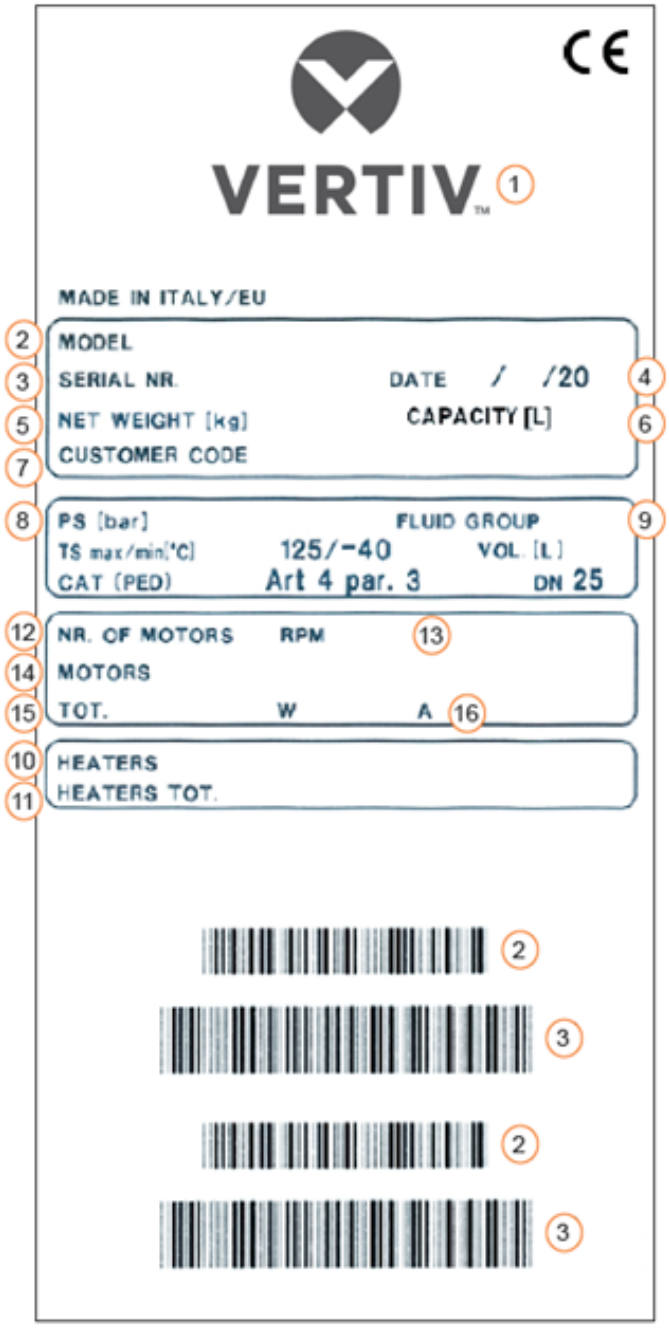
This document, written in English, is the original version

Contents

Annexes

Documents supplied with the machine

- User Manual (this document)
- OAC Control Application - Manual
- Electric Diagrams
- Instruction Leaflet for Transport and Handling (on the packaging)
- Labels with Gravity Center (on the packaging)
- Warranty Certificate



Onboard Label

Please refer to the label placed on the unit for the relevant operating data.

If you need assistance or spare parts, please find the model identification and the serial number on the label.

NOTICE

The data in the manual are referred to standard conditions and can be modified without any advance notice.

The data relevant to the supplied unit are filled in the inboard label (see below an empty facsimile).

Pos.	Description
01	Manufacturing plant
02	Model
03	Serial number
04	Date of manufacture
05	Unit net weight [kg]
06	Internal volume [l]
07	Customer code
08	Max.refrigerant circuit pressure [bar]
09	Fluid group
10	Min. ambient operation temperature [°C]
11	Max. ambient operation temperature [°C]
12	Condenser fan motor quantity
13	Condenser fan motor max.RPM
14	Fan power supply
15	Unit nominal power input [W]
16	Unit total Full Load Ampere [A]

1. Safety

This chapter gives general safety instructions.

Additional safety warnings, for specific operations, are given in the rest of the manual.

1.1 Conventions

DANGER

Indicates a hazardous situation which, if not avoided, **will** result in **death** or **serious injury**.

WARNING

Indicates a hazardous situation which, if not avoided, **could** result in **death** or **serious injury**.

CAUTION

Indicates a hazardous situation which, if not avoided, **may** result in **death** or **serious injury**.

NOTICE

Indicates a property damage message.

ENVIRONMENT

Indicates a environment damage message.

1.2 General Instructions

Intended readers	• This User Manual is intended for transport, installation and maintenance personnel. • The end user can only switch the unit **ON** and **OFF** and modify the setpoint.
Personnel	• The operations described in this manual must be made by technical staff, expressly authorized in compliance with the regulations in force at the installation site. • The authorized personnel must be properly trained and qualified, wear appropriate personal protective equipment and use adequate equipment and tools.
Read this manual	• Carefully read the manual before performing any operation on the unit.
Keep this manual	• Keep the manual during the complete life-span of the unit. • Keep the diagrams provided with the unit (wiring diagram, water circuit,...). They are part of the instructions for use. • If you move or sell the unit, transfer the manual and the diagrams together with the unit. • The manuals may be subject to modification. For complete and up-to-date information always consult the specific manual supplied with the unit.
Intended use	• Use the unit only for the purpose it has been designed. • The manufacturer takes no liability for any improper use of the unit.
Do not modify the unit	• Do not modify the unit without **Vertiv™** permission in any way, including the safety devices, the control system and the software. • The manufacturer takes no liability for any unauthorized modification of the unit.
Warning labels	• Pay attention to the warning labels on the unit. • Do not remove or cover the labels placed on the unit by the manufacturer.
Lockout-Tagout (LOTO)	Before any intervention on the electrical system or accessing the inner components: • Lock the disconnection device by a padlock or similar tool. • Apply on the general disconnecting switch a warning plate.
Safeguards	When you finish the operations on the unit, always remind the following: • Mount again and fix with screws all the safeguards (panels, grids). • Close and lock all the doors, if present. • Never operate the unit without the above mentioned safeguards.

1.3 Electric system

WARNING

- The unit contains **potentially lethal voltage** in some circuits.
- Risk of **arc flash** and **electric shock**.
- Can cause **injury** or **death**.
- Open all local and remote unit electric power disconnect switches, verify with a voltmeter that power is **OFF**.
- Always wear the protective equipment prescribed by the local and **Vertiv™** regulations.

WARNING

- The electric connection enclosures, the fan speed control and the **EC fan** enclosures can retain a stored high-voltage electrical charge for **up to 10 minutes**.
- Risk of **electric shock**.
- Can cause serious **injury** or **death**.

Before working within the unit electric connection enclosures or working within the fan speed control and the **EC fan** enclosures proceed as follows:

- open all local and remote unit electric power disconnect switches.
- wait **10 minutes**.
- verify with a voltmeter that power is **OFF**.

Only properly trained and qualified personnel may perform repair, maintenance and cleaning.

1.4 Automatic restart

WARNING

- Fan blades can automatically start rotating without warning at any time during a cooling cycle or after power is restored after a power failure.
- Risk of contact with high-speed, rotating fan blades.
- Can cause serious personal **injury** or **death**

Before working within the unit cabinet, removing the fan guards or servicing the fan speed control, fan blades or **EC fan** motors proceed as follows:

- Open all local and remote electric power supply disconnect switches.
- Wait **10 minutes**.
- Verify with a voltmeter that power is **OFF**.
- Only properly trained and qualified personnel may perform repair, maintenance and cleaning.

WARNING

- This unit operates and restarts automatically.
- The fans may suddenly start blowing out a strong air flow, which may carry particles and small objects from inside the unit.
- Can cause serious personal **injury.**
- Wear eyes protection when you need to get close to the unit while it is operating.
- Turn the main switch to **OFF** to disconnect the unit from the power supply before any operation on the unit.

1.5 Personal protective equipment

CAUTION

- Fin and tube heat exchanger is made of plates and fins, which may have sharp edges and burrs.
- For fans with metallic impeller, be cautious of sharp edges and burrs.
- Also, other elements inside the unit may have sharp edges, burrs, splinters, and exposed fasteners.

General safety measures:

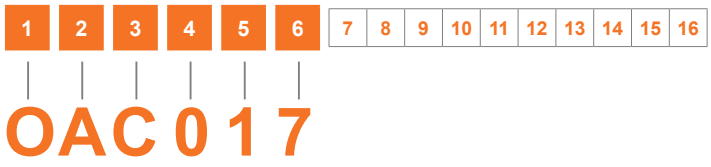
- Be cautious and always wear cut resistant gloves.

CAUTION

- Components at high temperature (condenser inlet piping at about 120°C).
- Always wear temperature resistant gloves when operating on the condenser.

2. Digit Nomenclature

The unit is fully defined by eleven (11) digits.



Digit	Feature	Value	Description
1	Family name	O	Outdoor unit
2		A	R513A refrigerant
3		C	Condenser unit
4 - 6	Model & Design*	017	17 kW / PS 22,9 bar
		033	33 kW / PS 22,9 bar
		042	42 kW / PS 22,9 bar
		058	58 kW / PS 22,9 bar
		H58	58 kW / PS 30,0 bar
		087	87 kW / PS 22,9 bar
		H87	87 kW / PS 30,0 bar
		095	95 kW / PS 22,9 bar
7	Fan Control	M	EC Fans controlled by indoor unit
8	Air flow	V	Vertical air flow
		H	Horizontal air flow

Digit	Feature	Value	Description
9	Low ambient kit	S	Safety valve + Shut-off valve
		R	Liquid receiver + Safety valve + Shut-off valve
		L	LAC valve + Liquid receiver + Safety valve + Shut-off valve
10	Packaging**	G	Standard package with wooden crate
		M	Standard package with seaworthy crate
11	Power supply	1	230V / 1ph / 50-60 Hz
12	Coil treatment	S	Without coating
		T	With Epoxy coating
		U	With Electrofin coating
13	Free	E	Free option
14	Free	E	Free option
15	Free	E	Free option
16	Special	A	Standard
		X	Special Vertiv™

Note:

* The three digit tends to identify the nominal Heat rejection Capacity in kW at standard conditions: Delta (Tsaturated condensing - Tair inlet)=15K; Tcoil air inlet = 35°C; Liquid subcooling = 3K; Installation height = 0m above the sea level; clean exchange surfaces;

** Standard packaging means cardboard and polyethene foil with pallet.

3. Intended use

3.1. Purpose of the unit

- **OAC** models belong to **CoolPhase Condenser** family. They are qualified to be coupled with **CoolPhase Perimeter**, **PAM** model range, using refrigerant **R513A**;
- **OAC** models are single circuit condensers, specifically designed to be coupled with single circuit or dual circuit **PAM** models, and cover a complete range of nominal heat rejection from **17** to **95 kW**;
- **OAC** condensers are designed with plane shape coils, finned tube type, and equipped with **EC axial fans**;
- The condenser is quickly and easily installed; all internal wiring is completed at the factory with only electrical connections and pipe kits with safety valve and accessories need to be connected at the job site;
- **OAC** condensers are directly controlled by the indoor **CoolPhase Perimeter** unit via Modbus protocol and may require a fan setting during installation.

3.2. Assembly of the unit

The unit is supplied in separate modules:

- The condenser unit;
- Pipe kit with accessories (depending on the configuration) is delivered separately and needs to be connected at the installation site.

Operations to be made at the installation site are the following:

- Condenser unit installation, height adjustment, frame;
- Electrical connections for power supply;
- Piping connections to the refrigerant system.

See Chapter *5. Description* for details about the unit structure, versions, and optional components.

WARNING

Do not assemble or connect the unit with systems or machines that are different from what is specified in this manual for your unit.

Contact **Vertiv™ Technical Support** for any question.

WARNING

The pipe kit contains safety valve which is mandatory for the refrigerant system.

The condenser cannot be connected to the refrigerant system without the pipe kit section.

3.3. Functional limits

WARNING

Risk of components failure or breakage.

Do not use fluids and voltage that are different from what is specified in this manual for your unit.

Contact **Vertiv™ Technical Support** for any question.

Refrigerant	This unit is designed for use with **R513A** (group 2, not dangerous according to PED Directive).
Performance	Nominal heat rejection capacity: See chapter *6. Tecnical Data* MAX working pressure **22,9 barg** for condenser units **OAC0**** MAX working pressure **30,0 barg** for condenser units **OACH****
Electrical system requirements	**Voltage and Frequency Limits:** **CoolPhase Condenser OAC** with EC Fan 1Ph AC supply 200 V-277 V ± 10% • 50-60Hz 0,99 to 1,01 of nominal frequency continuously; • 0,98 to 1,02 short time. **Protection level:** • Electrical control box: IP55; • Unit body: IPX5.

3.4. Operating environment

This unit is designed for outdoor installation, with the following ambient conditions:

Outdoor ambient	-20°C … +48°C for **OAC0**** -20°C … +52°C for **OACH**** Recommended application conditions: Safety valve pipe kit option "**S**" 0°C < T < 48°C (52°C) Safety valve pipe kit option "**R**" -5°C < T < 0°C Safety valve pipe kit option "**L**" -20°C < T < -5°C For installation with ambient temperature below -20°C it is necessary to contact **Vertiv™** technical support.
Outdoor relative humidity	5% … 95%
Ambient	**Do not** use in explosive, acid, or anyway aggressive atmosphere. In case of installation near the sea or other particularly atmosphere conditions consider ordering the Epoxy coating or Electrofin.
Altitude	≤1000 m. Derating is required if the altitude exceeds 1000 m.

3.5. Space limits

Overall unit dimensions	Provide enough free space to place the unit. See *Annex I – Dimensions and Weight.*
Clearance	Keep a free space around the unit as explained in *8.4 Space Requirements*. **WARNING** The unit does not operate correctly if placed too close to walls or other obstacles.

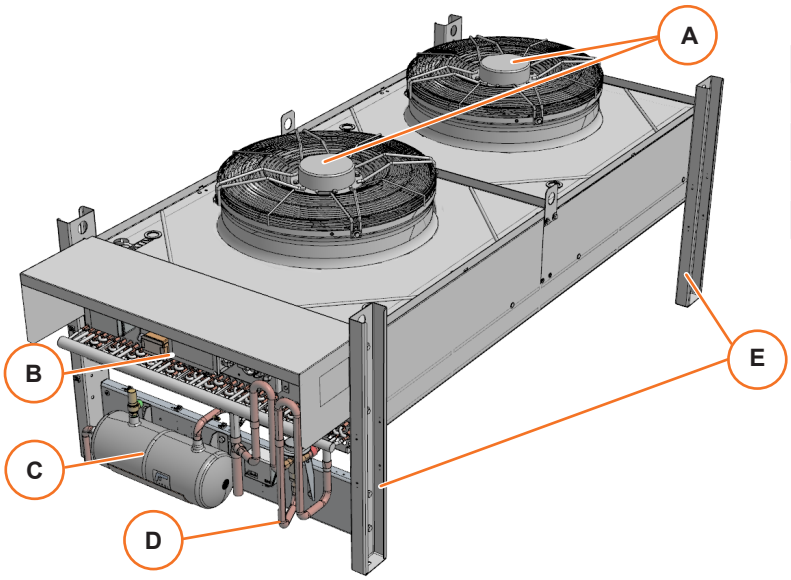
4. Reference norms

The **CoolPhase Condenser OAC** units are designed and manufactured in accordance with the following European Directives:

EU Directives	• Machine Directive 2006/42/CE • PED Directive 2014/68/EU • Low Voltage Directive 2014/35/UE • EMC Directive 2014/30/UE • RoHS II Directive 2011/65/EU • RoHS III Directive EU/2015/863
Electrical board	• EN 60204-1 • CEI 20-22 II • IEC 332-3 cat. A.
Electro-Magnetic Compability (EMC)	• EN 61000-6-2:2005 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards – Immunity for industrial environments • EN 61000-6-3:2011 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards – Emission standard for residential, commercial, and light-industrial environments
Performances	• Heat rejection capacities tests (with R410A): UNI EN 327 • Sound pressure levels (referred to 5m far from the unit): EN13487
CE Marking and Conformity Declaration	The units are marked “**CE**” Each unit is supplied complete with individual test certificate in accordance with internal procedures and a Declaration of Conformity to the relevant European Union Directives.
UKCA Marking and Conformity Declaration	The units are marked “**UKCA**” Each unit is supplied complete with individual test certificate in accordance with internal procedures and a Declaration of Conformity to the relevant UK Safety Regulations.

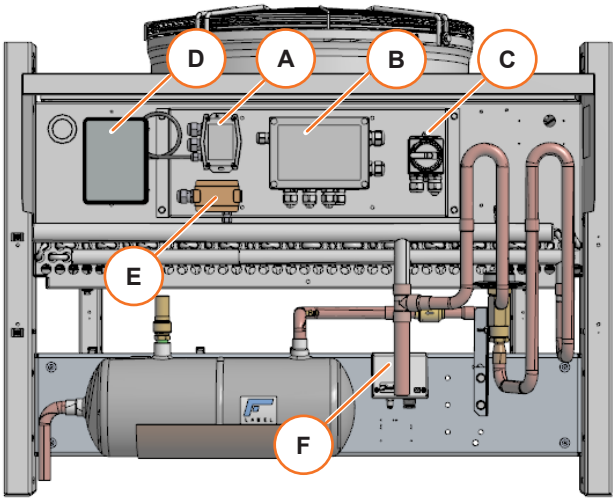
5. Description

5.1. Main components



A	Fans
B	Electric box
C	Liquid receiver (optional)
D	Pipe kit
E	Supporting structure

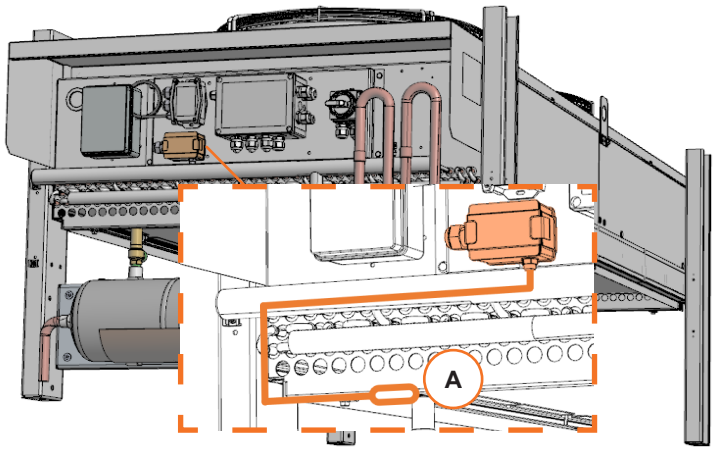
5.2. Electric system



A	Temperature probe box (optional)
B	Main electric box
C	Main switch
D	El. Junction box (for El.heater, Pressure switch, Thermostat)
E	Temperature probe box (optional)
F	Pressure control switch

- The main switch **[C]** is a disconnecting switch and cuts **OFF** electric power supply to the condenser unit.
- The controller, connected to the main unit, starts/stops the condenser unit operation.

5.3. Mechanical specifications



Fan

The axial fan motor is built with external rotor.

The position and appearance of the fan are shown in section *5.1.- Main components*.

Supporting structure

The cabinet legs are made of aluminum.

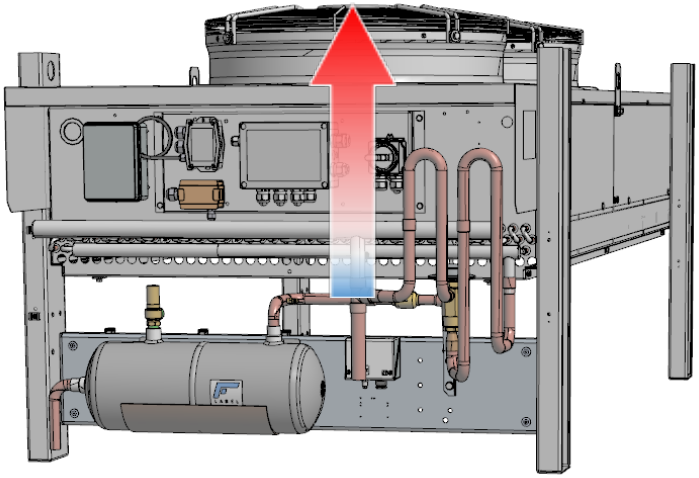
Temperature sensor

The control option "**M-Controlled by indoor unit**" for the **OAC condenser**, allows to install a temperature probe **[A]** placed on the end plate under the control box to monitor the ambient temperature.
This sensor is mandatory for "floating setpoint condensation" algorithm.

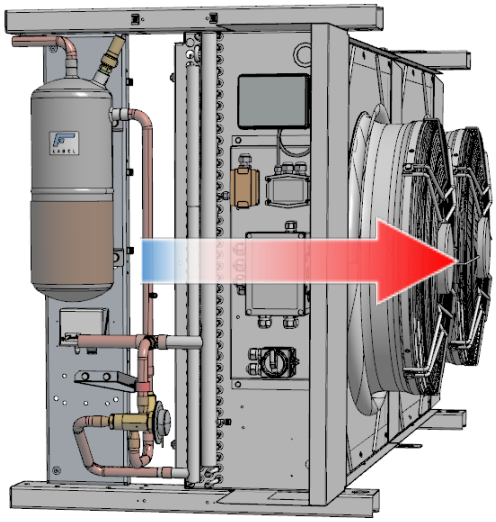
5.4. Fan and control system

EC fans	The **EC fan** is an integral assembly of an electronically commutated motor, quiet fan blade assembly and finger/hail guard.
Control by indoor unit / EC fan	• The condenser is directly connected to the indoor unit via Modbus communication; • The unit can optimize the system by managing everything through a single control, then combines the advantages of **EC fans** with system management; • It's possible to install an external temperature probe to have a control on the external conditions; • The system allows to adjust the system pressure (head pressure setpoint); • The pressure transducer is present and wired inside the indoor unit.

5.5. Installation and air flow



VERTICAL = Vertical airflow



HORIZONTAL = Horizontal airflow

5.6. Coil types and corrosion treatments

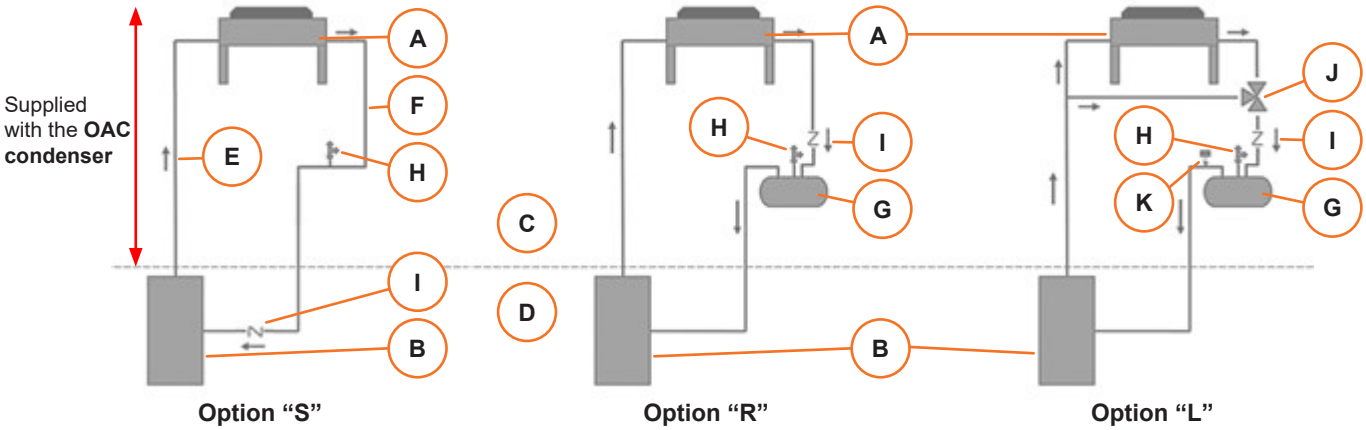
Finned coil coating selection for different atmospheric corrosivity category:

Atmospheric corrosivity category (ISO 922)	C1, C2	C3		C4	C5	C6
		Inland	Coastal			
Corrosivity	Very low, low	Medium	Medium	High	Very high	Extreme
Typical environment - examples	Indoor, Rural areas	Urban areas	Urban areas	Polluted urban, industrial, coastal areas	Very high pollution & salt deposition areas	Extreme industrial, coastal areas
OAC config. Digit **12 = S**	OK	OK	NR	NR	NR	NR
OAC config. Digit **12 = T**	OK	OK	AP	NR	NR	NR
OAC config. Digit **12 = U**	OK	OK	OK	OK	AP	NR

NOTE:

OK = Suitable application;
AP = Acceptable when protection is applied. Lifespan may be shortened! Protection could be additional separating wall or filter screen;
NR = Not recommended application.

5.7. Ambient kit option - Digit 9



A	Condenser
B	Indoor unit
C	Outdoor environment
D	Indoor environment
E	Gas discharge line
F	Liquid return line
G	Liquid receiver
H	Pressure safety valve
I	Check valve
J	Head pressure (LAC) valve
K	Pressure switch

NOTICE

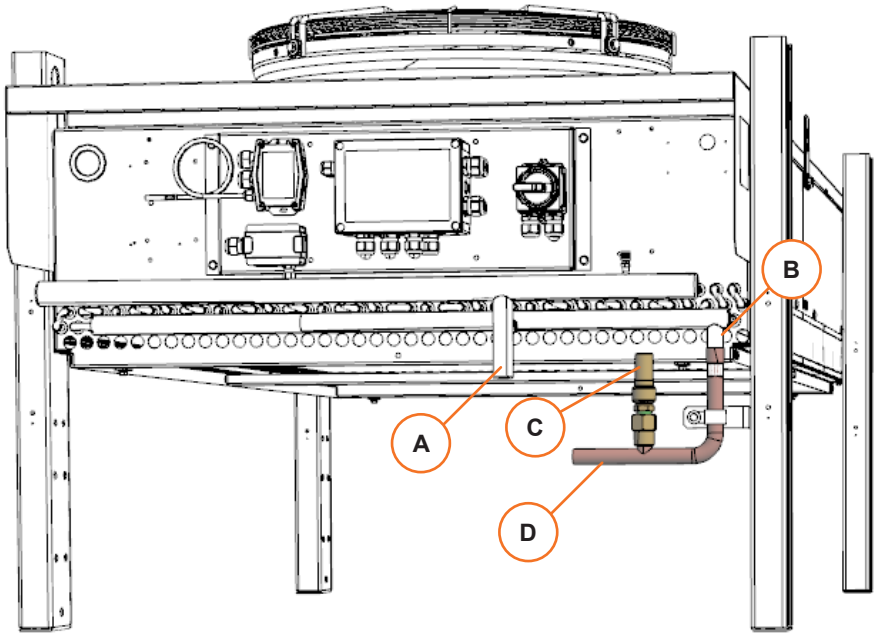
- Check valve for option “**S**” needs to be installed on site;
- See section *5.10. External refrigerant piping requirements* for more information.

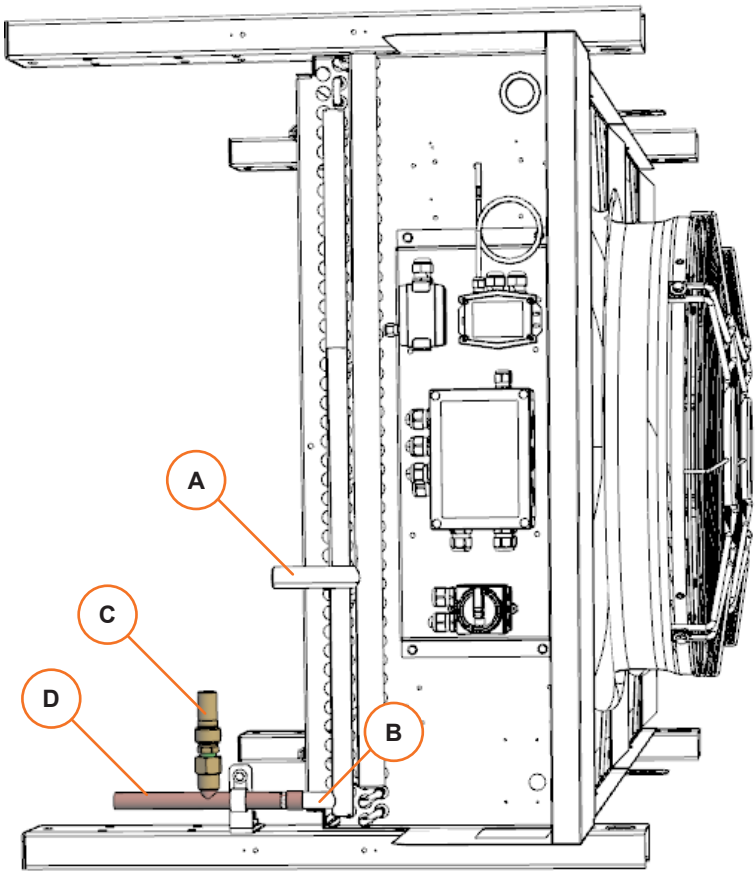
NOTICE

- Option “**L**” includes a receiver with heater pad, a head pressure valve, a safety valve, a check valve, and a pressure switch;
- The kit is designed to maintain proper operating pressure in outdoor temperature down to -20°C (-4°F).

5.8. Pipe kit options

5.8.1. Option “S” – Safety valve + Shut off valve.

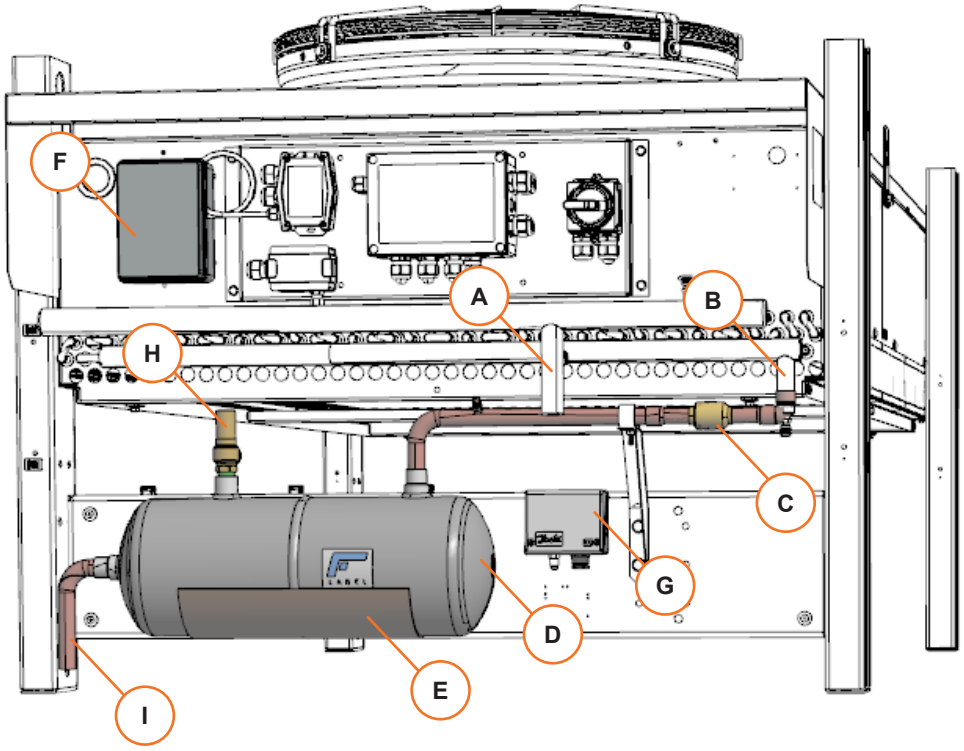


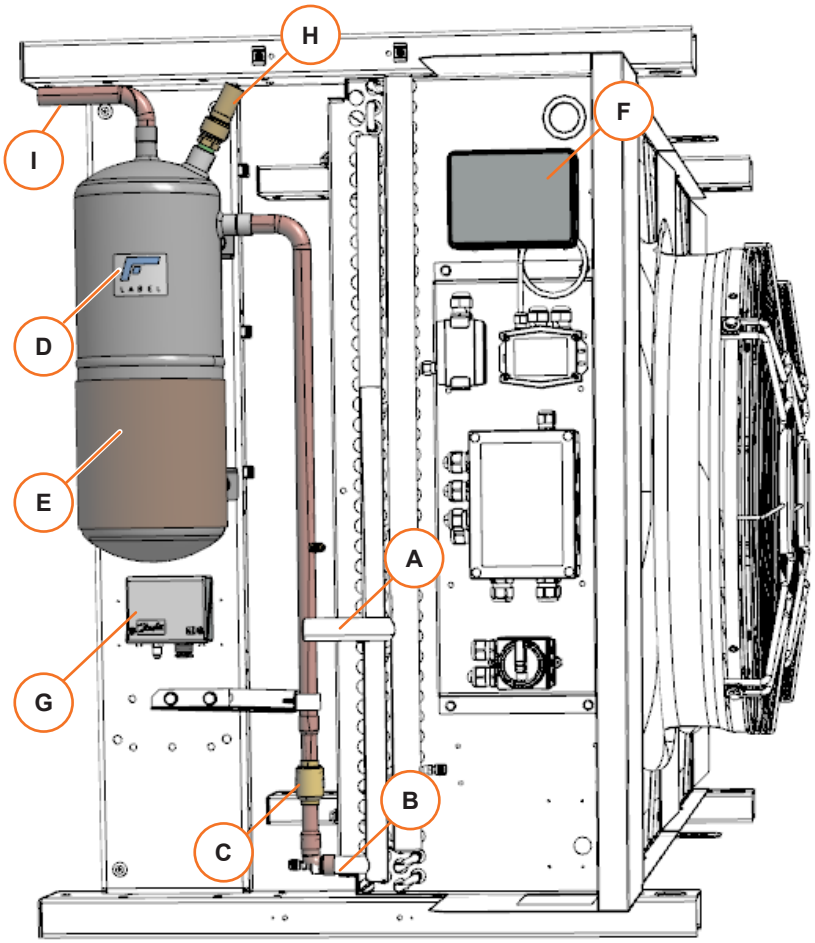


A	Condenser inlet from the system
B	Condenser outlet
C	Pressure Safety valve
D	Outlet connection to the system

Shut-off valves are included in the kit and should be attached on site.

5.8.2. Option “R” – Liquid receiver + Safety valve + Shut off valve.

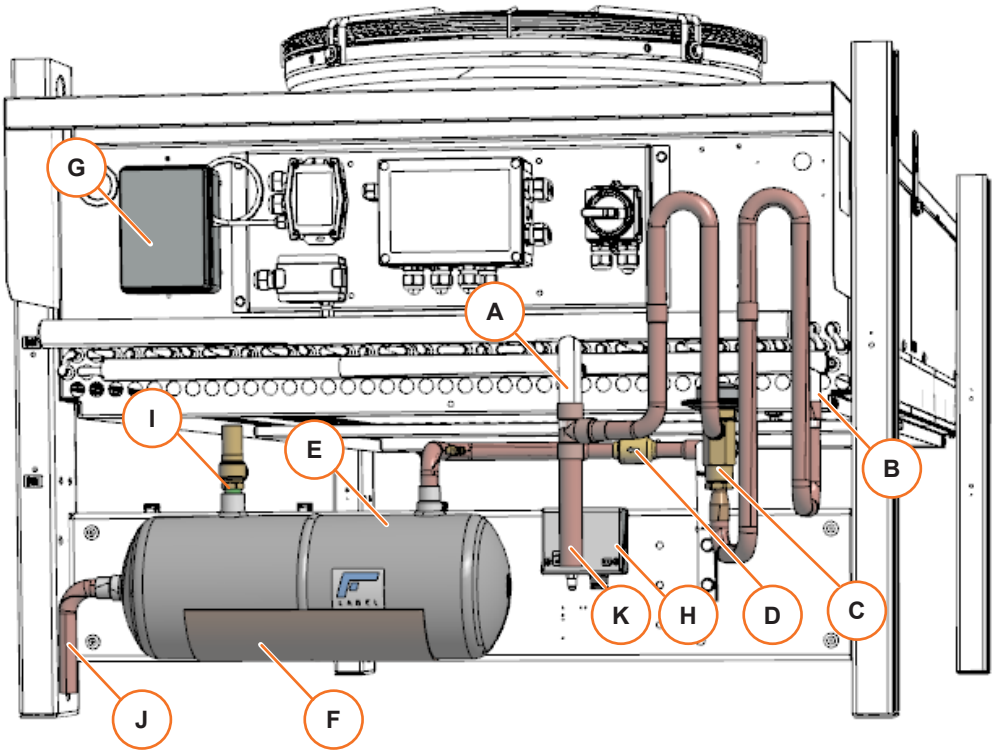


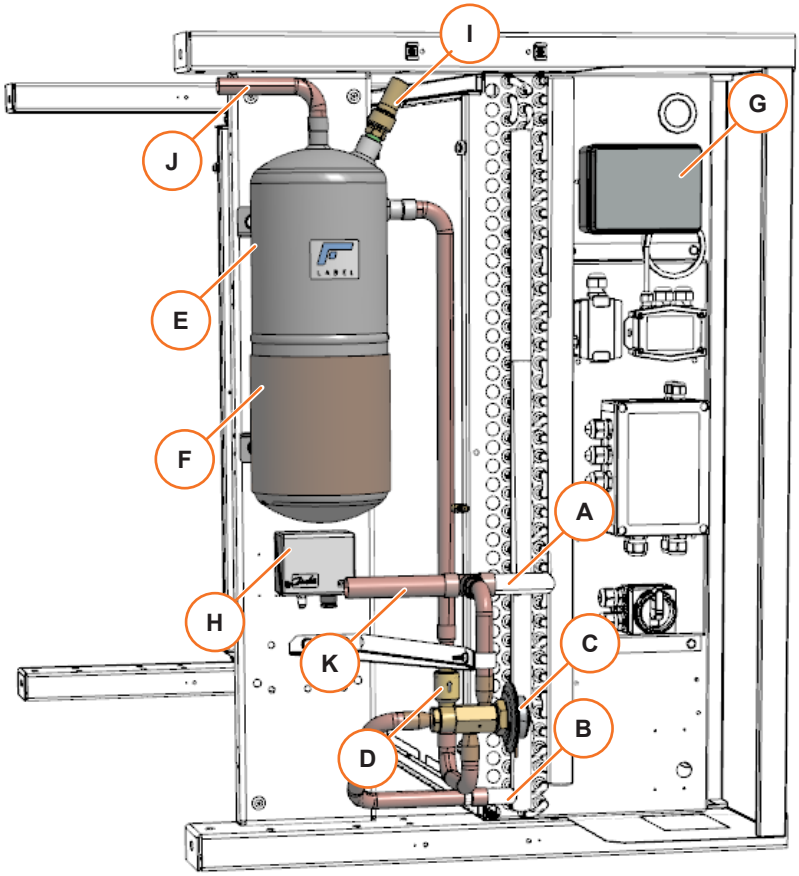


A	Condenser inlet from the system
B	Condenser outlet
C	Check valve (Non-return valve)
D	Liquid receiver *covered by thermal sleeve
E	Surface heater for liquid receiver
F	Thermostat for surface heater
G	Pressure switch
H	Pressure Safety valve
I	Outlet connection to the system

Shut-off valves are included in the kit and should be attached on site.

5.8.3. Option “L” – LAC Valve + Liquid receiver + Safety valve + Shut off valve.





A	Condenser inlet
B	Condenser outlet
C	LAC Head pressure control valve
D	Check valve (non-return valve)
E	Liquid receiver *covered by thermal sleeve
F	Surface heater for liquid receiver
G	Thermostat for surface heater
H	Pressure switch
I	Pressure Safety valve
J	Outlet connection to the system
K	Inlet connection from the system

Shut-off valves are included in the kit and should be attached on site.

5.9. Main components description

5.9.1. Fan

- The axial fan uses low-noise fan blades and a high-performance motor.

5.9.2. Heat exchanger

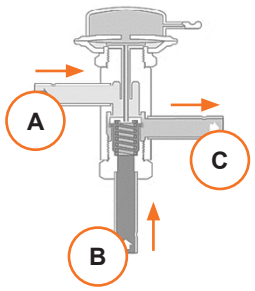
- The finned-tube heat exchanger provides high heat-dissipating efficiency and is convenient for maintenance.

5.9.3. Receiver

- The receiver stores refrigerant to help fulfill the needs for low temperature load in winter and high temperature load in summer;
- There are three connection ports in the receiver to connect refrigerant inlet pipe, refrigerant outlet pipe, and safety valve.

5.9.4. Head pressure valve

- The head pressure valve is a three-way modulating valve that responds to discharge pressure. When the discharge pressure falls below a certain value, the discharge port is opened and the discharge gas bypasses the condenser. When the discharge pressure is high, the discharge port is closed and there is full liquid flow to the condenser.



A	Connected with discharge pipe
B	Connected with condenser
C	Connected with receiver

5.9.5. Surface heater pad

- The receiver is equipped with a surface heater pad. The operation of this heater is controlled by a pressure switch, based on the pressure of refrigerant in the receiver.

5.9.6. Pressure switch

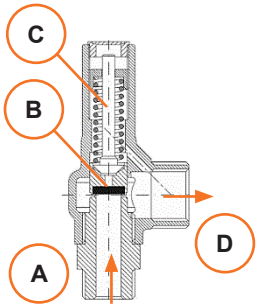
- Pressure switch controls the heater pad;
  - → When the refrigerant pressure in the receiver is lower than 1.4 MPa, the pressure switch will be closed and the heater pad will start heating;
  - → When the refrigerant pressure in the receiver is higher than 1.9 MPa, the pressure switch will be opened and the heater pad will stop heating.

5.9.7. Check valve

- Check valve is installed between the head pressure valve and the receiver on the liquid line, to prevent the refrigerant from flowing back to the condenser;
- The arrow on the valve indicates the direction of the flow and it should point towards the receiver.

5.9.8. Pressure safety valve

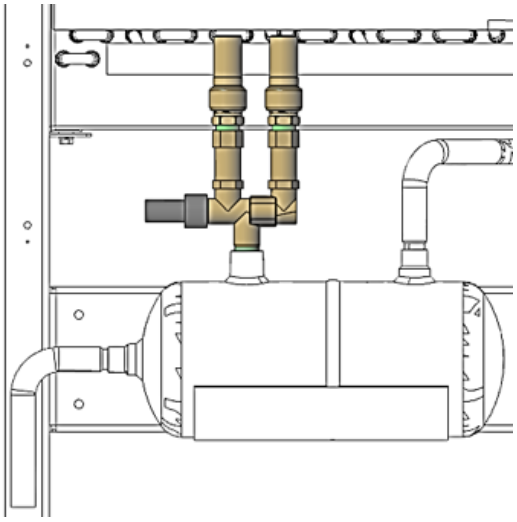
- The safety valve provides protection against possible overpressures of the refrigerating system;
- If the pressure in the system exceeds the set pressure of the safety valve, the valve opens and relieves excess pressure from vessels or equipment.



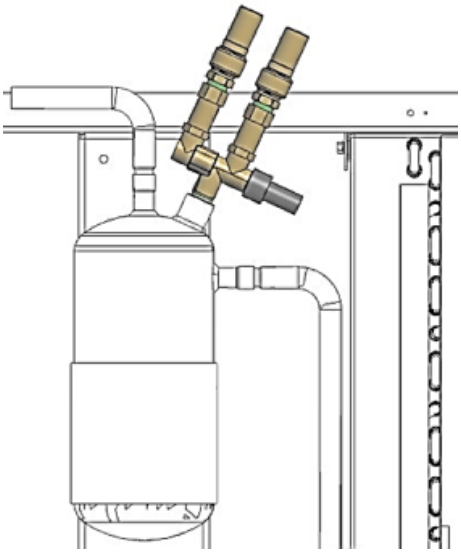
A	Inlet from the circuit or pressure vessel
B	Closing disc
C	Spring
D	Discharge outlet

5.10. Optional accessory

5.10.1. Changeover valve for pressure safety valve



Example of changeover valve for pressure safety valve for OAC017xVR



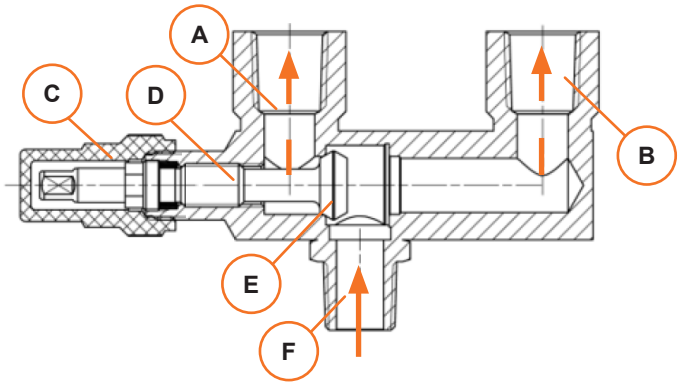
Example of changeover valve for pressure safety valve for OAC017xHR

- The changeover valve is a service devicefor dual pressure relief valve assembly;
- It allows the user to perform maintenance or replacement on the isolated valve while the system remain operational and protected by the other valve in the assembly.

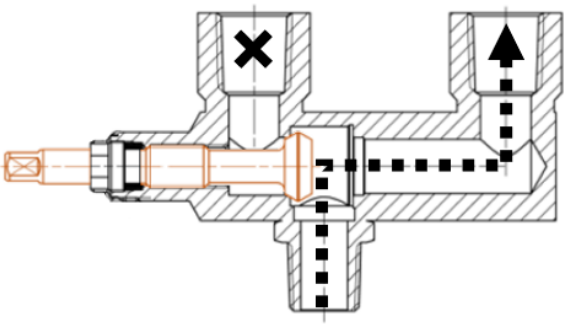
NOTICE

- The device is designed to never allow to close off both ports at the same time.
- Under working conditions, the shutter must be clamped against one of the seats of the valve to always ensure full discharge capacity of the corresponding safety valve.
- Intermediate working position of the shutter is not acceptable.

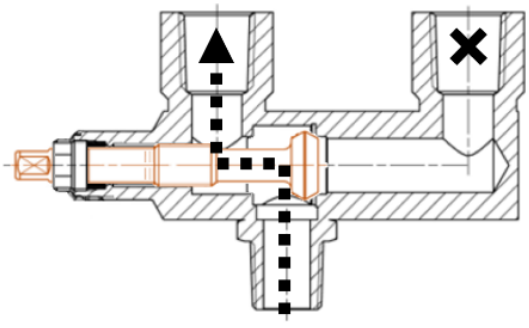
The condenser cannot be connected to the refrigerant system without the pipe kit section.



A	Mounting port for safety valve A
B	Mounting port for safety valve B
C	Protective cap
D	Spindle
E	Shutter
F	Inlet from the circuit or vessel

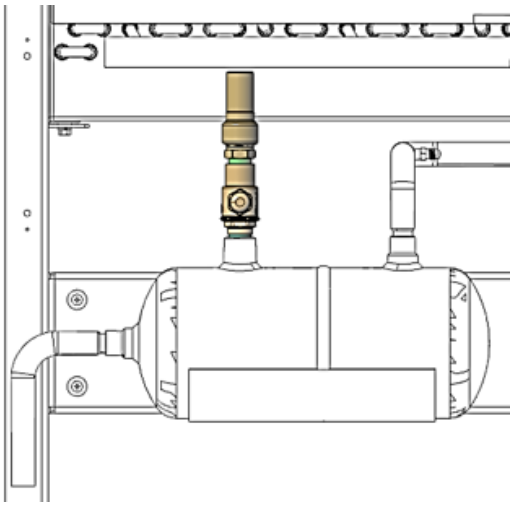


Safety valve B connected

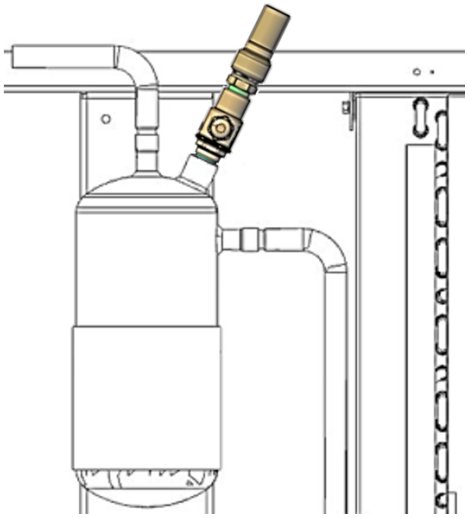


Safety valve A connected

5.10.2. Shut-off valve for pressure safety valve



Example of shut-off valve for pressure safety valve for OAC017xVR



Example of shut-off valve for pressure safety valve for OAC017xVR

- The shut-off valve is installed between the liquid receiver vessel and the pressure safety valve;
- Closing the shut-off valve allows removing of the valve for periodic checking or replacement without draining the refrigerant system.

NOTICE

The spindle of the shut-off valve is protected by a cap screwed on the valve body.

The cap is secured by a seal.

WARNING

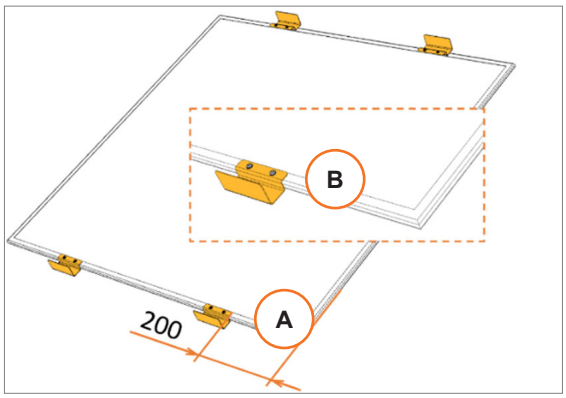
During operation of the refrigerant system, the shut-off valve needs to remain always open, and the protective cap needs to be sealed to avoid unauthorized operation of the valve.

- Any closing intervention must be performed with the refrigerant system stopped.
- Closing intervention can be performed only by:
  - → Staff authorized to work on the system;
  - → Public servant of Competent Body.
- Before restarting the refrigerant system, the shut-off valve needs to be fully open, the protective cap must be re-attached and sealed.

5.10.3. Metallic filter for inlet surface

The purpose of this accessory is to protect the inlet surface of the condenser coil and to keep out debries which could damage or clog the coil.

5.10.3.1. Filter assembly

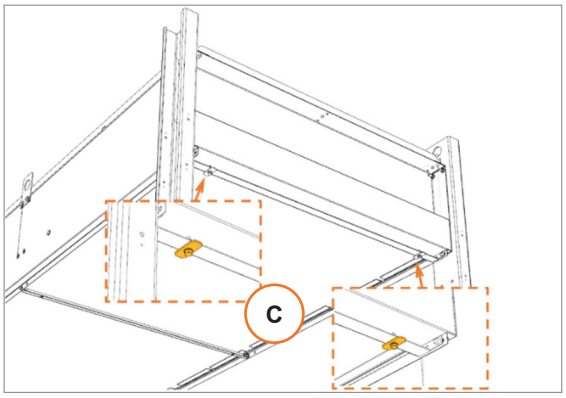


Prepare the filters panels before assembly – attach the brackets to the filter frame.

Add 4 brackets [**A**] to each filter frame on the longer side of the filter.

NOTICE

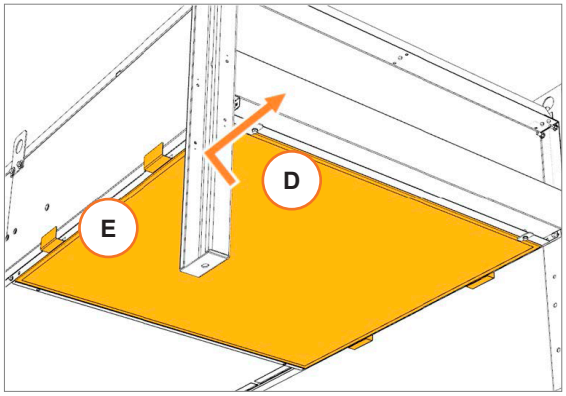
- The filter frame is not a square.
- The brackets need to be located on the longer side of the frame.



Correct location should be approximately 200mm from the corner.

Secure each bracket with 2 self-drilling screws [**B**] (supplied).

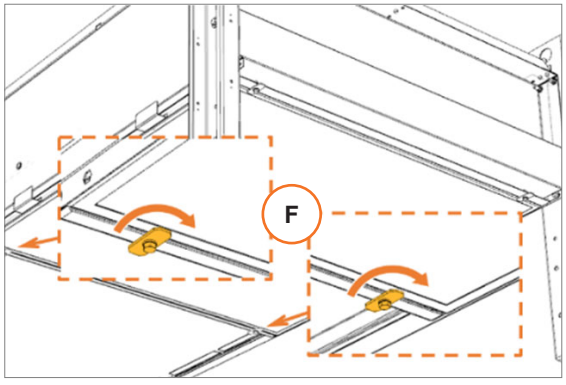
Turn the latches [**C**] into 90° position relative to the condenser frame.



Insert the filter into position under the latches [**D**].

Make sure the brackets [**E**] are located over the side of the condenser frame.

Push the filter into the condenser frame.



Turn the latches [**F**] to secure the filter.

For 2 and 3 fan units, repeat the procedure to cover entire inlet surface of the condenser.

5.11. External refrigerant piping requirements

Prepare the piping for connecting the remote condenser to the main unit according to the following specifications.

Material

Soft or hard copper

Diameter and thickness

See *6.2.5 Refrigerant piping diameters and thickness*

NOTICE

The guarantee becomes invalid if you do not respect the diameters given in this manual.

If you need to use piping with a larger diameter (for example for long winding runs), please contact Vertiv™ Technical Support.

NOTICE

Refrigerant **R513A** requires piping and fitting with a minimum thickness of 1,5 mm. when the external diameter is bigger than 18 mm.

Thermal insulation

Wrap the piping by thermal insulating material.

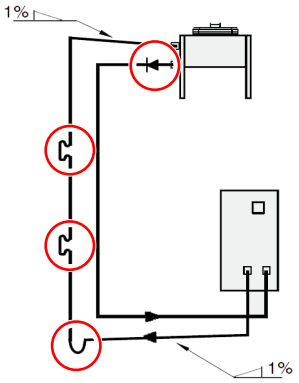
NOTICE

IMake sure that no electrical cables are in contact with piping that is not thermally insulated. The high temperature of the piping would damage the cables.

Check valve

NOTICE

It is mandatory to install a check valve at the condenser outlet.



Piping gradient

- Lay the horizontal gas piping with a 1% downward gradient along the refrigerant flow.

Oil traps

- Create oil traps as following:
  → every 6 m. of piping;
  → before each lift in the horizontal discharge line.

Piping layout

- Keep the piping as short as possible. This helps to minimize the total charge of refrigerant and the pressure drops,
- Avoid bends as much as possible. Make bends with large radius (bending radius at least equal to the pipe diameter);
- For hard copper piping use preformed curves. You may bend soft copper piping by hand or by a bending tool;
- Keep a separation of at least 20 mm. between the gas and the liquid piping. If this is not possible then insulate both the piping;
- Support both the horizontal and the vertical piping by vibration dampening clamps that include rubber gaskets. Place the clamps every 1,5-2 m.

Condenser matching

The condenser pipe kit includes a pressure safety valve.

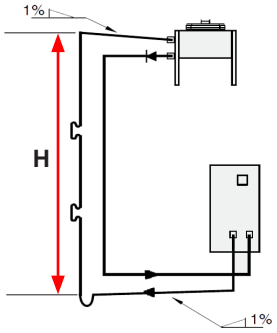
The PS for condensers **OAC0xx** is 22,9 bar.

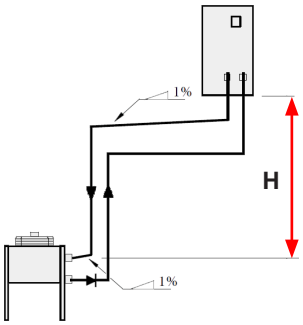
The PS for condensers **OACHxx** is 30 bar.

Installation conditions

NOTICE

It is recommended to install the condenser at higher level with respect to the unit.





H = level difference between the unit delivery and the condenser inlet.

L = total linear length of the piping + equivalent length of curves and valves.

Installation condition		Condenser	Check valve on return line			Liquid line thermal insulation
			Pipe kit option:			
			S	R	L	
L < 60 m.	-3 m. < **H** < 20 m.	Standard	Mandatory	Included	Included	Mandatory
L < 100 m.	-8 m. < **H** < 30 m.	20% oversized	Mandatory	Included	Included	Mandatory
L < 60 m.	-15 m. < **H** < -8 m.	30% oversized	Mandatory	Included	Included	Mandatory

NOTICE

- A check valve needs to be installed in the refrigerant return line, close to the condenser;
- The purpose is to prevent the liquid refrigerant from draining back into the condenser when the system is **OFF**.

NOTICE

- Insulation of the gas line is just for safety oraestetic reasons;
- Insulation waterproof and UV resistant.

6. Technical Data and Performance

6.1. Technical Data and Performances

Condenser model	Fan type	Power supply	Heat Rejection	Airflow	Power input	Current absorption	FLA
			[kW]	[m³/h]	[kW]	[A]	[A]
		[V/Ph/Hz]	C1	C1	C1	C1	
OAC017	Standard	230 V 1ph 50-60 Hz	20,1	6130	0,7	3,410	4,0
OAC033			29,1	7240	0,5	2,000	3,0
OAC042			46,2	16260	0,9	3,740	6,0
OAC058			53,5	15540	0,9	3,900	6,0
OACH58			53,5	15540	0,9	3,900	6,0
OAC087			79,9	23250	1,4	5,750	9,0
OACH87			79,9	23250	1,4	5,750	9,0
OAC095			86,6	21790	1,4	6,040	9,0

Total Heat Rejection* @ R513A; Delta (T saturated condensing - T air inlet) = 15K; T coil air inlet = 35°C; Liquid subcooling = 3K; Installation height = 0 m. above the sea level; clean exchange surfaces.
Noise Level** Sound Pressure Level measured with horizontal installation in the same operative conditions, referred to 5 m. far from the unit, in a free field over a reflecting plane (according to EN13487).

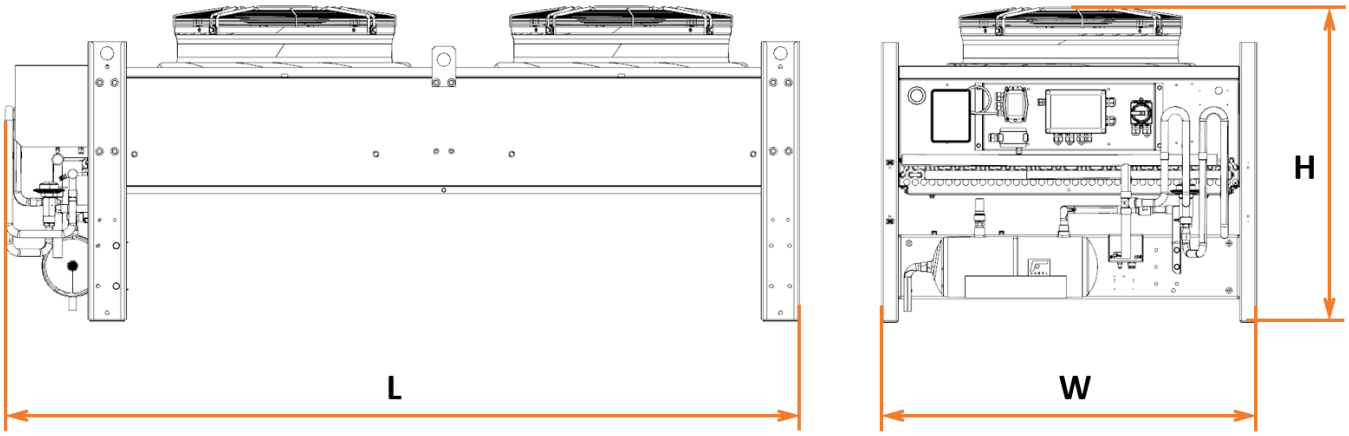
6.2 Unit noise data

Unit Model	Level	Octave band frequency (Hz)								Sound level
		63	125	250	500	1000	2000	4000	8000	[dB(A)]
OAC017	SPL @1M	35,6	47,3	51,7	59,1	63	59,4	53,3	45,4	**66,2**
	SPL @5M	24,8	36,6	40,9	48,3	52,2	48,6	42,5	34,6	**55,4**
	PWL	76,8	78,6	75,4	77,4	78	73,2	67,3	61,5	**81,2**
OAC033	SPL @1M	29,7	40,5	46,7	48,6	53,1	51,7	44,5	37,4	**57,2**
	SPL @5M	19,2	30,1	36,3	38,1	42,7	41,2	34,1	26,9	**46,7**
	PWL	71,4	72,2	70,9	67,3	68,6	66	59,1	54	**72,6**
OAC042	SPL @1M	28,8	42	48,3	50,1	54,5	53,2	46,3	38,9	**58,6**
	SPL @5M	18,9	32	38,3	40,2	44,6	43,3	36,4	29	**48,7**
	PWL	71,3	74,4	73,2	69,6	70,8	68,3	61,6	56,3	**74,9**
OAC058	SPL @1M	29,7	42,1	48,4	50,2	54,7	53,4	46,4	39,1	**58,8**
	SPL @5M	19,8	32,2	38,5	40,3	44,8	43,4	36,5	29,2	**48,9**
	PWL	72,2	74,6	73,3	69,7	70,9	68,4	61,7	56,5	**75**
OACH58	SPL @1M	29,7	42,1	48,4	50,2	54,7	53,4	46,4	39,1	**58,8**
	SPL @5M	19,8	32,2	38,5	40,3	44,8	43,4	36,5	29,2	**48,9**
	PWL	72,2	74,6	73,3	69,7	70,9	68,4	61,7	56,5	**75**
OAC087	SPL @1M	29,1	41,4	47,6	49,6	54	52,7	45,9	38,7	**58,1**
	SPL @5M	19,6	31,9	38,2	40,1	44,5	43,2	36,4	29,3	**48,6**
	PWL	72,2	74,5	73,2	69,7	70,9	68,5	61,9	56,8	**75**
OACH87	SPL @1M	29,1	41,4	47,6	49,6	54	52,7	45,9	38,7	**58,1**
	SPL @5M	19,6	31,9	38,2	40,1	44,5	43,2	36,4	29,3	**48,6**
	PWL	72,2	74,5	73,2	69,7	70,9	68,5	61,9	56,8	**75**
OAC095	SPL @1M	30,8	41,7	47,9	49,9	54,4	53	46	39	**58,4**
	SPL @5M	21,3	32,2	38,4	40,4	44,9	43,5	36,6	29,5	**48,9**
	PWL	74	74,8	73,5	70	71,3	68,7	62	57,1	**75,4**

@ Tamb = 35°C; Tc = 50°C; SC = 8,3K; 100% fan modulation

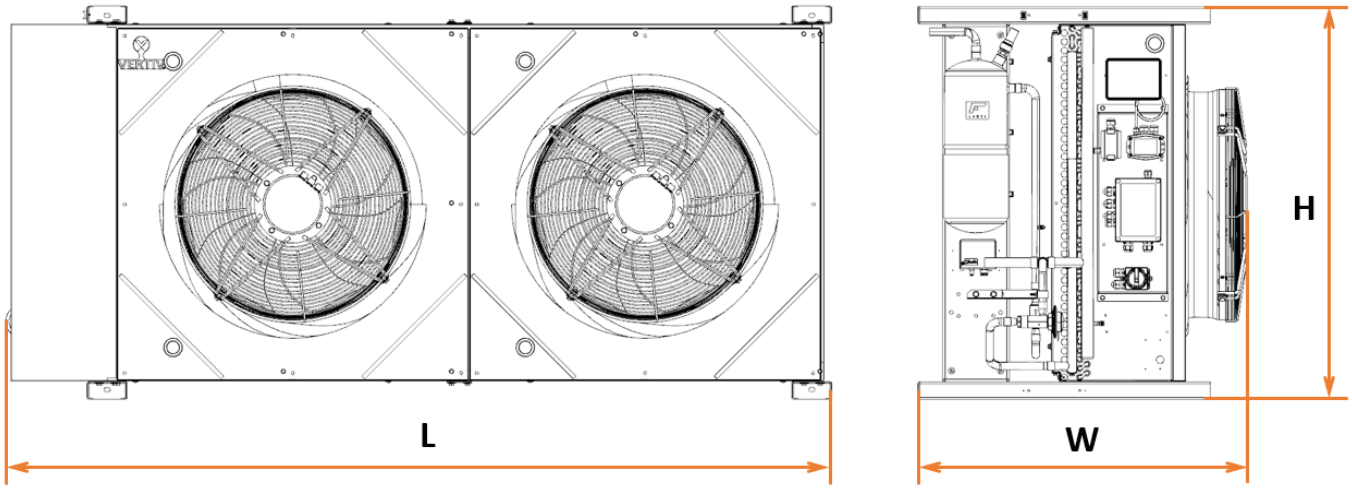
6.3. Installation dimensions

6.3.1. Base dimensions for installation with vertical airflow



Model	Dimension		
	L [mm]	W [mm]	H [mm]
OAC017*VS	1054	892	950
OAC017*VR	1054	892	950
OAC017*VL	1119	892	950
OAC033*VS	1330	1113	936
OAC033*VR	1330	1113	936
OAC033*VL	1359	1113	936
OAC042*VS	2330	1113	936
OAC042*VR	2330	1113	936
OAC042*VL	2359	1113	936
OAC058*VS	2330	1113	936
OAC058*VR	2330	1113	936
OAC058*VL	2359	1113	936
OAC087*VS	3330	1113	936
OAC087*VR	3330	1113	936
OAC087*VL	3359	1113	936
OAC095*VS	3330	1113	936
OAC095*VR	3330	1113	936
OAC095*VL	3359	1113	936

6.3.2. Base dimensions for installation with horizontal airflow



Model	Dimension		
	L [mm]	W [mm]	H [mm]
OAC017*HS	1054	950	892
OAC017*HR	1054	950	898
OAC017*HL	1117	950	898
OAC033*HS	1330	936	1113
OAC033*HR	1330	936	1113
OAC033*HL	1345	936	1113
OAC042*HS	2330	936	1113
OAC042*HR	2330	936	1113
OAC042*HL	2345	936	1113
OAC058*HS	2330	936	1113
OAC058*HR	2330	936	1113
OAC058*HL	2345	936	1113
OAC087*HS	3330	936	1113
OAC087*HR	3330	936	1113
OAC087*HL	3345	936	1113
OAC095*HS	3330	936	1113
OAC095*HR	3330	936	1113
OAC095*HL	3345	936	1113

6.4 Unit weight

Model	Total unit weight	Brutto weight	Packaging weight
	[kg]	[kg]	[kg]
OAC017	34,9	56,3	21,4
OAC033	85,9	125,9	40
OAC042	118,6	178,6	60
OAC058	126,6	186,6	60
OAC087	182,40	265,4	83
OAC095	202,1	285,1	83

6.5. Safety device settings

Model	HP switch	Safety valve
OAC017 OAC033 OAC042/058 OAC087/095	Open: 20,8 +0/-1,4 bar(g) Manual reset: 14,8 ±2 bar(g) Normally closed. Durability 10 000 times	Setting 22,9 bar(g) Over pressure 10% Closing variation 15%
OACH058 OACH087	Open: 27 ±0,7 bar(g) Manual reset: 20 ±1 bar(g) Normally closed. Durability 10 000 times	Setting 30 bar(g) Over pressure 10% Closing variation 15%

6.6. Internal volume

6.6.1. Internal volume for condenser units with vertical airflow

Model	Coil volume	Liquid receiver	Pipe kit	Total
	[L]	[L]	[L]	[L]
OAC017*VS	6,40	4,6	0,11	**11,11**
OAC017*VR	6,40	4,6	0,22	**11,22**
OAC017*VL	6,40	4,6	0,89	**11,89**
OAC033*VS	12,40	10,7	0,11	**23,21**
OAC033*VR	12,40	10,7	0,21	**23,31**
OAC033*VL	12,40	10,7	0,88	**23,98**
OAC042*VS	18,30	10,7	0,11	**29,11**
OAC042*VR	18,30	10,7	0,21	**29,21**
OAC042*VL	18,30	10,7	0,88	**29,88**
OAC058*VS	18,30	10,7	0,11	**29,11**
OAC058*VR	18,30	10,7	0,21	**29,21**
OAC058*VL	18,30	10,7	0,88	**29,88**
OAC087*VS	26,70	10,7	0,11	**37,51**
OAC087*VR	26,70	10,7	0,21	**37,61**
OAC087*VL	26,70	10,7	0,88	**38,28**
OAC095*VS	35,80	10,7	0,11	**46,61**
OAC095*VR	35,80	10,7	0,21	**46,71**
OAC095*VL	35,80	10,7	0,88	**47,38**

6.6.2. Internal volume for condenser units with horizontal airflow

Model	Coil volume	Liquid receiver	Pipe kit	Total
	[L]	[L]	[L]	[L]
OAC017*HS	6,40	4,6	0,08	**11,08**
OAC017*HR	6,40	4,6	0,27	**11,27**
OAC017*HL	6,40	4,6	0,53	**11,53**
OAC033*HS	12,40	10,7	0,08	**23,18**
OAC033*HR	12,40	10,7	0,30	**23,40**
OAC033*HL	12,40	10,7	0,59	**23,69**
OAC042*HS	18,30	10,7	0,08	**29,08**
OAC042*HR	18,30	10,7	0,30	**29,30**
OAC042*HL	18,30	10,7	0,59	**29,59**
OAC058*HS	18,30	10,7	0,08	**29,08**
OAC058*HR	18,30	10,7	0,30	**29,30**
OAC058*HL	18,30	10,7	0,59	**29,59**
OAC087*HS	26,70	10,7	0,08	**37,48**
OAC087*HR	26,70	10,7	0,30	**37,70**
OAC087*HL	26,70	10,7	0,59	**37,99**
OAC095*HS	35,80	10,7	0,08	**46,58**
OAC095*HR	35,80	10,7	0,30	**46,80**
OAC095*HL	35,80	10,7	0,59	**47,09**

7. Handling

7.1 Safety Instructions

WARNING

Improper handling can cause injury or death.
Only authorized personnel is allowed to move, lift, remove packaging from or prepare the unit for installation.
The authorized personnel must be properly trained and qualified, wear appropriate personal protective equipment and use adequate moving equipment (cranes, forklift, etc.).

WARNING

Make sure to use transport and lifting equipment rated for the unit dimensions and weight. See *Annex I – Dimensions and Weights.*

The center of gravity varies depending on the unit size and selected options. The slings must be equally spaced on either side of the center of gravity.

WARNING

Never walk or stay below a suspended load.

CAUTION

Sharp edges, splinters and exposed fasteners.

Can cause injury!

Only properly trained and qualified personnel wearing appropriate, protective equipment should attempt to move, lift, or remove packaging from the unit in preparation for unit installation.

Wear protective gloves before operating on the unit.

NOTICE

Improper handling can cause product damage.

Risk of doorway/hallway interference.

The unit may be too large to fit through a doorway or hallway while on the skid.

Measure the unit and passageway dimensions, and refer to the installation plans prior to moving the unit to verify clearances.

7.2 Inspection

- After receiving the product, check the accessories against the packing list;
- Carefully inspect all items for visible or concealed damage;
- If any parts are found missing or damaged, please report to the carrier immediately;
- If you find any damage, please report to the carrier and to the local distributor too.

7.3. Storage

You may keep the unit in a storehouse with the following ambient conditions:

Item	Requirement
Storage environment	Clean (no dust), well-ventilated indoor environment.
Ambient temperature	-40°C … +70°C
Ambient humidity	5%RH … 85%RH
Storage time	The total storage time should not exceed six months. Otherwise, the performance needs to be re-calibrated.

NOTICE

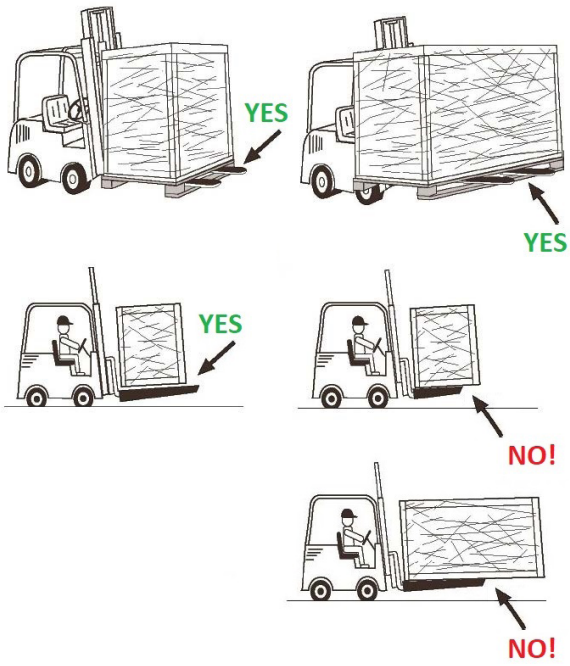
- These requirements are valid only for the unit without refrigerant charge.
- If the condenser is assembled with the main unit and the whole system is charged with refrigerant, and then put in a storehouse, there is a risk of overpressure in a lower ambient temperature range.
- Please refer to the main unit manuals for allowed ambient temperatures with refrigerant charge.

7.4. Transport – with package

Use mechanical transport equipment such as a forklift when unloading or moving the packed unit to the installation site.

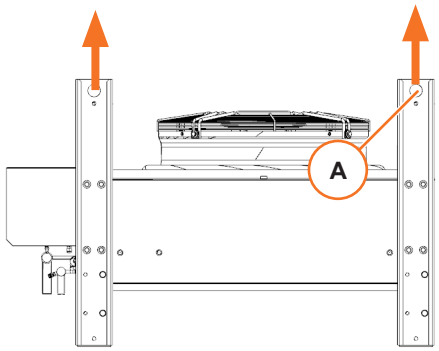
When a forklift is used to unload and move the packed unit:

• Insert the tines of the forklift following the direction shown in the figure.



7.5 Unpacking & assembly

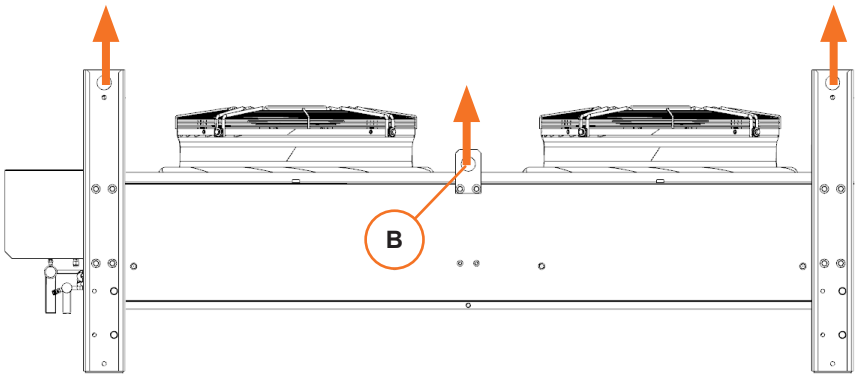
7.5.1. Lifting of the condenser unit

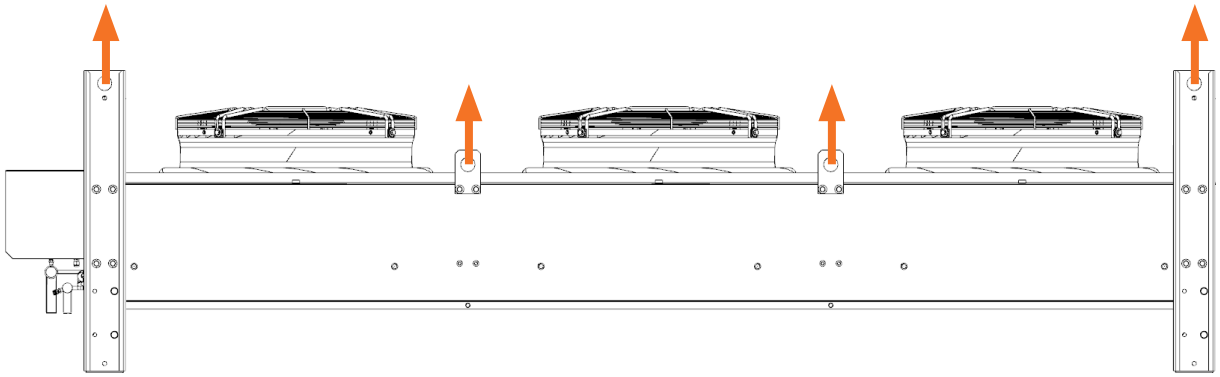


Using available lifting points on the supporting legs **[A]** and additional lifting brackets **[B]**, lift the unit from the package.

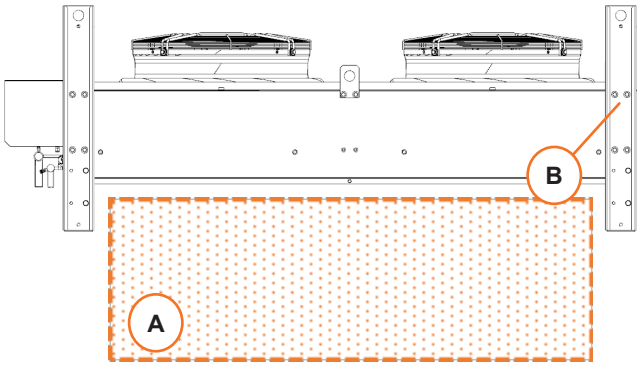
CAUTION

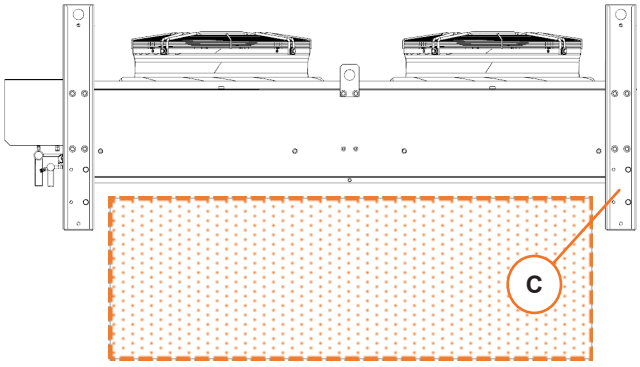
- Use suitable spreader beam for lifting the unit.
- Make sure that the spreader bars are wider than the unit. If the spreader bars are too short, the slings may crush the unit.
- The lifting force needs to be vertical to avoid damage of the structure of the unit.
- Lift the unit with reasonable speed to avoid additional dynamic load.
- The lifting equipment needs to be rated for the weight of the unit. See chapter *6.3 – Unit weight*.

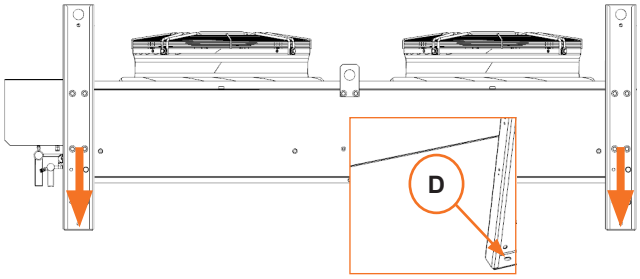




7.5.2. Unit installation for vertical airflow







• After lifting the unit from the package, place it on a suitable workbench or supports **[A]**.

• Remove the 4 bolts **[B]** holding each leg on the unit.

• Re-attach the legs in final position **[C]** and fix each leg with 4 bolts.

CAUTION

• The workbench or supporting structure needs to be able to hold the weight of the condenser unit.

See chapter *6.3 – Unit weight*.

• The unit needs to lay on the outer diameter of the frame.

• Avoid any contact with the coil surface or the header assembly.

NOTICE

•The supporting structure needs to provide enough clerance so the legs could be attached in the final position without collision with the floor.

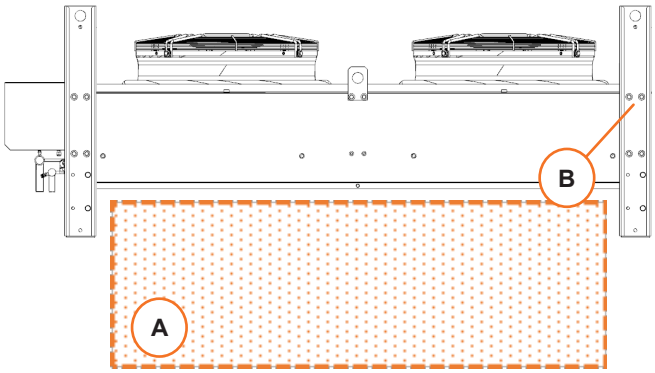
• Lift the unit from the workbench and move the unit to the final position.

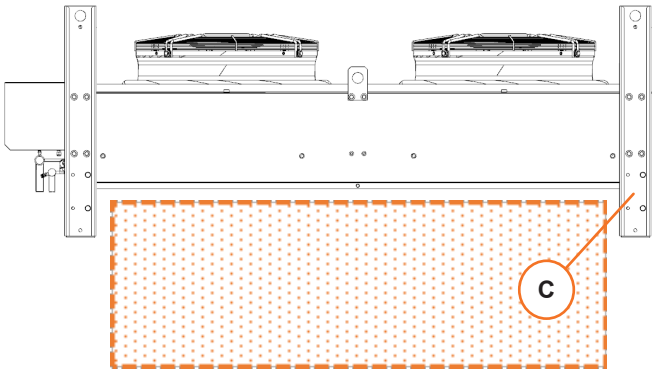
• In the final location, anchor the condenser unit to the base using the holes **[D]** in the supporting legs.

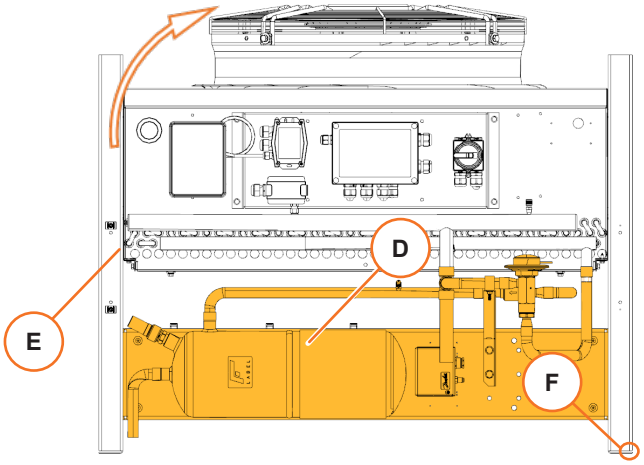
CAUTION

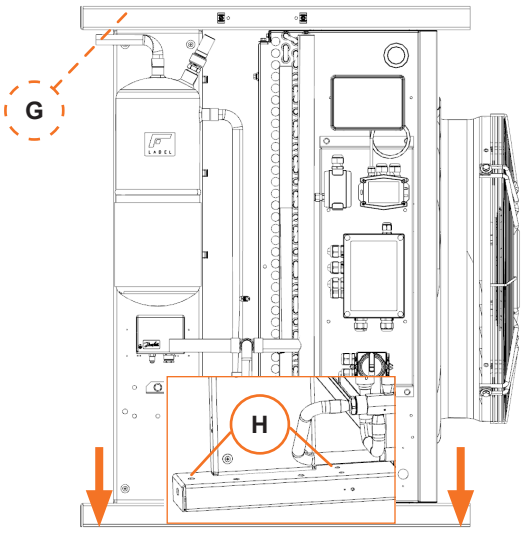
To anchor the unit to the floor or base, use bolt grade or chemical anchor meeting the local requirements.

7.5.3. Unit installation for horizontal airflow









- After lifting the unit from the package, place it on a suitable workbench or supports **[A]**;
- Remove the 4 bolts **[B]** holding each leg on the unit;
- Re-attach the legs in final position **[C]** and fix each leg with 4 bolts;
- Lift the unit from the workbench and move the unit to the final position.

CAUTION

- The workbench or supporting structure needs to be able to hold the weight of the condenser unit.
- See chapter *6.3 – Unit weight*.
- The unit needs to lay on the outer diameter of the frame.
- Avoid any contact with the coil surface or the header assembly.

NOTICE

The supporting structure needs to provide enough clerance so the legs could be attached in the final position without collision with the floor.

- Assemble the pipe kit **[D]** and connect it to the condenser unit. See *chapter 9 – Unit assembly*;
- Attach the lifting equipment to the lifting point **[E]** located in the middle of the supporting legs on left side of the condenser unit (when looking at the electric panel).

NOTICE

Use all legs on the side of the unit for lifting.

- Carefully start lifting the unit while using the legs on the opposite side as a pivoting point **[F]**.

CAUTION

Stabilize the pivoting point and avoid slipping of the unit.

- Turn the condenser unit on its side;
- Use these lifting points to carefully lift the unit and move it to the final position;
- Only for option *"S" – Safety valve + Shut off valve*, it is possible to remove the (now not needed) legs **[G]** from the unit;
- Anchor the condenser unit to the base using the available holes **[H]** in the supporting legs.

CAUTION

The supporting structure needs to provide enough clerance so the legs could be attached in the final position without collision with the floor.

8. Installation

8.1 Overview

The condenser unit is delivered assembled at the factory, including all the internal wiring.

The pipe kit needs to be attached on site.

The following operations must be done at the installation site:

Operation	See…
Prepare the unit and (if needed) adjust the leg height	*7.5.3. Unit installation for horizontal airflow*
Position the unit at the final location and fix it on the floor or the supporting structure.	*8.3 Location* *8.4 Space Requirements*
Connect the pipe kit with safety valve	
Connect the pipes to the main system	*8.5 Piping*
Connect the main switch to the electric power supply	*8.6 Electrical Connections*

8.2. Safety instructions

WARNING

Only authorized personnel are allowed to do installation operations.

The authorized personnel must be properly trained and qualified, wear appropriate personal protective equipment and use adequate tools.

CAUTION

Sharp edges, splinters, and exposed fasteners.

Wear protective gloves before operating on the unit.

NOTICE

Improper handling can cause product damage.

8.3. Location

Condensers should be installed in a location offering maximum security and access for maintenance.

The service clearance area must be respected.

Avoid areas prone to heavy snow or ice accumulations.

The installation site must guarantee a sufficient dispersion of the air to allow operation in even the severest conditions. **Vertiv™** recommends that condensers to be installed in an area with clean air, away from loose dirt and foreign matter that might clog the coil.

For roof installation, mount the condenser on suitable curbs or other supports in accordance with local rules.

Follow the installation arrows on the condenser for the installation.

Installation with vertical air flow:

- To allow sufficient air through the unit and space for any eventual maintenance, the Service Area should be left free of obstructions;
- With vertical air flow installation, a free area of at least 4 m. above the condenser must be guaranteed for a correct air circulation with the aim to avoid short-cut from discharge to suction air side of condenser.

Installation with horizontal air flow:

- To allow sufficient air through the unit and space for any eventual maintenance, the Service Area should be left free of obstructions.

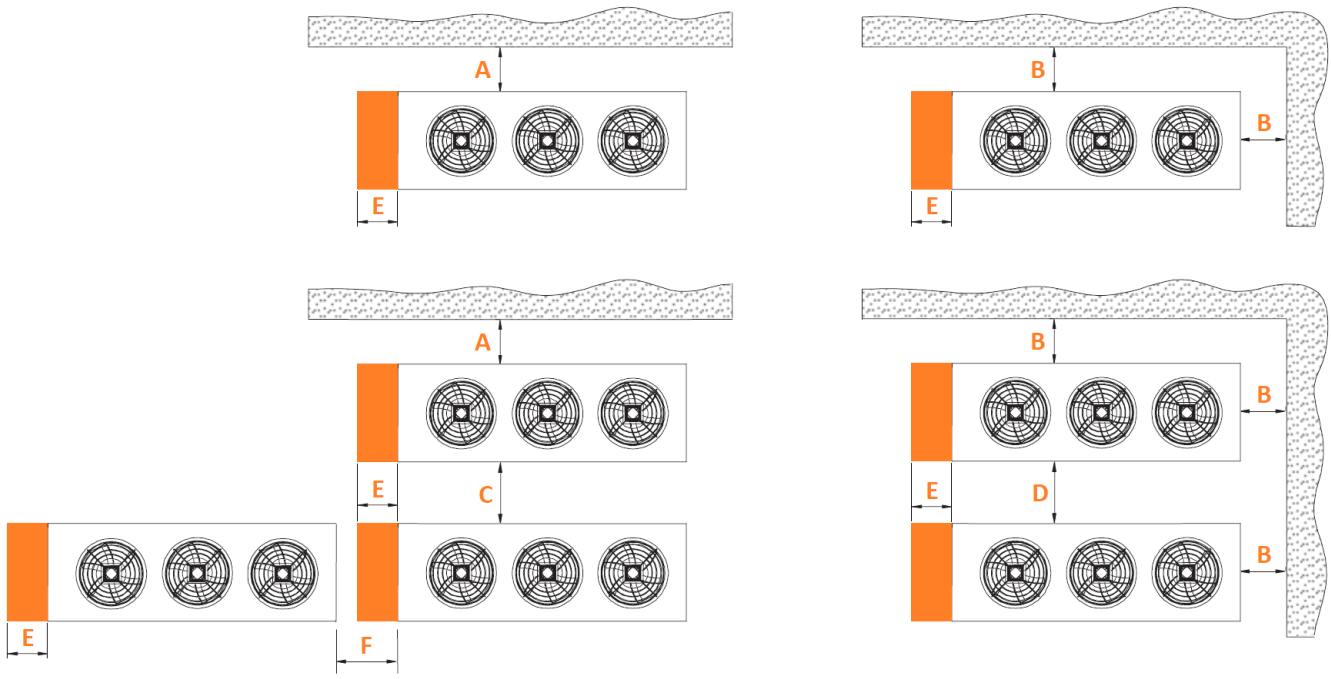
8.4. Space requirements

The condenser needs sufficient installation and service space around the installation place. The detailed space requirements are shown in Figures below:

NOTICE

Improper handling can cause product damage.

8.4.1. For units with vertical airflow

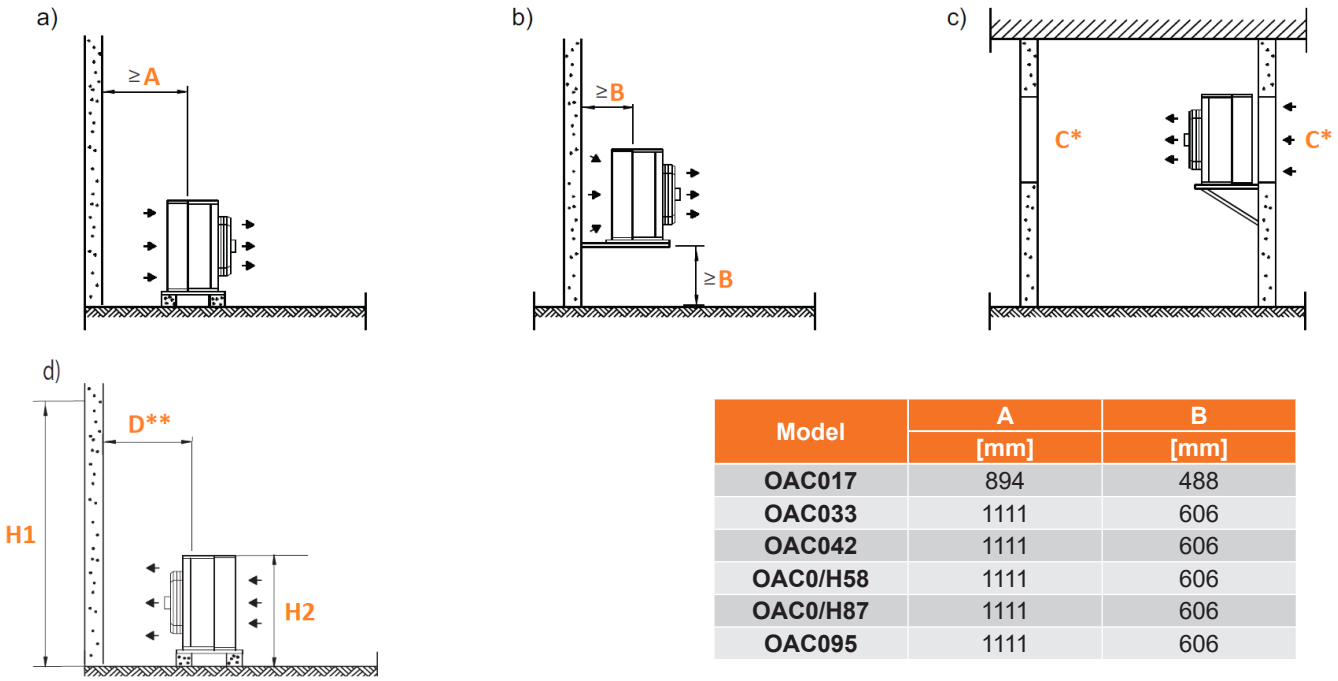


Model	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
OAC017	370	463	555	741	700	700
OAC033	464	580	695	927	700	700
OAC042	614	767	920	1227	700	767
OAC0/H58	614	767	920	1227	700	767
OAC0/H87	734	917	1100	1467	700	917
OAC095	734	917	1100	1467	700	917

NOTICE

Keep at least 0,7 m. service clearance **[E]** on the side of the condenser unit to allow maintenance access to electrical panel and pipe assembly.

8.4.2. For units with horizontal airflow



Model	A [mm]	B [mm]
OAC017	894	488
OAC033	1111	606
OAC042	1111	606
OAC0/H58	1111	606
OAC0/H87	1111	606
OAC095	1111	606

NOTICE

C* Air flow passage equal or greater than the front surface of the condenser.

D** If H1 > H2 → D ≥ 3000 mm.

If H1 ≤ H2 → D ≥ 1000 mm.

8.5 Piping

Release the pressure

NOTICE

• The circuit is pressurized by dry air or helium at 2 bar.

• Before welding the pipeline, discharge completely the circuit to release the pressure.

Connections

- The inlet and outlet directions are clearly marked with labels and arrows on the respective pipes;
- Pay attention to follow the directions.

Piping sizes

Model	Pipe IN	Pipe OUT
OAC017	22	28
OAC033	22	28
OAC042	22	28
OAC058	22	28
OAC087	22	28
OAC095	22	28

Keep clean

- Keep the pipes clean and dry;
- Ensure that the tubing surfaces to be brazed are clean and that the ends of the tubes have been carefully reamed to remove any burrs;
- Ensure that all loose material has been cleaned from inside the tubing before brazing.

Brazing

- Use copper piping with a brazing alloy with a minimum temperature of 732°C, such as Sil-Fos;
- Avoid soft solders such as 50/50 or 95/5;
- During brazing use pure dry nitrogen through the piping with a flow of 0.5-1.5 l/s.

CAUTION

When copper is heated in the presence of air, copper oxide forms. **POE** oil will dissolve these oxides from inside the copper pipes and deposit them throughout the system, clogging filter driers and affecting other system components.

Vibration

- Isolate piping from building using vibration isolating supports.

Refrigerant charge

NOTICE

- A not adequate charge of refrigerant could bring to inappropriate work of the refrigeration system.
- Refer to the main unit user manual for the refrigerant charge operation.

8.6. Electrical connections

8.6.1. General instructions

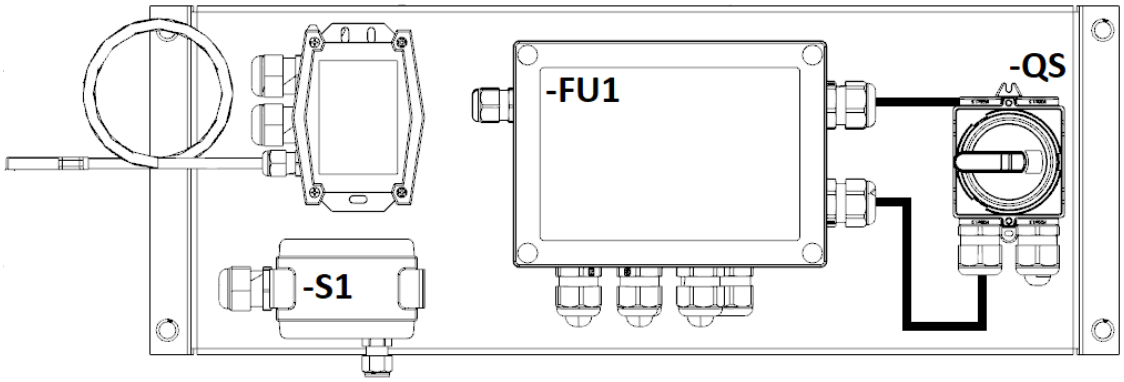
Specifications	• Check the electrical data on the label applied on the unit; • Check that the available power supply is consistent with the unit power requirements given in *6.1 Technical Data and Performances*; • Refer to the electrical schematic supplied with the condenser when making line voltage supply, low voltage main unit interlock and any low voltage alarm connections; • Make sure all electrical connections are tight; • Electrical service must conform to national and local electrical codes; • All wiring must be done in accordance with all applicable local, state, and national electrical codes; • Use copper wiring only; • For specific electrical requirements, see the electrical schematic provided with the unit; • The voltage supply to the condenser might be different from voltage supply to the main unit.
Outdoor	• The protection tube or shielded line is required for the outdoor part of the connecting cable between the main unit and the condenser.
Sealing	• When leading the cable through the joint, you are recommended to use the sealant for waterproof disposal; • If you do not follow the recommended cable sizes and mode to connect the cables, water leakage may occur at the waterproof joint.
Hot surfaces	• The cables cannot be in contact with hot objects, such as the copper pipe and water pipe without thermal insulation pipe, lest the insulation layers should be damaged.
Disconnecting switch and protection	• A manual electrical disconnect switch should be installed in accordance with local codes. • Select and install the line side electrical supply wire and over current protection device(s) according to the specifications on the unit nameplate(s), per the instructions in this manual and according to the applicable national, state, and local code requirements

8.6.2. Connection to the power supply

NOTICE

CoolPhase OAC Condensers are suitable for connection to power supplies with a solidly grounded neutral.

8.6.3. Wiring instructions

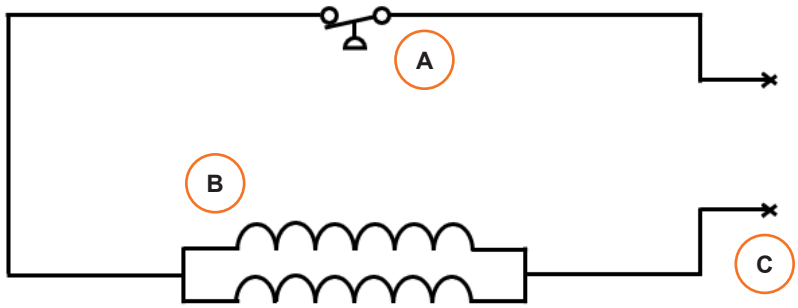


1. Route the power supply cable to the site disconnect switch and then to the unit (**QS**);
2. Route the conduit to the knockout provided in the bottom right end of the electrical control enclosure;
3. Connect the earth ground wire lead to the marked earth ground connection terminal provided near the factory-installed disconnect switch;
4. Connect the single-phase cable to the factory-installed disconnect switch.

8.6.4. Heater pad for the liquid receiver

- The liquid receiver is equipped with a heater pad;
- This device is controlled by a pressure switch based on the pressure of refrigerant in the receiver;
- For more information, see chapter *5.8 – Main component description*.

Circuit diagram:



A	Pressure switch
B	Heater pad
C	Power supply

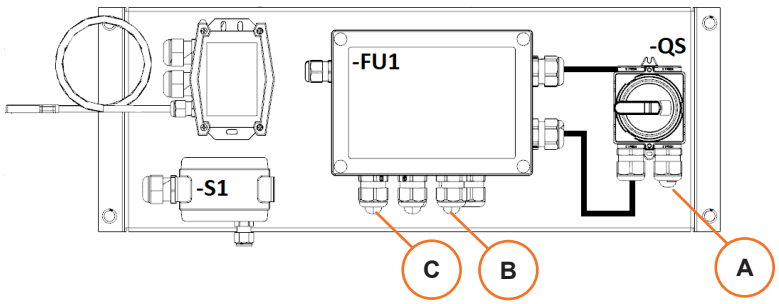
8.6.5. Controlled by indoor unit

NOTICE

Risk of control malfunction.
Can cause improper unit operation.
Make sure that all low voltage electrical wiring has been performed per the schematic diagram provided and that all low voltage wiring connections are tight.

Specifications

Modbus	**OAC EC** remote condensers are designed to use Modbus communication between **CoolPhase OAC Condensers** and **iCOM™** control on main unit. The Modbus wiring is field-supplied and must be: • shielded; • 24-18 AWG (0.20-0.82 mm²) stranded tinned copper until 107m, 18-16 AWG (0.82-1.31 mm²); • stranded tinned copper until 200 m.; • twisted pair (minimum 8 twists per foot); • low capacitance (17pF/ft or less); • plenum rated (NEC type CMP) if required by local codes; • UV and moisture resistant or run within conduit once in an outdoor environment, and must be temperature and voltage rated for conditions present. **Examples:** Belden part number 89207(plenum rated) or Alpha Wire part number 6454 (UV resistant outdoor rated) category 5, 5e or higher.
Cautions	• **Do not** run the Modbus cable in the same conduit, raceway or chase used for high-voltage wiring; • Mandatory shield connection to ground close Master (indoor unit control board); • For Modbus network lengths greater than 130 m., contact **Vertiv™** for assistance.
Addressing	All the **CoolPhase OAC Condensers** are shipped with standard fan addressing: 31, 32 (up to 3 fans). In case of dual circuit units, it is required to change the addressing of fan of the second circuit in 41, 42, 43, respectively.



A	Primary high voltage entrance	M20 cable gland
B	Modbus IN	M20 cable gland
C	Modbus OUT	M20 cable gland

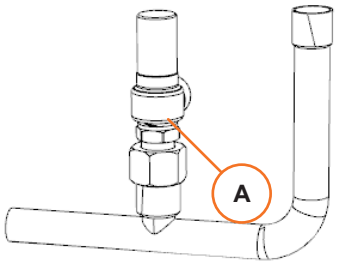
8.6.6. Fans

- During the commissioning phase, each remote condenser must work for **2 hours** with a fan speed above 80%;
- This grants proper lubrication on the bearings and avoid the presence of any condensate water inside the motor.

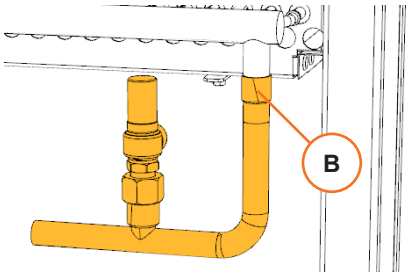
9. Pipe kit assembly

9.1. Option “S” – Safety valve + Shut off valve.

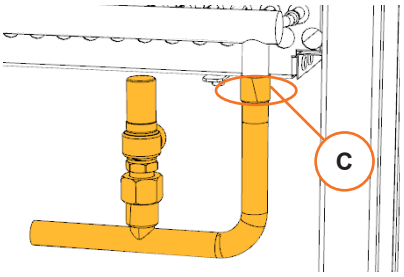
NOTICE
The pipe kit for installation with vertical and horizontal airflow is slightly different but the unit assembly procedure is the same for both versions.



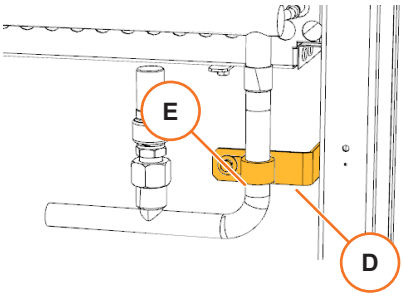
- The pipe kit is delivered in a box, pre-assembled, with attached safety valve **[A]**.



- Align the pipe to the outlet pipe from the condenser **[B]**.



- Braze the connecting pipes **[C]**.

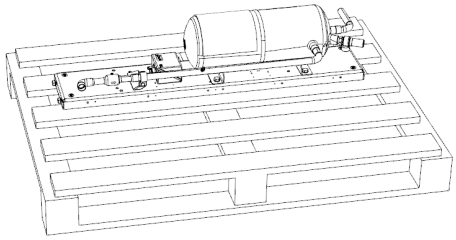


- Align the bracket **[D]** into suitable position;
- Fix the pipe to the bracket with provided mount, screw M6x25 **[E]** with washer and nut;
- **For OAC017** – Fix the bracket to the leg with provided self-drill screws;
- **For OAC033-095** – Fix the bracket to the leg with provided screw M8 with washers and nut.

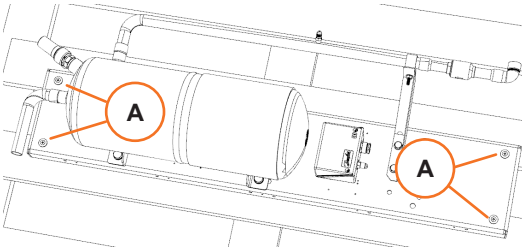
NOTICE
When welding the copper pipe with the inlet and outlet pipes of the condenser and the pipe kit, wrap a piece of wet cloth around components near the welding position to prevent any damage.

9.2. Option “R” – Liquid receiver + Safety valve + Shut off valve.

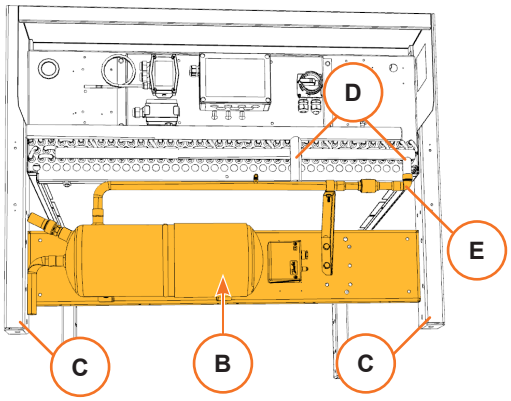
NOTICE
The pipe kit for installation with vertical and horizontal airflow is slightly different but the unit assembly procedure is the same for both versions.



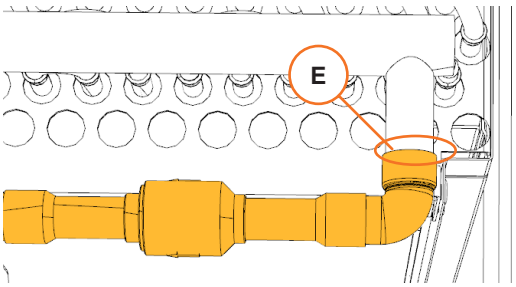
- The pipe kit is delivered pre-assembled and attached to a pallet.

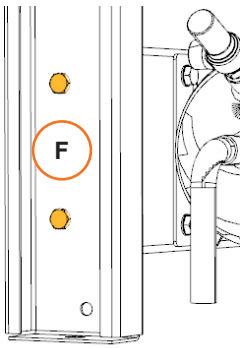


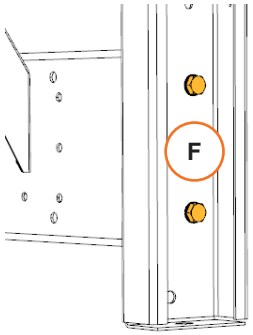
- Remove the **4** screws **[A]** which hold the pipe kit on the pallet.



- Slide the entire pipe kit **[B]** between the legs of the condenser unit **[C]**.
- Pay attention to the position of the connecting pipes on the header **[D]**.
- Adjust the length of the inlet and outlet pipes on the condenser.
- Slide the outlet pipe **[E]** on the connecting pipe of the header.
- Fix both ends of the pipe kit support plate on the legs **[F]**:





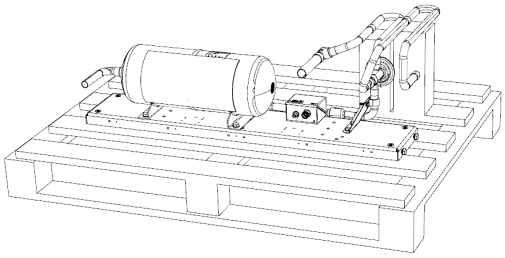


- Braze the connecting pipes **[E]**.

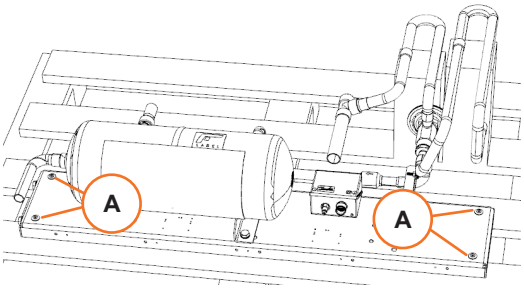
NOTICE
When welding the copper pipe with the inlet and outlet pipes of the condenser and the pipe kit, wrap a piece of wet cloth around components near the welding position to prevent any damage.

9.3.Option “L” – LAC Valve + Liquid receiver + Safety valve + Shut off valve.

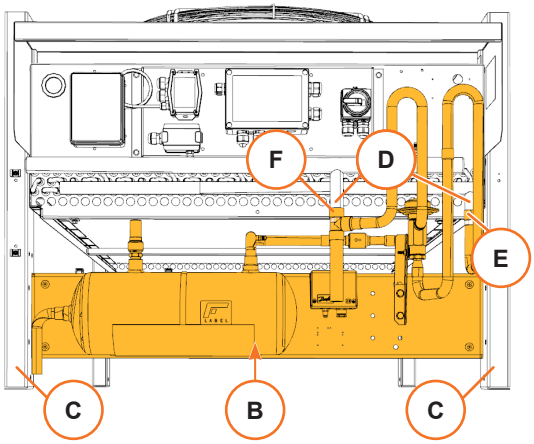
NOTICE
The pipe kit for installation with vertical and horizontal airflow is slightly different but the unit assembly procedure is the same for both versions.



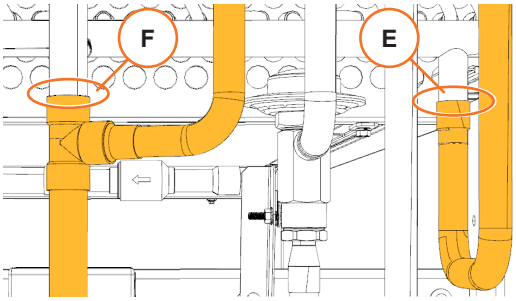
- The pipe kit is delivered pre-assembled and attached to a pallet.

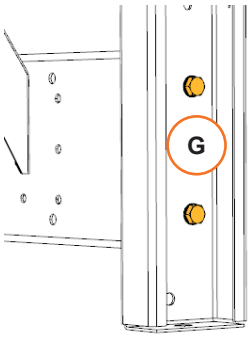


- Remove the **4** screws **[A]** which hold the pipe kit on the pallet.



- Slide the entire pipe kit **[B]** between the legs of the condenser unit **[C]**;
- Pay attention to the position of the connecting pipes on the header **[D]**;
- Adjust the length of the inlet and outlet pipes on the condenser;
- Slide the outlet pipe **[E]** and inlet pipe **[F]** on the connecting pipes of the header;
- Fix both ends of the pipe kit support plate on the legs **[G]**:





- Braze the inlet **[F]** and outlet **[E]** connecting pipes.

NOTICE
When welding the copper pipe with the inlet and outlet pipes of the condenser and the pipe kit, wrap a piece of wet cloth around components near the welding position to prevent any damage.

10. Unit controller

10.1.Controlled by indoor unit

10.1.1.Condensing unit address change procedure

The Control Firmware shall offer the possibility to change the Modbus address of one condensing unit which pre-set address is known.

The change address procedure shall be applied in two circumstances:

1. Commissioning of a system with two condensing units, **C1** and **C2**, which are powered through dedicated circuit breaker in the Electric Panel;
2. Replacement of a broken fan from Service with a new one pre-addressed with a known address (e.g. 50).

The procedure number one shall be dedicated to the change of the factory programmed addresses of the fans of the circuit number two, that in origin are identical to the ones of the circuit number one (31, 32, 33).

The Firmware shall have one dedicated page in the Service Menu. The user shall confirm that **C1** circuit breaker is **OFF** and **C2** is **ON**.

Then the operation shall occur for each fan connected, changing 31 to 41, 32 to 42, 33 to 43.

The user is finally told to do a power cycle of the fans with at least **20** seconds of **OFF** Power to memorize the new addresses.

The replacement of a broken fan with a new one is achieved connecting to fan of address number 50 (the new one installed by service). On connection detection a new page for changing the address shall be open asking for the new address. When it is confirmed, the user is finally told to do a power cycle of the fans with at least **20** seconds of **OFF** Power to memorize the new address.

10.1.2. Condensing unit not running for a long period

- If the condenser fans are not running for a long period (more than **30** days), they shall run at maximum speed for at least **2** hours;
- This grants proper lubrication on the bearings and avoid the presence of any condensate water inside the motor;
- The control is always monitoring the status, so in case the above condition has been not satisfied, a warning will be triggered: ***"Warning 257 'Too Long Fans Off Time'"***;
- This event can be automatically reset if during the normal operations the fans will operate on the above conditions. So, in case the warning is still active, please put the unit in manual mode and run the fans at least for **2** hours at a speed higher than 80%;
- After this procedure the warning will be reset, and the unit can be configured again in automatic mode.

NOTICE
During the commissioning phase, each remote condenser must work for **2** hours with a fan speed above 80%.

11. Maintenance and check

11.1. Refrigeration system

Perform the following steps for refrigeration system maintenance:

1. Check that the refrigeration pipes are firmly fixed. The refrigeration pipes shall not shake with the vibration of wall, earth, or equipment frame. Otherwise reinforce the refrigeration pipes with fastening objects;
2. Check that there is no oil on the accessories of all refrigeration pipes, and make sure that the pipes do not leak.

11.2. Heat exchanger

Perform the following steps for heat exchanger maintenance:

1. Clean the fin of heat exchanger regularly;
2. The best overall condenser coil cleaner to use is plain water or compressed air;
   - If the coil has been maintained and cleaned at regular intervals, water or compressed air is sufficient to remove dirt and debris from the fins;
   - Heavy build up on the exterior of the fins can be removed with a brush;
   - Water pressure from a garden hose and sprayer usually works well;
   - If the installation environment of the condenser does not allow the fins to be cleaned with water, the compressed air may be a better method;
   - The recommended pressure for the air is about 0.3 MPa.
3. Check for damaged or bent fins and straighten them as needed;
4. Avoid snow accumulation around the condenser in winter.

11.2.1. Frequency indication for coil cleaning procedures in different areas

The frequency of cleaning depends on the istallation area.

It is suggested to be no less than the one indicated on the table below:

Atmospheric corrosivity category (ISO 9223)	C1, C2	C3		C4	C5	C6
		Inland	Coastal			
Corrosivity	**Very low, low**	**Medium**	**Medium**	**High**	**Very high**	**Extreme**
Typical environment - examples	**Indoor, Rural areas**	**Urban areas**	**Urban areas**	**Polluted urban, industrial, coastal areas**	**Very high pollution & salt deposition areas**	**Extreme industrial, coastal areas**
Visual inspection	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Water rinse cleaning	Annually	Once a quarter	Once a quarter	Monthly	Monthly	Monthly
Cleaner cleaning	Biannually	Biannually	Biannually	Biannually	Biannually	Biannually

11.3. Fan

Check that the fan runs normally and check it for problems such as abnormal noise, vibration, and bearing failure.

12. Troubleshooting

Symptom	Possible cause	Check or remedy
Condenser will not start	No power to condenser.	Check voltage at input terminal block.
	Circuit breaker or fuse condenser is tripped.	Locate problem in condenser electrical panel and repair.
	Missing Modbus communication (only for Controlled Indoor Unit).	Check the cable connection. Check if the fans have the correct addressing.
Low discharge pressure	Faulty head pressure control valve	Replace if defective.
High discharge pressure	Dirty condenser fins.	Check for low-voltage signal from indoor unit.
	Condenser fans not operating.	Check fan motors and fuses.
	High refrigerant charge.	Check refrigerant charge.

13. Dismantling the unit

The machine has been designed and built to ensure continuous operation.

The working life of some of the main components, such as the fan, depends on the maintenance that they receive.

The machine must be dismantled if it is moved to another site, or at the end of its technical and operational life.

NOTICE

The unit contains substances and components hazardous for the environment (electronic components, lead gel battery, refrigerating gases and oils).

At the end of the useful life, when the unit is dismantled, the operation must be carried out by specialized refrigerating technicians.

The unit must be delivered to suitable centers specialized for the collection and disposal of equipment containing hazardous substances.

The lead gel battery, refrigeration fluid and the lubricating oil inside the circuit must be recovered according to the laws in force in the relevant country.

13.1. Safety instructions

Personnel

WARNING

Only authorized personnel are allowed to do dismantling operations;

The authorized personnel must be properly trained and qualified, wear appropriate personal protective equipment and use adequate tools.

Electric System

WARNING

Unit contains potentially lethal voltage in some circuits.

Risk of arc flash and electric shock.

Can cause injury or death.

Open all local and remote unit electric power disconnect switches, verify with a voltmeter that power is **OFF** and wear protective equipment per local standard before working within the electric control enclosure.

WARNING

The electric connection enclosures, the fan speed control and the **EC fan** enclosures can retain a stored high-voltage electrical charge for up to **10** minutes.

Risk of electric shock.
Can cause serious injury or death.

Before working within the unit electric connection enclosures or working within the fan speed control and the **EC fan** enclosures proceed as follows:

→ open all local and remote unit electric power disconnect switches.

→ wait **10** minutes.

→ verify with a voltmeter that power is **OFF**.

Only properly trained and qualified personnel may perform repair, maintenance, and cleaning.

Personal Protective Equipment		**CAUTION** The condenser is made of plates and fins, which may have sharp edges and burrs. Always wear cut resistant gloves when operating on the condenser.

13.2. Operations

Operation	Notes
1. Disconnect the main switch from the electric power supply.	Reverse the procedure from chapter: *8. Installation - 8.6 Electrical Connections*
2. Disconnect the Premium Controller from the main unit.	
3. Remove the refrigerant.	 **NOTICE** During the commissioning phase, each remote condenser must work for **2** hours with a fan speed above 80%. See *13. Regulation (EU) no. 517/2014 (F-gas)*
4. Cut the piping at inlet and outlet of the unit.	 **WARNING** Before cutting the pipeline, make sure that the circuit is completely discharged.
5. Remove the fixing bolts.	Reverse the procedure from chapter *7.5 Unpacking*
6. Move away the unit.	See chapter *7. Handling*
7. If you need to keep the unit in a storehouse for reuse.	See chapter *7.3 Storage*
8. If you need to scrap the unit.	Handle to authorized disposal company according to the local regulations about waste disposal.

14. Regulation (EU) No. 517/2014 (F-gas)

14.1 Introduction

Stationary air conditioners placed into the European Community market and operating with fluorinated greenhouse gases (F-gas, such as R407C, R134a, R410A), have to comply with the F-gas Regulation (EU) No. 517/2014.

This Regulation is in force since Jan 1, 2015 an it replaces the Regulation (EU) No. 342/2006.

This document summarizes the obligations for the operators that are responsible for the equipment during all its operative life until its disposal.

14.2 Normative references

F-gas	517/2014	Regulation (EU) No. 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No. 842/2006
Certified Personnel and Companies	2015/2067	Commission Implementing Regulation (EU) No. 2015/2067 of 17 November 2015 establishing, pursuant to Regulation (EU) No. 517/2014 of the European Parliament and of the Council, minimum requirements, and the conditions for mutual recognition for the certification of natural persons as regards stationary refrigeration, air conditioning and heat pump equipment, and refrigeration units of refrigerated trucks and trailers, containing fluorinated greenhouse gases and for the certification of companies as regards stationary refrigeration, air conditioning and heat pump equipment, containing fluorinated greenhouse gases.
Leak check Air conditioning	1516/2007	Commission Regulation (EC) No. 1516/2007 of 19 December 2007 establishing, pursuant to Regulation (EC) No. 842/2006 of the European Parliament and of the Council, standard leakage checking requirements for stationary refrigeration, air conditioning and heat pump equipment containing certain fluorinated greenhouse gases.
Leak check Fire protection systems	1497/2007	Commission Regulation (EU) No. 1497/2007 of 18 December 2007 establishing, pursuant to Regulation (EC) No. 842/2006 of the European Parliament and of the Council, standard leakage checking requirements for stationary fire protection systems containing certain fluorinated greenhouse gases. From 01/01/2017 to be replaced by: Commission Implementing Regulation (EU) No. 2015/2068 of 17 November 2015 establishing, pursuant to Regulation (EU) No. 517/2014 of the European Parliament and of the Council, the format of labels for products and equipment containing fluorinated greenhouse gases.

14.3 Fluorinated Greenhouse Gasses

Following notes must be considered when operating with the above-mentioned equipment:

- Fluorinated greenhouse gases are covered by the Kyoto Protocol.
- The fluorinated greenhouse gases in this equipment should not be vented to the atmosphere.
- Referring to the value noted in Annex I and Annex IV of Regulation (EU) No. 517/2014 here below the Global Warming Potential (**GWP**) of some major F-gases or mixtures:

  - R-513A GWP 631
  - R-134a GWP 1430
  - R-407C GWP 1774
  - R-410A GWP 2088

NOTE: *The refrigerants as R22 are not F-gas and their relevant regulation is Regulation (EU) No. 1005/2009.*

14.4 Operators

14.4.1 Definitions

Operator, according to Regulation (EU) No. 517/2014 Article 2, point 8, means the natural or legal person exercising actual power over the technical functioning of products and equipment covered by this Regulation.

The State may, in defined, specific situations, designate the owner as being responsible for the operator's obligations.

Where large installations are involved, service companies are contracted to carry out maintenance or servicing. In these cases, the determination of the operator depends on the contractual and practical arrangements between the parties.

14.4.2 Obligations

Operators of stationary air conditioners, which contain fluorinated greenhouse gases, shall, using all measures which are technically feasible and do not entail disproportionate cost:

a Prevent leakage of these gases and as soon as possible repair any detected leakage.

b Ensure that they are checked for leakage by certified personnel.

c Ensure for putting in place arrangements for the proper recovery by certified personnel.

d According to Regulation (EU) No. 517/2014 the operators shall ensure that the equipment is checked for leaks as following:

Case 1 - Non-sealed equipment contains less than **5** tons of CO_2 equivalent of fluorinated greenhouse gases.

► Leakage test not required

Case 2 - Hermetically sealed equipment contains less than **10** tons of CO_2 equivalent of fluorinated greenhouse gases.

► Leakage test not required

Case 3

► Leakage test required: check the equipment for leaks with the minimum frequency given in the following table:

X = Tons of CO_2 Equivalent	Y = Equivalent amount of refrigerant [kg]				Minimum frequency for leak check	
	R-513A	R-134a	R-410A	R-407C	Without leakage detection	With leakage detection
5 ≤ X < 50	7,9 ≤ Y < 79	3,5 ≤ Y < 35	2,4 ≤ Y < 24	2,8 ≤ Y < 28	12 Months	24 Months
50 ≤ X < 500	79 ≤ Y < 792	35 ≤ Y < 350	24 ≤ Y < 240	28 ≤ Y < 282	6 Months	12 Months
X ≥ 500	Y ≥ 792	Y ≥ 350	Y ≥240	Y ≥ 282	3 Months	6 Months

e Recovery for the purpose of recycling, reclamation, or destruction of the fluorinated greenhouse gases, pursuant to Art.8 of the Regulation (EU) No. 517/2014 shall take place before the final disposal of that equipment and, when appropriate, during its servicing and maintenance.

14.5 Leakage detection

The manufacturer approves the following leakage check methods according to Regulation (EU) No. 1516/2007 and Regulation (EU) No. 1497/2007

Method		Specifications
a	Check of circuits and components representing a risk of leakage with gas detection devices adapted to the refrigerant in the system	• Gas detection devices shall be checked every 12 months to ensure their proper functioning. • The sensitivity of portable gas detection devices shall be at least five grams per year.
b	Application of ultraviolet (UV) detection fluid or suitable dye in the circuit	The method shall only be undertaken by personnel certified to undertake activities which entail breaking into the refrigeration circuit containing fluorinated greenhouse gases.
c	Proprietary bubble solutions/soapsuds	---

14.6 Labeling

The label applied on the unit (see Onboard Label) is designed to fill-in the relevant amounts of refrigerant according to Regulation (EU) No.1494/2007 (2015/2068):

a

• Where fluorinated greenhouse gas is foreseen to be added to the equipment outside of the manufacturing site at the point of installation, a dedicated label accommodates notation of both the quantity [kg] pre-charged in the manufacturing plant and of the quantity charged at the installation site as well as the resulting total quantity of F-gas as a combination of the above mentioned quantities, in a manner which conforms to the legibility and indelibility.

• Our split units are usually not pre-charged on factory, in this case the total quantity of refrigerant charged in the unit must be written in the relevant label, during the commissioning operation at the installation site.

• All the quantities of must be given both as mass of refrigerant [kg] and as Tonnes of CO_2 Equivalent.

$$\text{Tons of } CO_2 = \frac{(\text{kg of refrigerant x GWP of refrigerant})}{1000}$$

Where:

Refrigerant	GWP
R-513A	631
R-134a	1430
R-407C	1774
R-410A	2088

b	Our packaged units (not split) operating with F-gas are usually full charged on factory and the total amount of refrigerant charge is already reported on the label. In this case, the label has no need of further written information.
c	In general, the above mentioned information has been located in the main nameplate of relevant unit.
d	For equipment with double refrigeration circuits, in regards to differentiates requirements on the basis of the quantity of F-gas contained, the required information about refrigerant charge quantities has to be listed separately for each individual circuit.
e	For equipments with separate indoor and outdoor sections connected by refrigerant piping, the label information will be on that part of the equipment which is initially charged with the refrigerant. In case of a split system (separate indoor and outdoor sections) without a factory pre-charge of refrigerant, the mandatory label information will be on that part of the product or equipment which contains the most suitable service points for charging or recovering the fluorinated greenhouse gas(es).

NOTE: *Safety data sheets of F-gases used in the products are available on demand.*

14.7 Record keeping

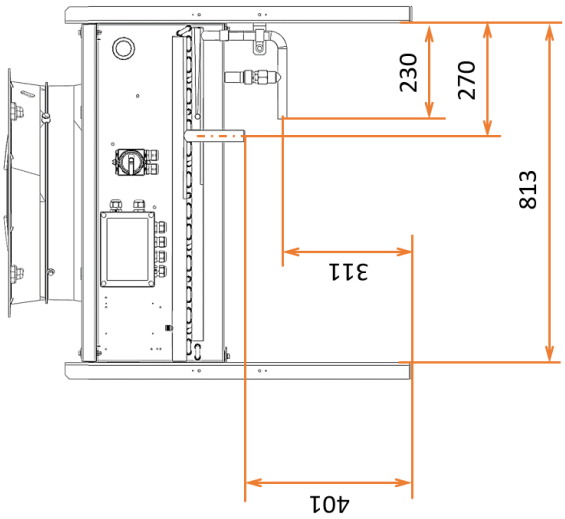
Operators of equipment which is required to be checked for leaks (see *14.5 Leakage Detection*), shall establish and maintain records for each piece of such equipment specifying the following information:

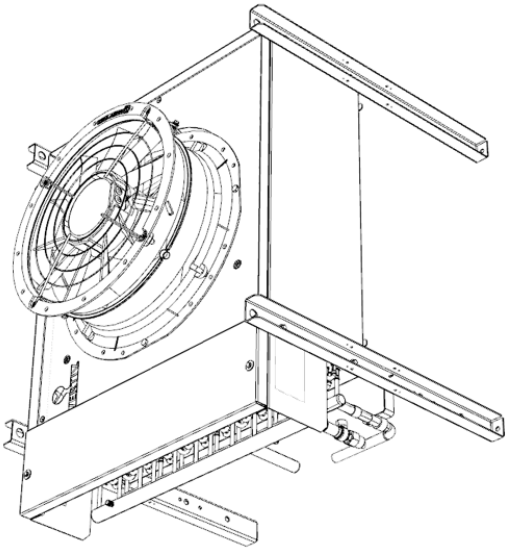
a	The quantity and type of fluorinated greenhouse gases installed.
b	The quantities of fluorinated greenhouse gases added during installation, maintenance or servicing or due to leakage.
c	Whether the quantities of installed fluorinated greenhouse gases have been recycled or reclaimed, including the name and address of the recycling or reclamation facility and, where applicable, the certificate number.
d	The quantity of fluorinated greenhouse gases recovered.
e	The identity of the undertaking which installed, serviced, maintained and where applicable repaired or decommissioned the equipment, including, where applicable, the number of its certificate.
f	The dates and results of the leak checks carried out (see *14.5 Leakage Detection*).
g	If the equipment was decommissioned, the measures taken to recover and dispose of the fluorinated greenhouse gases.

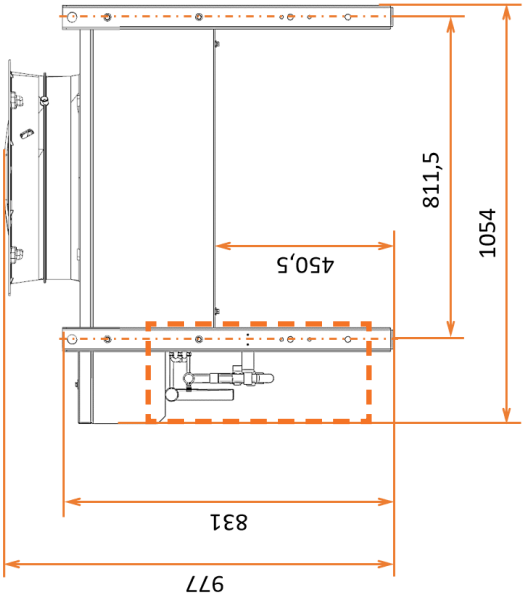
Unless the records are stored in a database set up by the competent authorities of the Member States the following rules apply:

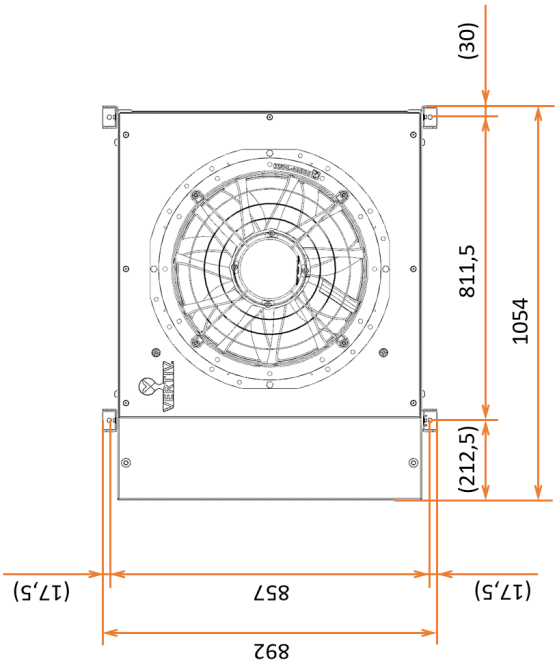
a	The operators shall keep the records for at least **five years**.
b	Undertakings carrying out activities for operators shall keep copies of the records for at least **five years**.

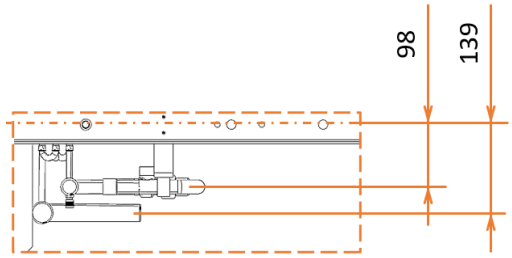
Annex I – Mechanical connections



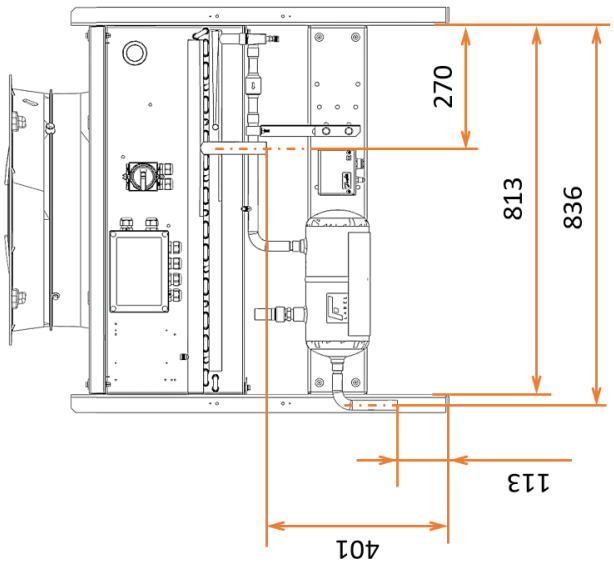


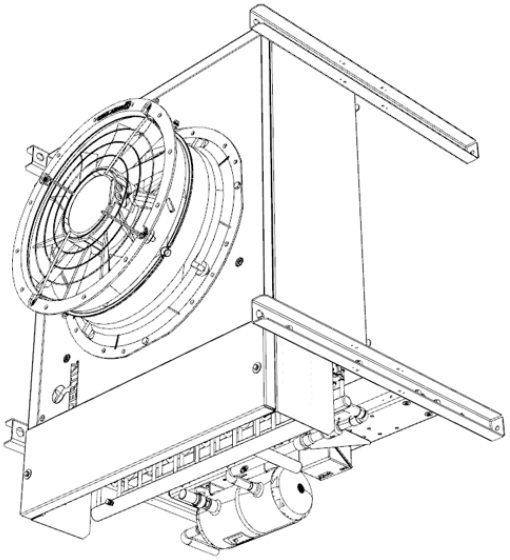


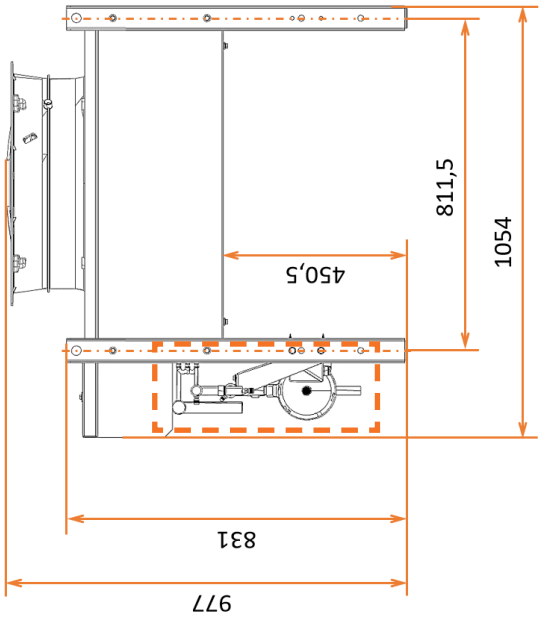


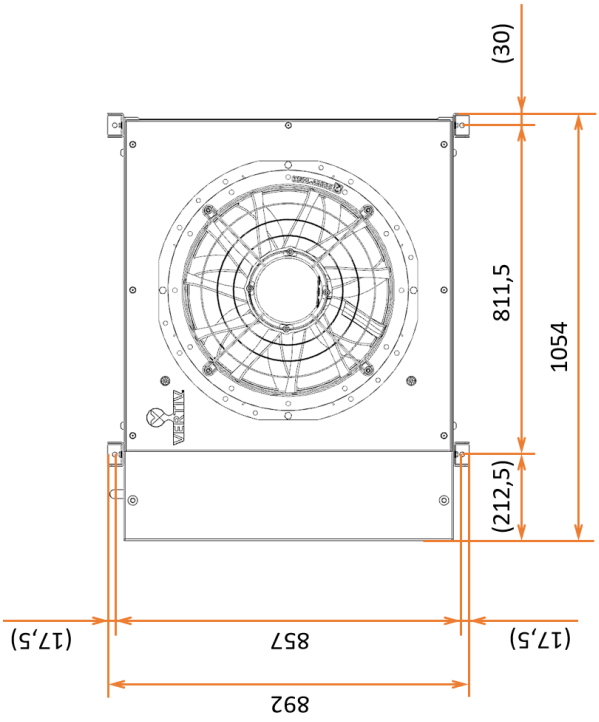


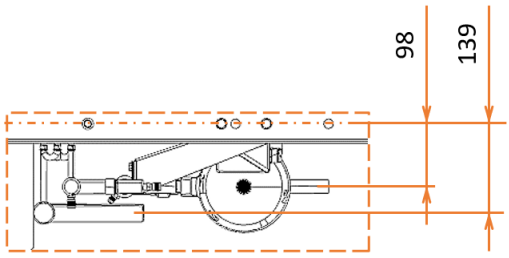
OAC017*VS – unit with vertical airflow



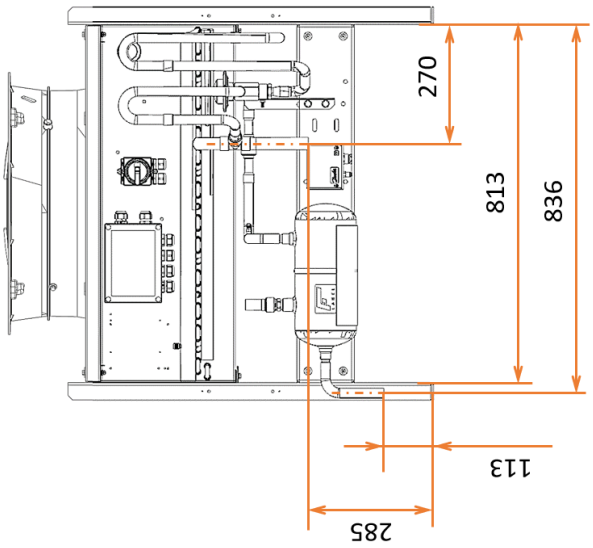


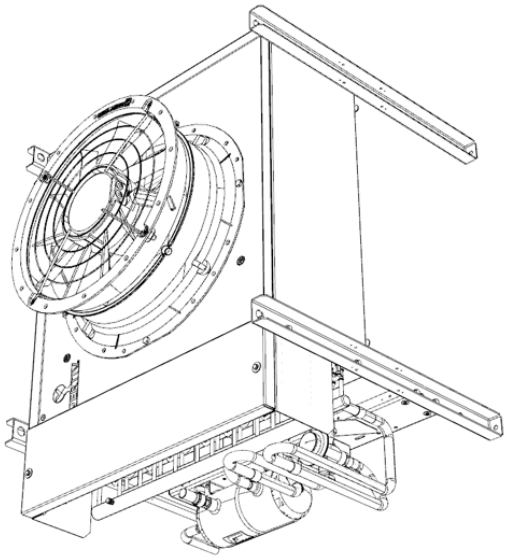


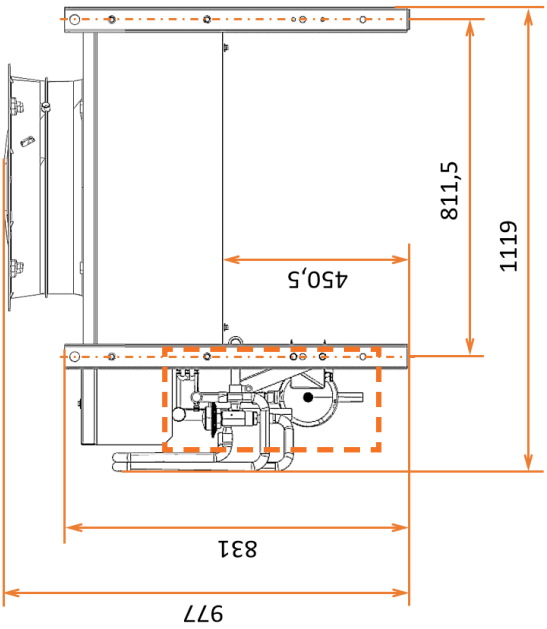


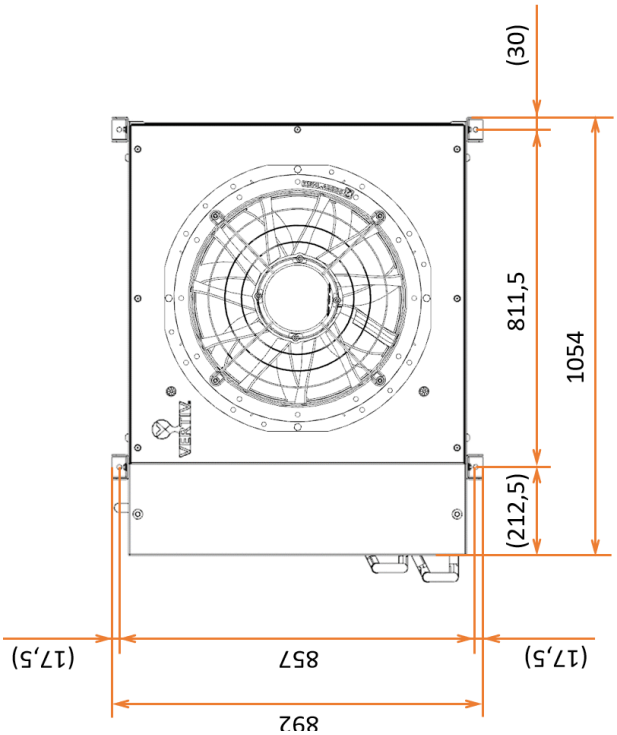


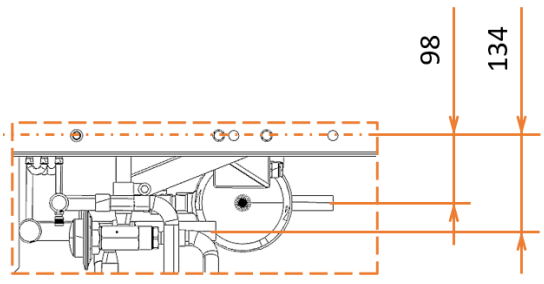
OAC017*VR – unit with vertical airflow



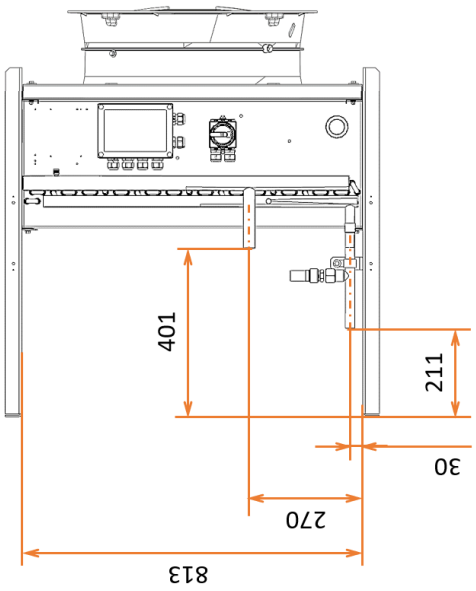


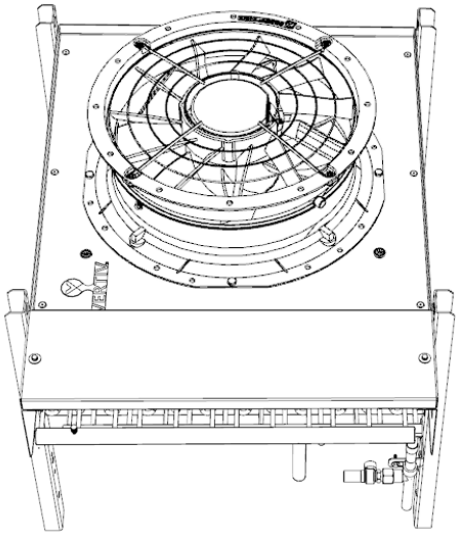


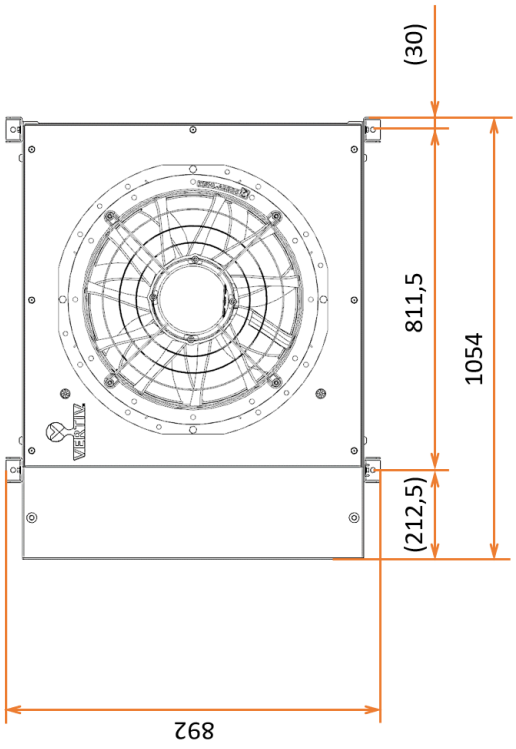


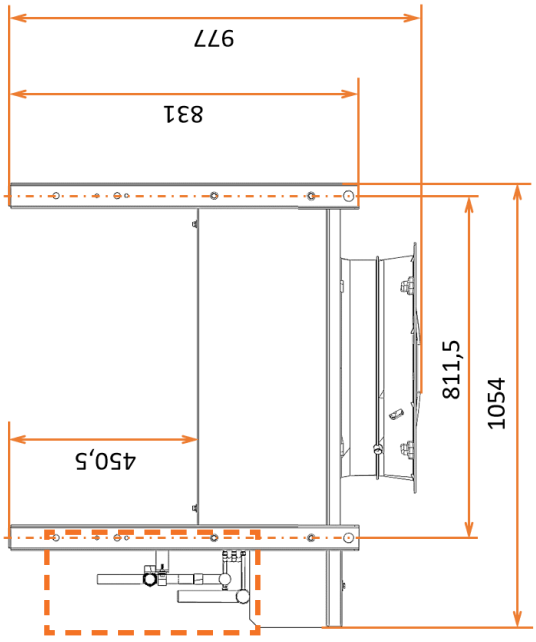


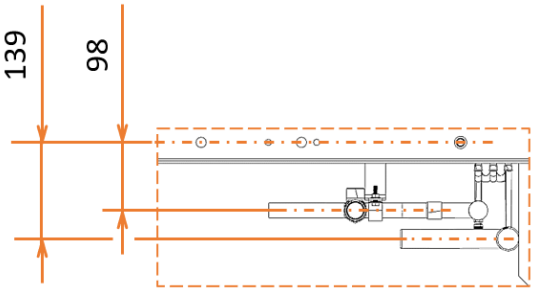
OAC017*VL – unit with vertical airflow



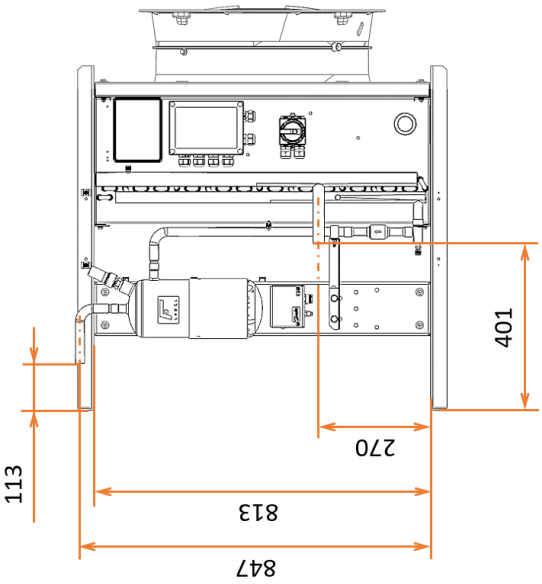


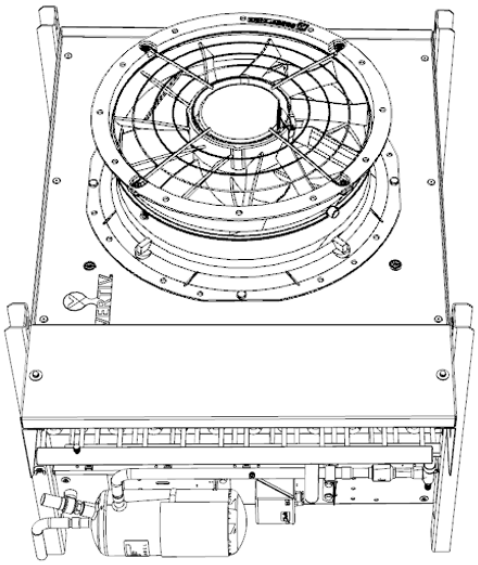


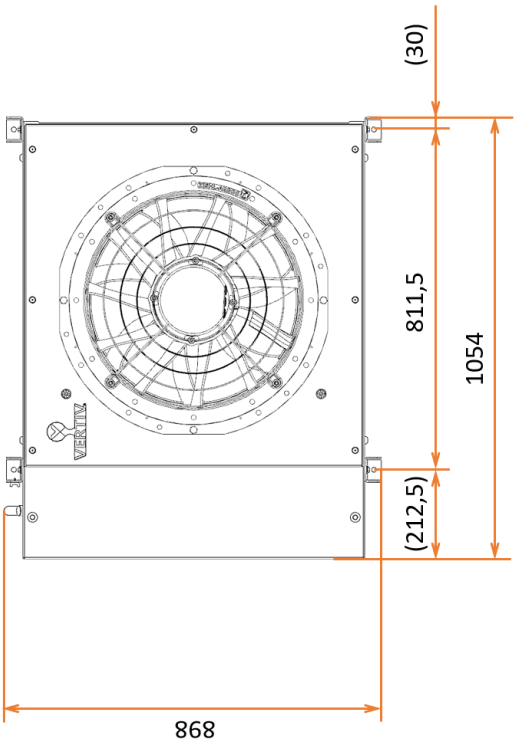


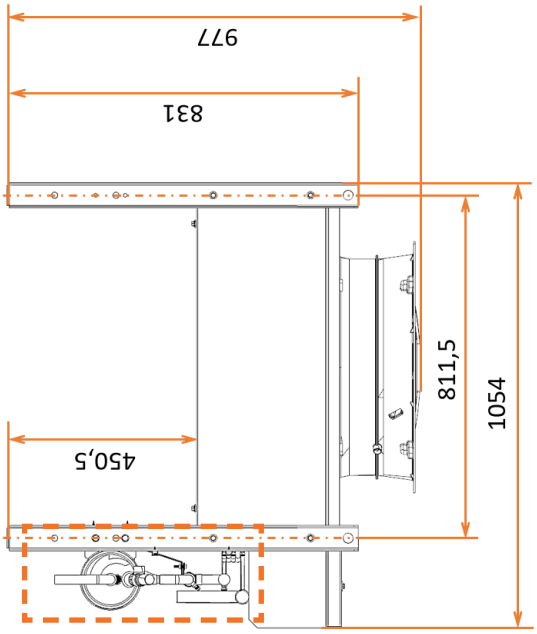


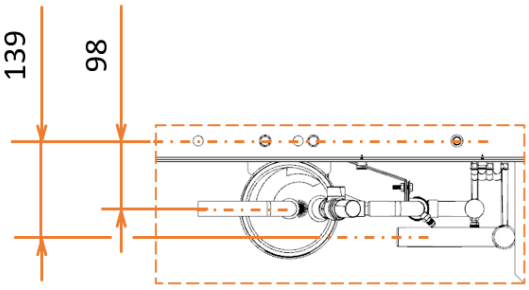
OAC017*HS – unit with horizontal airflow



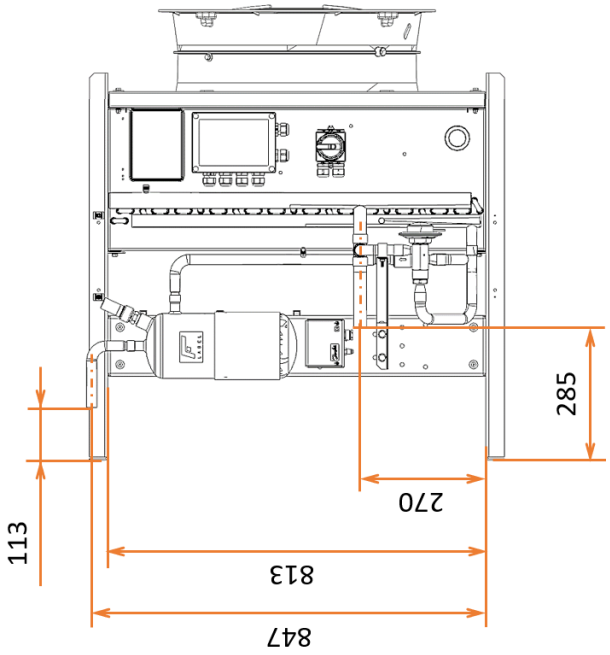


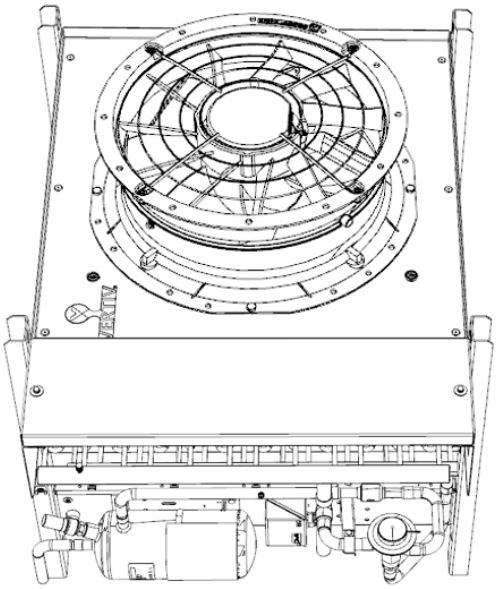


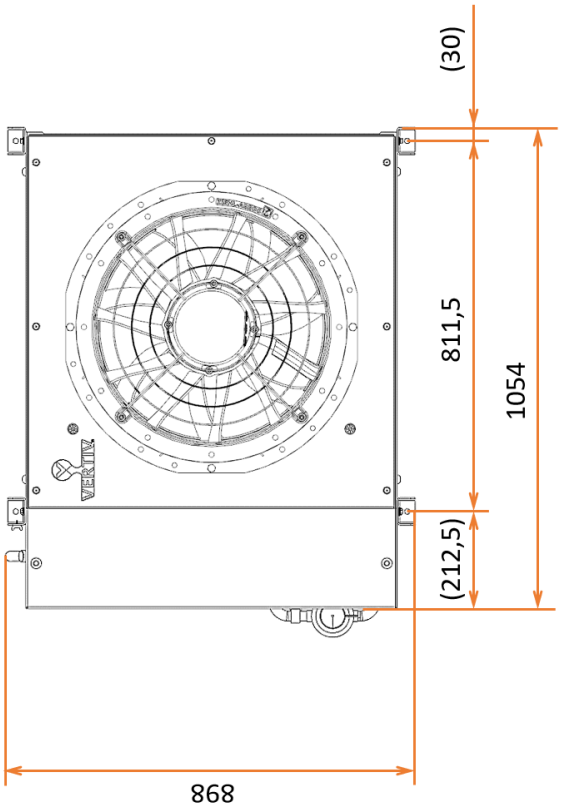


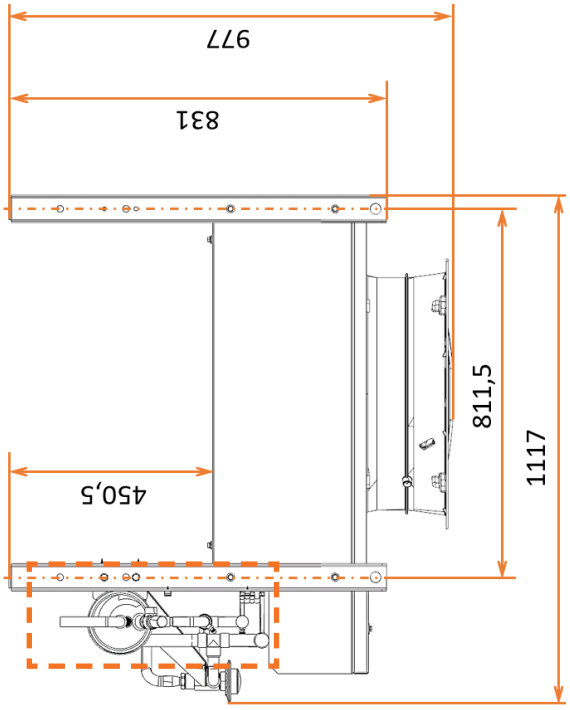


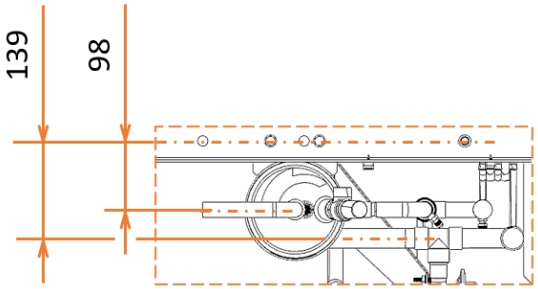
OAC017*HR – unit with horizontal airflow





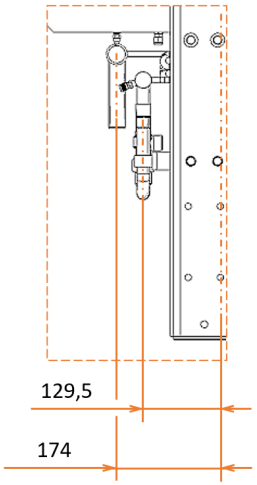


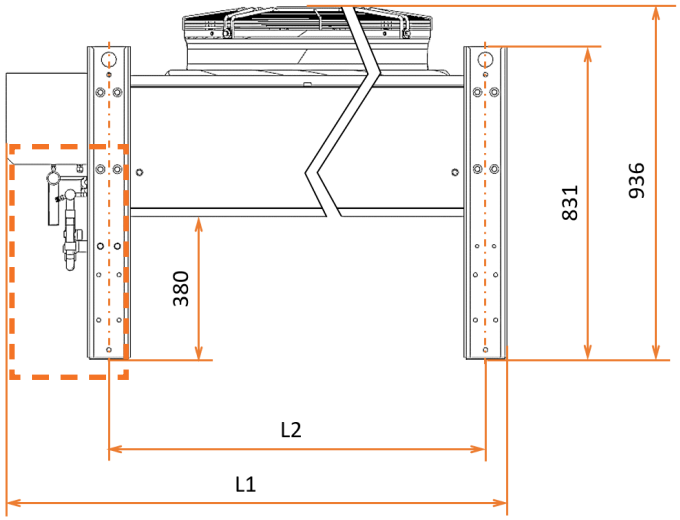


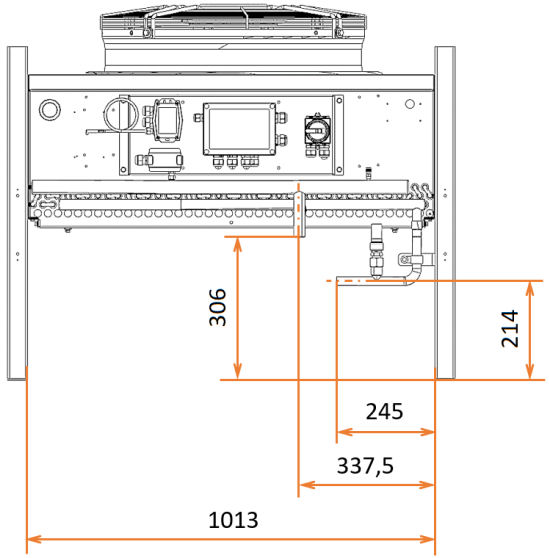


OAC017*HL – unit with horizontal airflow

OAC033-095*VS – unit with vertical airflow

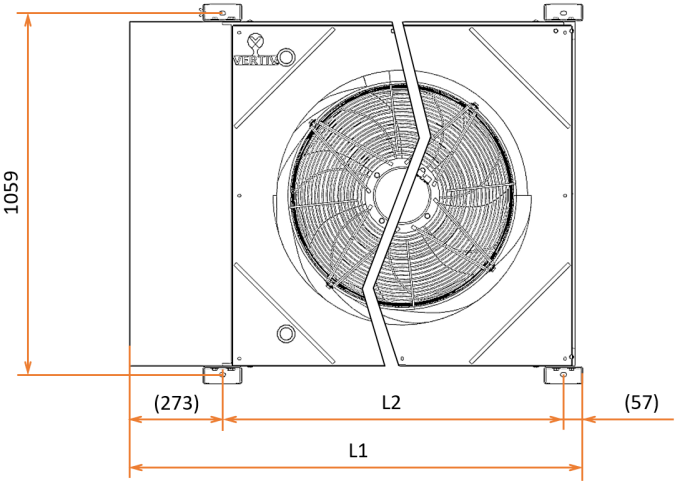


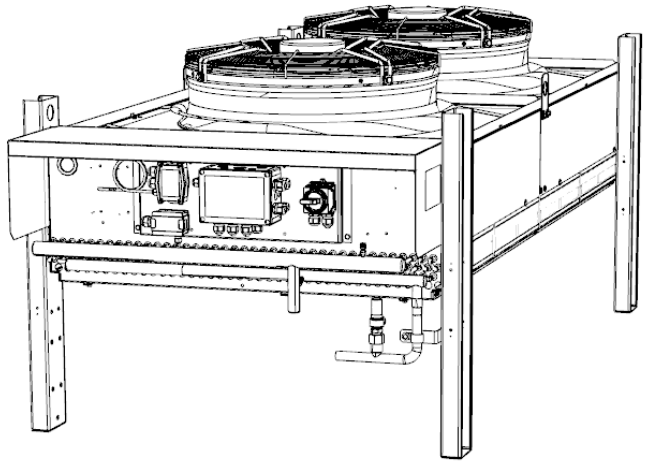




Model	L1 [mm]	L2 [mm]
033	1330	1000
042-0/H58	2330	2000
0/H87-095	3330	3000

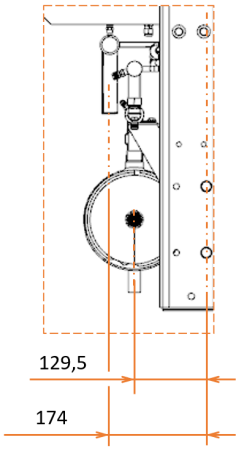
NOTICE
The pipe dimension is indicated from the base plate fixing point.

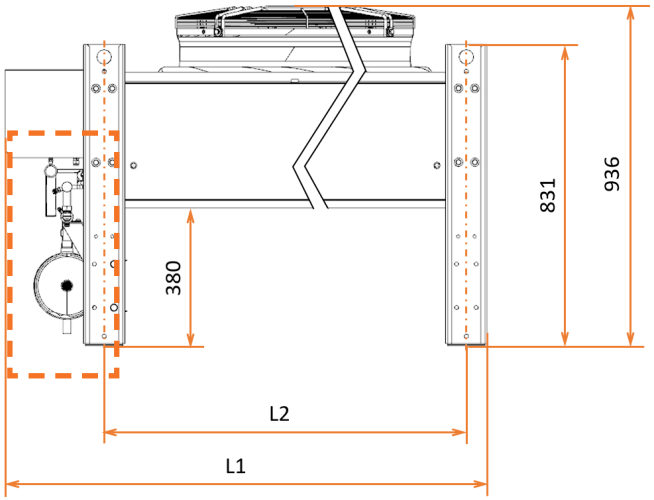


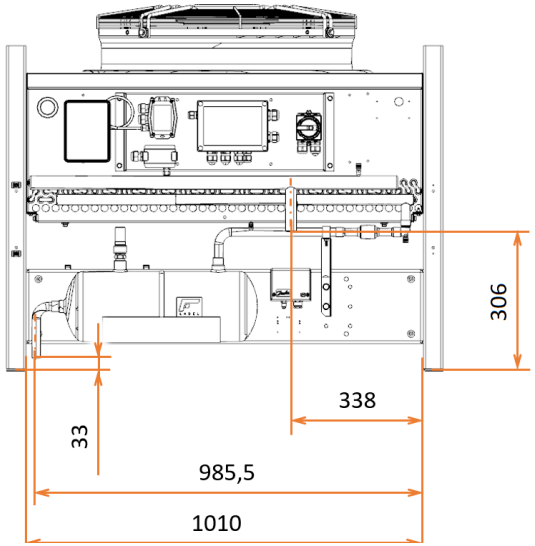


NOTE: *2-fan **OAC058***VS shown*

OAC033-095*VR – unit with vertical airflow

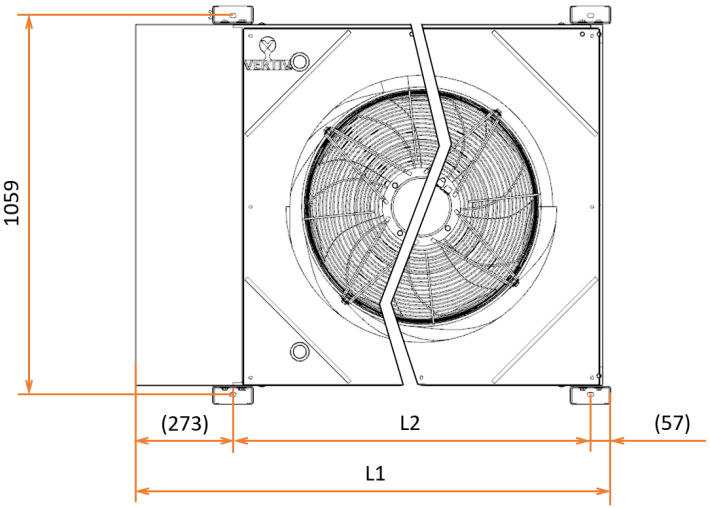


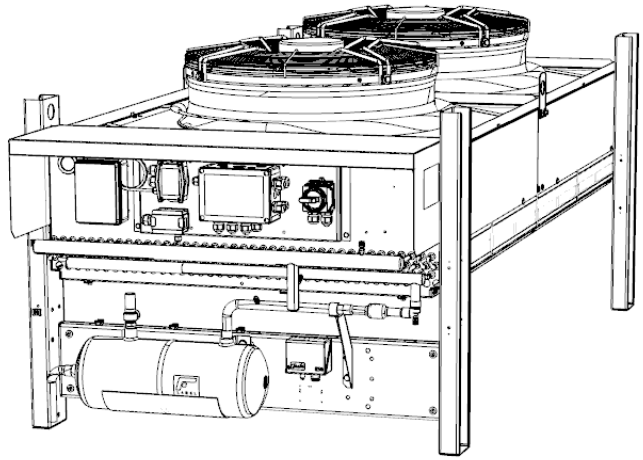




Model	L1 [mm]	L2 [mm]
033	1330	1000
042-0/H58	2330	2000
0/H87-095	3330	3000

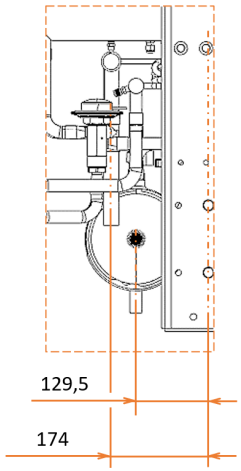
NOTICE
The pipe dimension is indicated from the base plate fixing point.

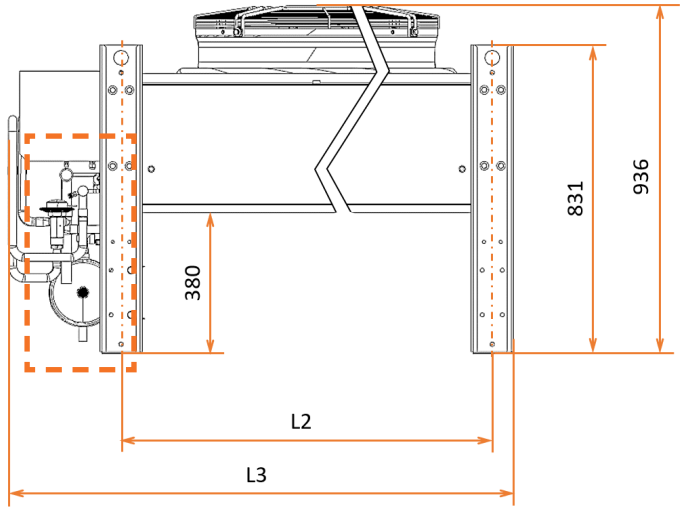


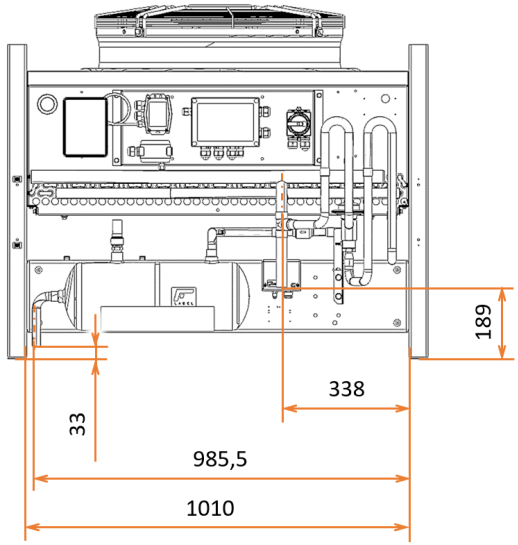


NOTE: *2-fan **OAC058***VR shown*

OAC033-095*VL – unit with vertical airflow

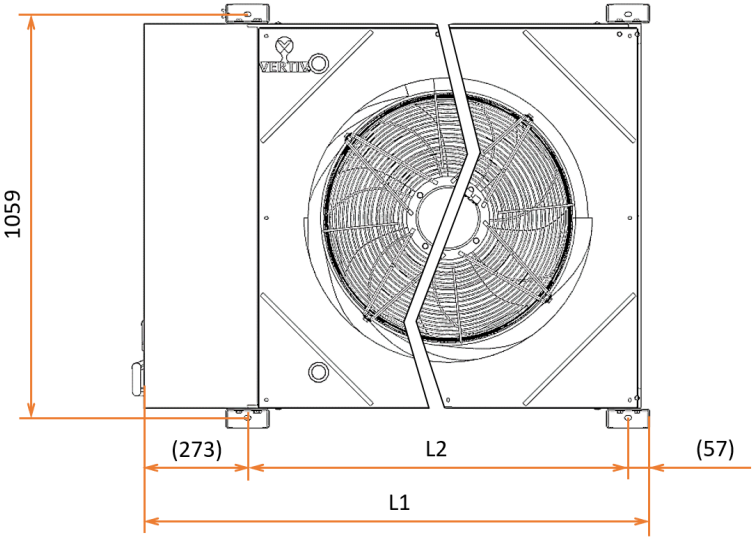


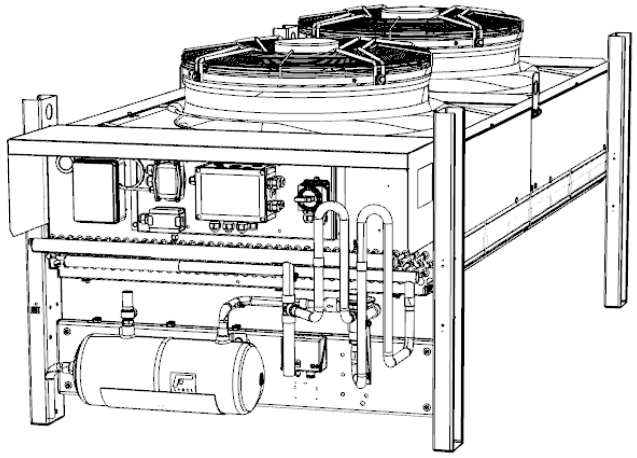




Model	L1 [mm]	L2 [mm]	L3 [mm]
033	1330	1000	1359
042-0/H58	2330	2000	2359
0/H87-095	3330	3000	3359

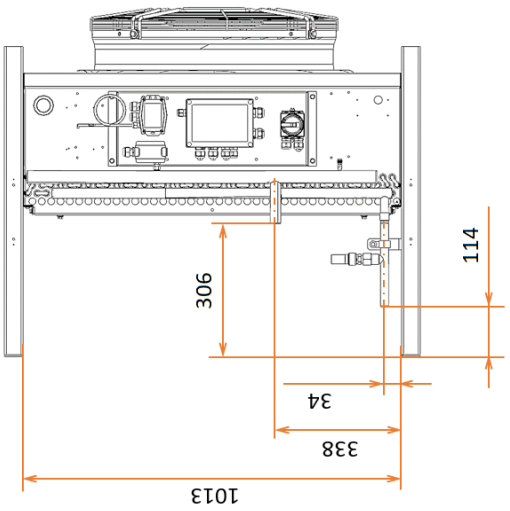
NOTICE
The pipe dimension is indicated from the base plate fixing point.

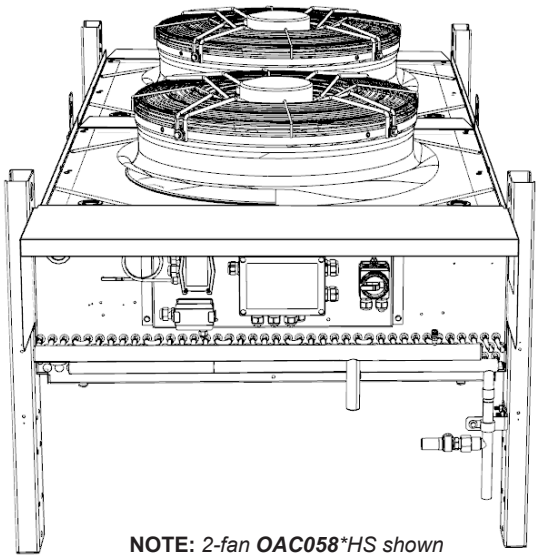




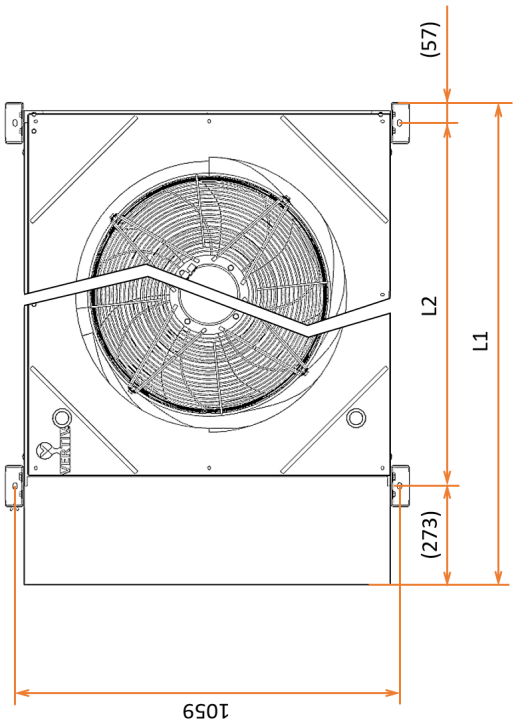
NOTE: *2-fan **OAC058***VL shown*

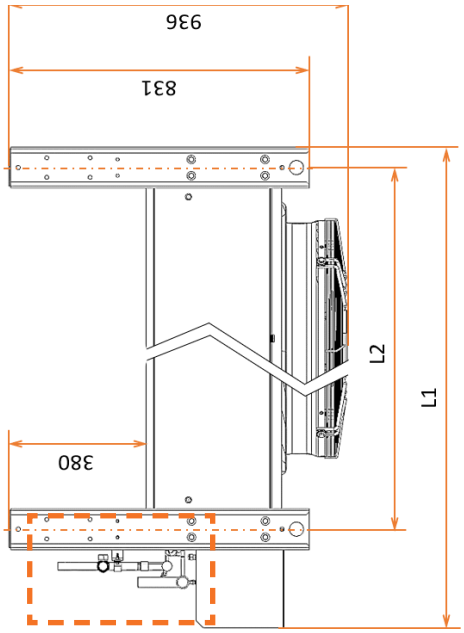
OAC033-095*HS – unit with horizontal airflow

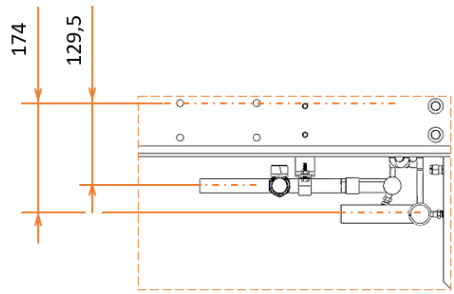




NOTE: *2-fan **OAC058**HS shown*



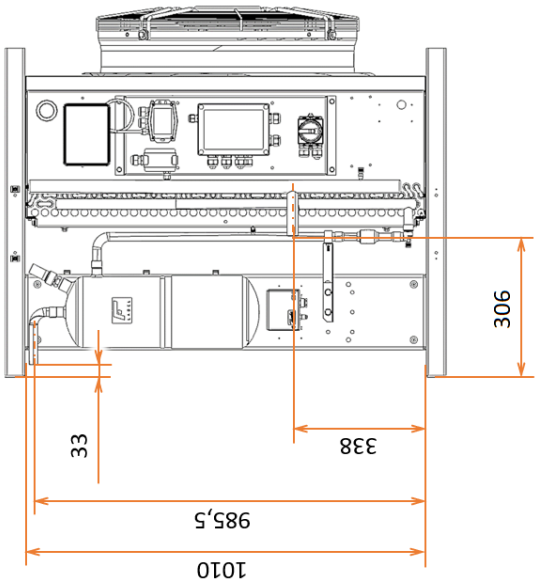


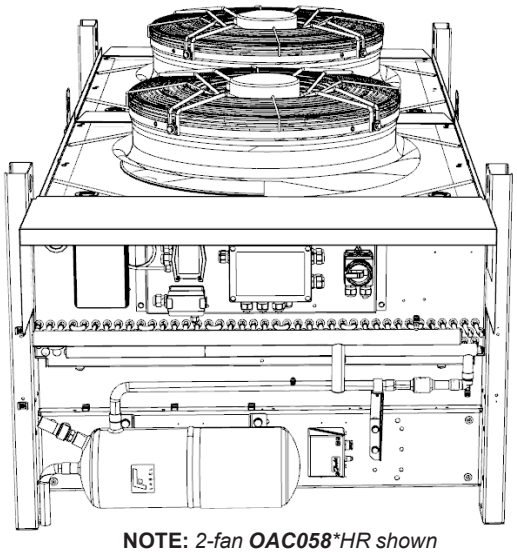


Model	L1 [mm]	L2 [mm]
033	1330	1000
042-0/H58	2330	2000
0/H87-095	3330	3000

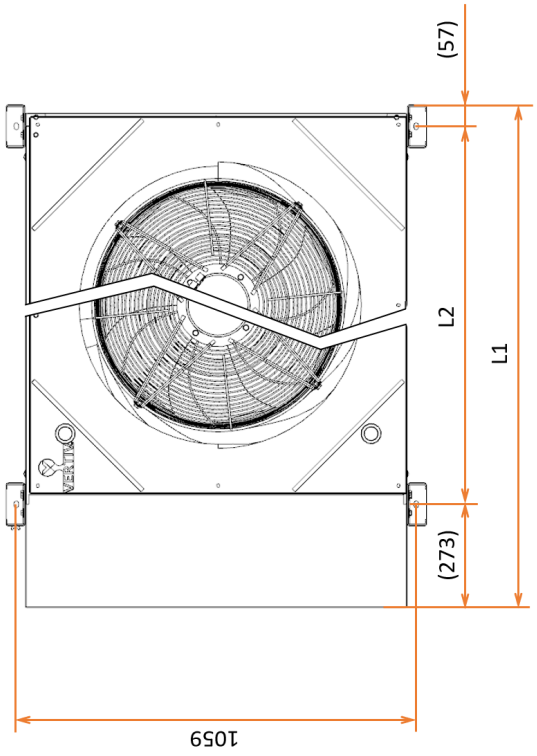
NOTICE
The pipe dimension is indicated from the base plate fixing point.

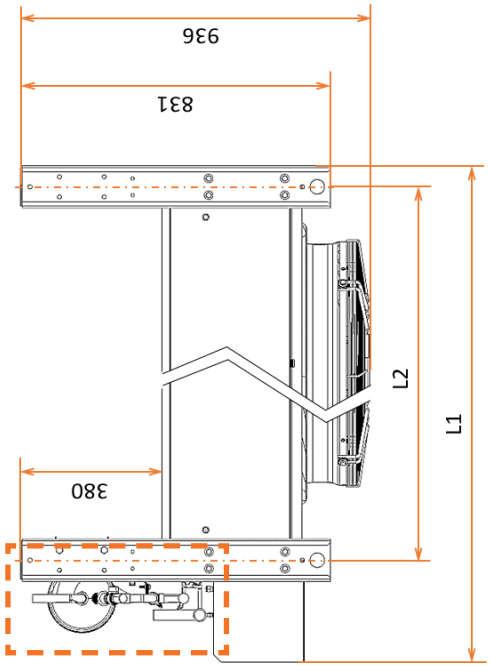
OAC033-095*HR – unit with horizontal airflow

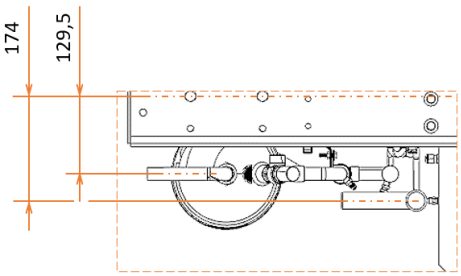




NOTE: *2-fan **OAC058**HR shown*

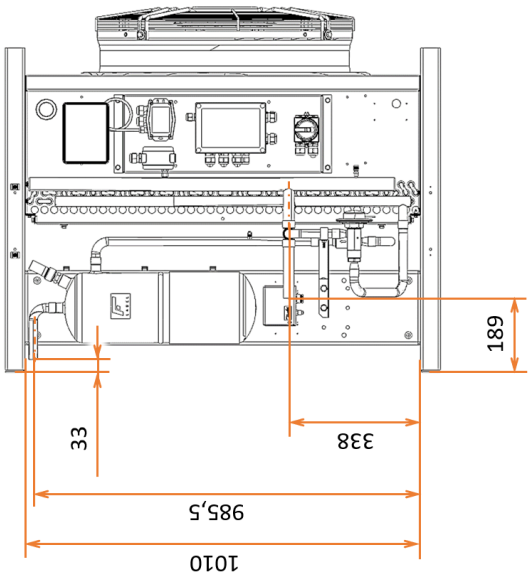


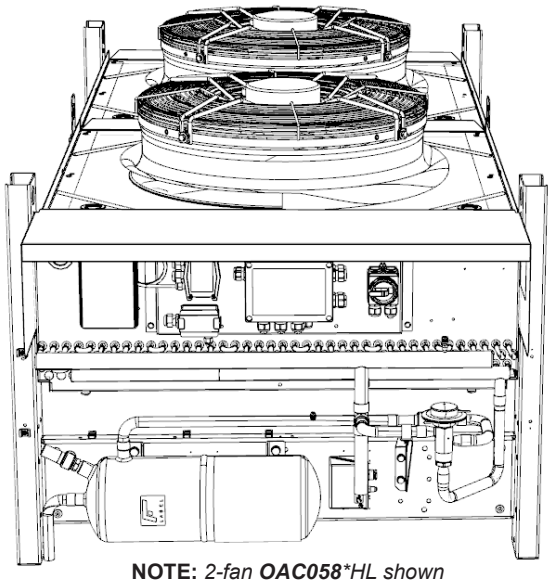




Model	L1 [mm]	L2 [mm]
033	1330	1000
042-0/H58	2330	2000
0/H87-095	3330	3000

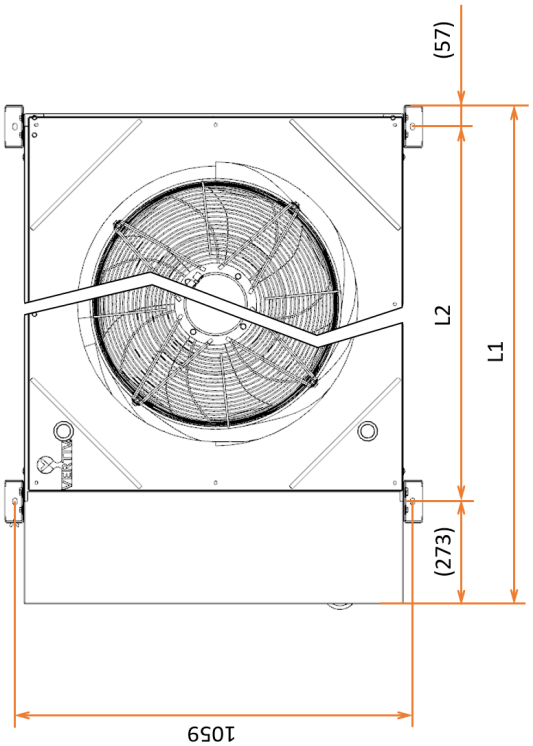
NOTICE
The pipe dimension is indicated from the base plate fixing point.

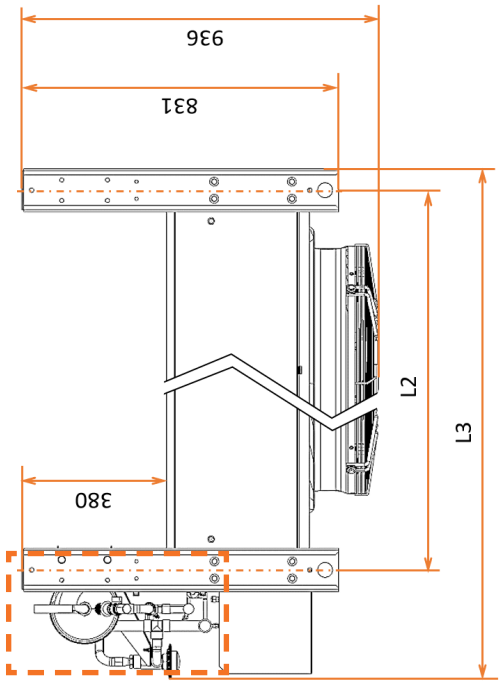




NOTE: *2-fan **OAC058***HL shown*

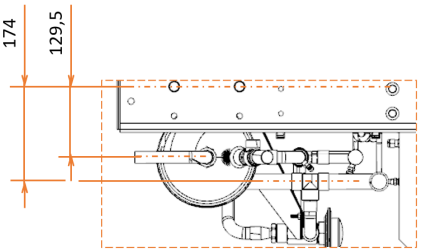
OAC033-095*HL – unit with horizontal airflow





Model	L1 [mm]	L2 [mm]	L3 [mm]
033	1330	1000	1345
042-0/H58	2330	2000	2345
0/H87-095	3330	3000	3345

NOTICE
The pipe dimension is indicated from the base plate fixing point.



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