Coolblade

12÷30 kW

General
The Coolblade range is specifically dedicated to Data Centres, in applications characterised by "hot aisle" and "cold aisle" layouts or in systems with containment and separation of the hot part from the cold part.

Configurations
Coolblade DX: Direct expansion air conditioning units, for coupling to external condensing units.

Coolblade CW –Coolblade DW: Chilled water air conditioning units.

Coolblade ED+: Direct expansion air conditioning units air cooled, with DC-Inverter compressor.

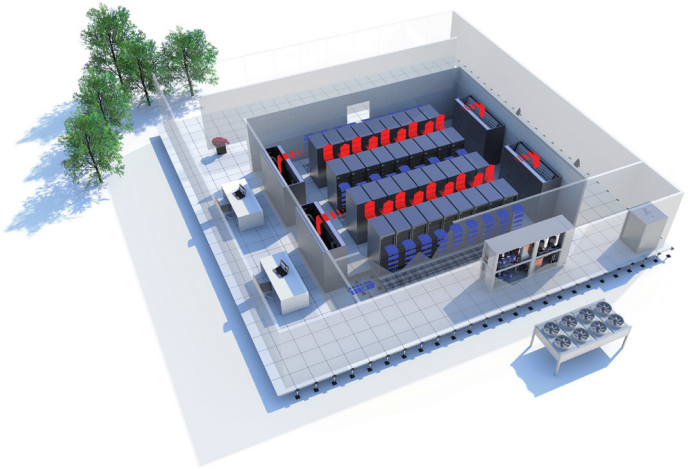
Strengths

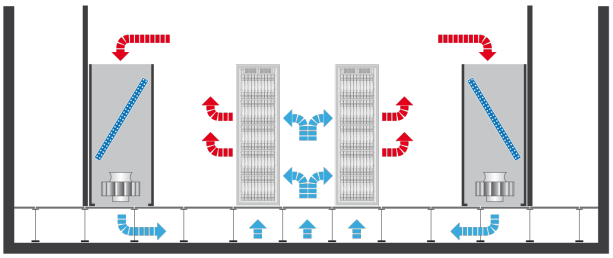
- Available in chilled water (CW - DW), direct expansion with (ED+) and without (DX) compressor on board version
- High heat removal on small footprint
- Axial and radial fan configuration
- Very high efficiency (increased in axial fan configuration)
- High installation flexibility
- Full redundancy option for Tier IV datacenter (DW version)

APPLICATION

The Coolblade range has been designed for use in Data Centres that require insertion of cooling units in an in-row configuration, that is, inserted between racks. These are therefore devices expressly made for insertion in a hot aisle/cold aisle configuration. Their operation can be concisely described as follows: the racks draw in fresh air from the front and expel hot air from the back using the fans supplied with the equipment contained inside them. The racks are arranged in opposing rows, so that they are facing the same aisle; the result is the creation of alternately cold (in front of the racks) and hot aisles (behind the racks).

In conventional systems, primary cold air is usually supplied from under a raised floor, by precision air conditioning units positioned on the outer edge of the room or just outside it ("external" or "room" air conditioning).

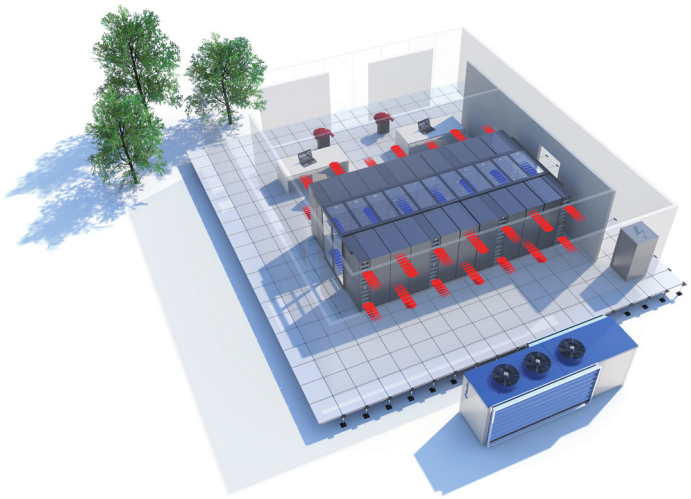


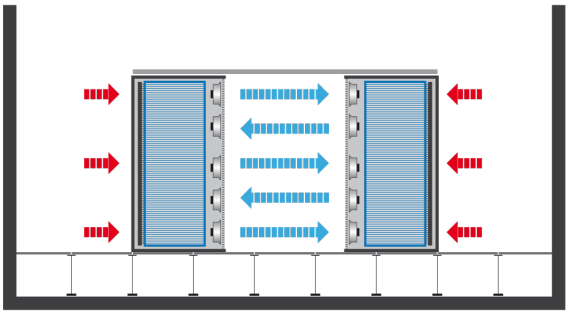


But Coolblade units draw in hot air directly from the hot aisle and put it, cooled, into the cold aisle A sufficient number of Coolblade units are installed alongside and in between the racks to cover the design heat load, usually with the addition of one or more redundant units to guarantee continuity of cooling in all situations.

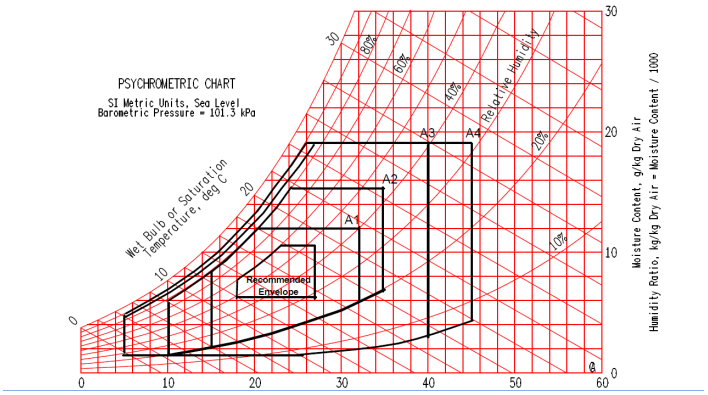
Maximization of energy efficiency is obtained with so-called containment, through which the hot and/or cold areas are isolated, thereby preventing any air bypass or recirculation between the two sections.

It should also be emphasised that this type of application does not require a raised floor for air distribution, or alternatively a moderately high raised floor for just power or refrigerant distribution.





Coolblade units manage the heat load using various methods and strategies, which can vary according to the specific installation method and the type of cooling system; in any case, with reference to the ASHRAE guidelines (TC9.9 /2011).



A feature common to all versions is the presence of variable speed fans with electronically commutated (EC) motors, which can modulate based on the return temperature (from the hot aisle); depending on configurations, it is also possible to modulate the cooling capacity based on the return temperature or, alternatively, choose to keep the supply temperature constant in the cold aisle (this last functionality is valid only for chilled water or direct expansion systems with modulation of cooling capacity).

The fans are available in axial version, with front air supply, and in radial version, with side air supply (from one side or both sides).

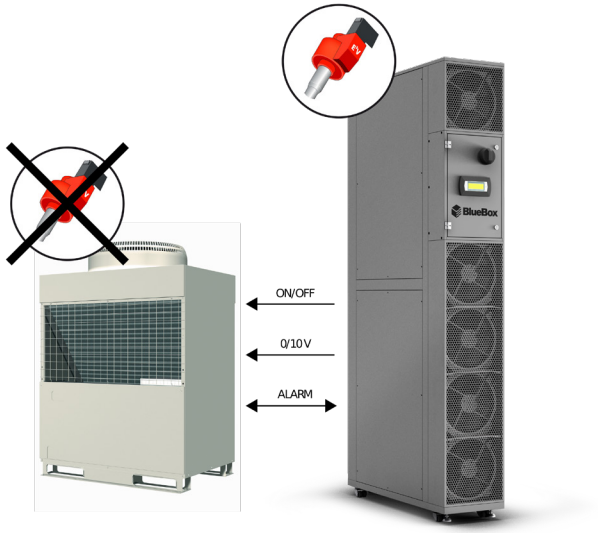
Direct expansion units, provided with evaporating coils, are designed to be connected to an external condensing unit, which can indifferently be provided with a variable speed or fixed speed compressor. It is possible to use condensing units provided with expansion valve (which therefore feed the internal unit with a liquid/gas mixture) and condensing units without expansion valve (which feed the internal unit with subcooled high pressure liquid); in the second case, the expansion valve can be installed on the Coolblade DX unit.

The unit can control the external condensing unit through a modulating 0-10V or on/off signal, and receive an alarm signal from it.

Instead Coolblade ED+ units are fitted with DC Scroll Brushless compressor directly on board. The units include as well electronic expansion valve and are designed for connections to remote air cooled condensers. The units can have as well (as accessory) the fan speed control for the remote air cooled condensers, to grant the best system operation.

For chilled water applications, Coolblade are also available as CW (Single circuit chilled water circuit with or without valve) and DW (Double chilled water circuits with or without valves). This last version can be extremely interesting for all those Data Centers which require the highest redundancy. In fact, Coolblade DW are extremely compact units with 2 hydraulic circuits completely indipendent. Within all the available accessories the solution with dual power supply with automatic changeover allows to design a unit **TIER IV ready**.

Example of connection with Blue Box condensing unit, provided with expansion valve.



Example of connection with condensing unit not provided with expansion valve.

Example of connection between Ed+ unit and air cooled remote condenser.

CONFIGURATION

Configuration example:

Coolblade	DX	A	12	L
1	2	3	4	5

1	Series	Coolblade
2	Type	**DX**: direct expansion without compressor on board **ED+**: direct expansion with compressor on board **CW**: chilled water with single hydraulic circuit **DW**: chilled water with double hydraulic circuit
3	Fan Section	**A**:Axial Fans, Frontal Air Delivery **R**: Radial Fans, Lateral Air Delivery **RR**: Radial Fans, Right Air Delivery **RL**: Radial Fans, Left Air Delivery
4	Size	**12**: Cooling Capacity at nominal catalogue conditions
5	Cabinet Variation	<**none**>: depth 1000 mm **L**: depth 1200 mm

SPECIFICATIONS

DIMENSIONS AND CONFIGURATION

The dimensions of the Coolblade units are 300x1000x2000 (width x depth x height, expressed in mm) or 300x1200x2000 ("L" versions). All units are provided with air filters at the inlet, copper coils with aluminium finning, fans, electrical control panel and electronic microprocessor controller.

Air is always sucked in from the back, filtered and cooled, and then expelled from the front thanks to the action of the fans positioned downstream of the exchange coil, evenly distributed over the entire height of the unit. Depending on the type of fans, air is expelled from the front or side into the cold aisle, thereby ensuring the best air distribution according to the application.

STRUCTURE

The structural frame is fabricated from polished sheet-steel with oven-baked epoxy polyester powder coating. The removable panels are also made of polished sheet-steel with oven-baked epoxy polyester powder coating, and internally insulated with open-cell matting (fire reaction class A2 according to EN13501). The colour for DX,CW,DW versions is RAL7016 (anthracite grey), while for ED+ is RAL9005 (black), both with textured finish. Unpainted internal panels and infills are made of hot dip galvanised sheet-iron.

The units are provided with wheels to make handling easier and adjustable feet for final positioning. There are threaded inserts in the upper part to make them easier to fix to adjacent racks.

All the materials making up the unit are recyclable and CFC-free.

FANS

The units are equipped with 3, 4 or 5 (depending on size) variable speed electric fans with directly coupled electronically commutated (EC) motor. Each fan is provided with integrated thermal overload protection.

The fans are installed on the front, downstream of the handling coil and can be accessed from the front of the unit even after installation, without having to take the unit out of the row of racks.

Available as an option are axial fans, which combine excellent efficiency and energy saving qualities, and radial fans, which allow a higher air flow rate than the axial version and the possibility of directing the supply air to the side of the unit.

Air flow is constantly monitored by a differential pressure switch, which signals an alarm condition when there is no flow.

AIR FILTERS

The non-regenerable air filter is class ISO Coarse 35% (according to ISO 16890; G2 - EN779) for CW,DW,DX ISO Coarse 30% (according to ISO 16890; G1 - EN779) for ED+ and is designed to minimize head loss while maintaining an adequate level of filtration. The filters are pleated and contained in a 100mm-thick galvanised sheet-iron frame. They can be accessed from the back of the unit for maintenance operations.

The condition of the filters is constantly monitored by a differential pressure switch that signals when they are excessively fouled.

CHILLED WATER HANDLING COIL AND HYDRAULIC CIRCUIT (CW and DW units)

The Coolblade CW and DW units are provided with handling coils with copper tubes and high turbulence aluminium fins, with hydrophilic coating.

A stainless steel condensate drip tray is positioned under the handling coil. The drain connection is from the bottom of the unit, unless a condensate booster pump (option) is requested, in which case the drain is plugged.

The CW units are provided with a single hydraulic circuit, without control valves in the basic version. Optionally available is a three-way valve with modulating servo control (0-10V control); or a two-way valve (for variable flow rate systems). The hydraulic connections can be carried out indifferently from the bottom or the top in units without valves; they are carried out from the bottom or, on request, from the top for units with valves.

The DW units are provided with a dual hydraulic circuit (a single finned pack coil with two interlaced circuits) without valves in the basic version. Optionally available is a three-way modulating valve (0-10V control) for each circuit; or a two-way valve (again, for each circuit). Each circuit can individually supply the full cooling capacity when the other circuit is not in operation. The controller installed on the unit also allows both circuits to be used at the same time, thereby supplying a higher cooling capacity to quickly satisfy any load peaks or temporary rises in water temperature.

EVAPORATING HANDLING COIL AND REFRIGERANT CIRCUIT (DX units)

The Coolblade DX units are provided with handling coil with small-section copper tubes, specifically designed for use with refrigerant R410A, and high-efficiency aluminium fins with hydrophilic coating.

The refrigerant circuit includes shut-off valves for gas and liquid and two 5/16" service outlets for each side. The refrigerant connections can be carried out indifferently from the top or the bottom.

If the external condensing unit is not provided with expansion valve, the electronic expansion valve integrated in the Coolblade unit and managed directly by the installed electronic controller is available as option.

REFRIGERANT CIRCUIT (ED+ units)

The refrigerant circuit includes:

- Liquid receiver;
- Oil Separator on the delivery;
- Electronic Expansion Valve;
- Solenoid valve for shutting off the refrigerant liquid;
- Refrigerant liquid flow indicator;
- Solid cartridge freon filter;
- Safety valve;
- High pressure safety pressure switch with manual reset;
- Low pressure switch with automatic reset;
- Shut-off valves for external connections;
- Copper refrigerant pipes with anti-condensation insulation on the suction line;
- Pipe taps on suction and delivery side and charging valve on liquid side;

EVAPORATOR COILS

The evaporator coils are finned coil, with copper tubes and aluminium fins with hydrophilic surface treatment. The fin profile is specially designed to prevent carry-over of condensation even at high through speeds. The coils are optimized for use with refrigerant R410A.

A stainless steel condensate collection basin is installed at the base of the coil, complete with fitting for drain and siphon.

COMPRESSORS

The compressors are "twin rotary" (size 13) or "scroll" (size 21) with invertercontrolled brushless DC motor, operating with R410A. The compressors are provided with integrated thermal overload protection.

The compressor motor control driver is provided with integral electronic protection against overtemperature, overcurrent, over or under-voltage with absence of one or more phases.

The electronic control of the inverter is provided with automatic soft-start system and continuous control of the compressor curve to prevent and correct its use beyond the maximum allowed limits.

The refrigerant connections can be carried out indifferently from the top or the bottom.

ELECTRICAL CONTROL PANEL

The electrical control panel is provided with an automatic circuit breaker and an isolation transformer for supplying power to the electronic controller, based on a microprocessor board and a display.

The wiring for the power supply and the field signals can be carried out indifferently from the top or the bottom, through suitable provision on the top or on the base of the unit.

The microprocessor controller inside the electrical control panel is provided with the following functions/features:

- Display of the return air temperature.
- Display of the supply temperature (on all the direct expansion units and on the chilled water units if the valve is present).
- Display of the incoming water temperature (only chilled water units).
- Display of the fan speed.
- Alarm signalling on two levels (serious alarm and minor alarm).
- Log recording of the last 150 alarms.
- Display of the status of controlled devices.
- Display of the status of inputs and outputs of the microprocessor.

ELECTRICAL PANEL - Coolblade DX-CW

The electrical control panel is contained in a box that can be accessed from the front of the unit. It contains a six-pole disconnect switch with 1-0-2 selector switch to manually switch between two alternative power sources. This selector switch also fulfils other functions as disconnect device for each of the two sources, and can be operated from the outside.

The standard power supply is 230V/1~/50Hz for all sizes.

ELECTRICAL PANEL - Coolblade ED+

The electrical control panel is accessible from the back of the unit. It's fitted on two rails which allows to easily extract it, in case any kind on maintenance is needed on it.

The standard power supply is 230V/1~/50Hz for size 13; 400V/3~/50Hz with neutral for size 21.

STANDARD FEATURES

In addition to what was described in the previous sections, the standard features of the Coolblade units include:

- Adjustable support feet.
- Wheels to facilitate handling.
- Air flow alarm.
- Dirty filter alarm.
- Water sensor (anti-flood). (only for Coolblade CW-DW-DX)
- Thermal overload protection (internal) for each fan.
- Packaging in wooden crate with pallet.
- Divisible pallet to facilitate the positioning operation.

TESTING

Leak tests and functional tests are carried out at the factory.

Units ED+ are supplied with refrigerant circuit charged with nitrogen, oil charge in the compressor and in the separator.

DESCRIPTION OF ACCESSORIES

HYDRAULIC ACCESSORIES

PSC **Condensate Pump**
Allows any condensate formed on the cooling coil and collected in the condensate drip tray to be boosted up to a hydrostatic head of 6m. Recommended in all cases where the hydraulic connections are carried out exclusively from the top.

PSC **Condensate Pump for units with humidifier**
Allows any condensate formed on the cooling coil and collected in the condensate drip tray to be boosted up to a hydrostatic head of 6m. Recommended in all cases where the hydraulic connections are carried out exclusively from the top.

VRM3 **3-way chilled water valve**
In chilled water units, this allows control of the supply temperature.

VRM2 **2-way chilled water valve**
In chilled water units, this allows control of the supply temperature in variable water flow rate applications.

COID **Upward hydraulic connections**
For chilled water units, these allow the configuration of the units to be adapted to the requirements of the system.

UMEI **Immersed Electrode Humidifier (Coolblade ED+)**
This accessory allows to have the unit fitted with immersed electrode humidifier, which grants to add humidity in case the air is too dry compared to the required set point.

SAL **Water Leakage / Flooding Sensor (Coolblade ED+)**
For detection of water leaks, complete with sensor to be placed in the area to control. Further sensors can be connected on request to allow control of several areas.
Standardly included within Coolblade CW-DW-DX.

REFRIGERANT CIRCUIT ACCESSORIES

VTE **Electronic Expansion Valve**
For direct expansion units, this is necessary when the condensing unit is not provided with a throttling device. Guarantees constant and precise control of superheating of the sucked-in gas. If available on the condensing unit, a potential-free contact that shows the operating status of the compressor can also be connected to the direct expansion units, thereby optimizing the operation of the electronic expansion valve.

LAK **Low Ambient Temperature Kit (-25°C) (Coolblade ED+)**
The accessory consists of a liquid receiver and flooding valve, which floods the condenser in order to keep the condensing pressure above the minimum threshold in case of very low external temperatures. The accessory has been sized for -25°C.
The accessory is provided inside a dedicated metal box (separate from the unit) to be installed inside the building.

LAM **Low Ambient Temperature Kit (-35°C) (Coolblade ED+)**
The accessory consists of a liquid receiver and flooding valve, which floods the condenser in order to keep the condensing pressure above the minimum threshold in case of very low external temperatures. The accessory has been sized for -35°C.
The accessory is provided inside a dedicated metal box (separate from the unit) to be installed inside the building.

KT **Kit flexible pipes**
The accessory is made off couple of flexible pipes designed to work with the high pressure needed by R410A refrigerant. Pipes are shipped separately, and they allow to make extremely flexible the connection between unit and the plant. This allows to partial move the unit in order to increase the accessibility in case of extraordinary maintenance.

SITL **Settings for long pipings applications (Coolblade ED+)**
The accessory is mandatory once the total equivalent lenght between internal and external unit exceeds specific values. The accessory consists on ad hoc settings to grant proper oil return and right unit operation. Specifically Coolblade ED+ 13 requires it once pipings are within 30 and 60 meters, Coolblade ED+ 21 once pipings are within 50 and 100m.

AERAULIC CIRCUIT ACCESSORIES

FG6 **High Efficiency Filters (G4)**
For those applications which need an higher filtration grade, higher efficiency filters are available. Coolblade can therefore be made available with G4 (according to CEN EN-779-2012 - corresponding to EU4 Eurovent BSEN - 779-4/5 - MERV8 with reference to ASHRAE 52.2 - 75% by ASHARAE 52.1). This accessory can be available only with radial fans.

MF **Frontal Air Delivery for Radial Fans**
The accessory allows to the have frontal air delivery even with radial fans. This can be used for those applications which need radial fans' available pressure (for example higher filtration requrements), as well as frontal air distribution.

CPA **Delivery Pressure Control (Coolblade ED+)**
The accessory allows to modulate the fan speed based upon the pressure value, to keep a constant pressure set point.

ELECTRICAL ACCESSORIES

DAA **Dual Power Supply with Automatic Changeover**
This allows immediate automatic switching to the other source if one of the two power supplies fails, in order to maintain continuity of service in installations where high redundancy is required. This obligatorily requires a dual power supply system.

FUOC **Smoke Sensor (Coolblade ED+)**
For fire detection with sensors placed on the unit. The sensor is a thermo-differential sensor and can perceive the speed with which the temperature is rising so as to react quickly to the currents of hot air from a fire. It can protect an area of 7 [m] x 7 [m].

FUMO **Smoke Sensor (Coolblade ED+)**
For smoke detection with sensors placed on the unit. The sensor is an optical sensor and has been type-approved in conformity with harmonized European regulations CEN EN 54 part 7 and 8. It can protect an area of 9 [m] x 9 [m].

ALMA **No Water Flow Alarm**
For chilled water units, this keeps the water flow at the inlet monitored and signals when there is no flow by generating an alarm condition.

A216 **Power Supply 210 V - 1 ph - 60 Hz**
60 Hz power supply configuration for single phase sizes.

A46N **Power Supply 380-400 V - 3 ph - 60 Hz + N**
60 Hz power supply with neutral (Voltage 380-400 V) configuration for three phases sizes.

BORU **Black Out Restart (Coolblade ED+)**
To allow a quicker restart after a power failure, the unit can be equipped with electrical capacitors which keep alive the control for a period of 15 - 20 seconds (based upon the configuration). This allows once the power is back (or for the dual power in case of the commutation to the second line) a quicker cooling restart.

CRM **Provision for Remote Condenser with Fan Speed Regulator (Coolblade ED+)**
This accessory is mandatory in case the unit is coupled with remote condenser from our company: type Standard, Plus, Low Noise with AC Fans. The provision consists of an automatic circuit breaker and the speed regulation for fans of remote condenser. The speed regulation is realized through a phase cutting speed controller. These components are always placed inside the indoor unit.

CREC **Provision for Remote EC Condenser (Coolblade ED+)**
This accessory is mandatory in case the unit is coupled with remote EC condenser from our company. The provision consists of an automatic circuit breaker and the speed regulation for fans of remote condenser. The speed regulation is realized directly by modulating signal coming from the electronic board of indoor unit. These components are always placed inside the indoor unit.

CRHT **Provision for Remote Condenser High Temperature (Coolblade ED+)**
This accessory is mandatory in case the unit is coupled with remote condenser HT (High External Temperature). The provision consists of an automatic circuit breaker and the speed regulation for fans of remote condenser. These components are always placed inside the indoor unit.

SUM **Probe for Humidity Indication (Coolblade ED+)**
This is available for cooling only or cooling plus heating units and enables display of ambient humidity and dehumidification in the cooling plus heating units.

REL **Electrical Heaters (Coolblade ED+)**
The accessory allows to have a unit equipped with electrical heaters to manage heating and reheating functions.

MUSR **Multiple (4) Return Air Sensors**
Solution with 4 sensors which read the return temperatures and make the average of the readings This allows a more distributed temperature reading and therefore a more precise regulation. The accessory is supplied lose, to be cabled on site based upon the specific lenght needs required by the application layout.

MUSM Multiple (4) Supply Air Sensors

Solution with 4 sensors which read the supply temperatures and make the average of the readings This allows a more distributed temperature reading and therefore a more precise regulation. The accessory is supplied lose, to be cabled on site based upon the specific lenght needs required by the application layout.

NETWORK ACCESSORIES

SERI RS485 serial board

Serial connection boards allow connection to supervision and remote management systems, thereby making it possible to display the main operating parameters and edit the main operational parameters. The RS485 serial board allows connection to supervision systems with the Modbus RTU protocol.

BAC BacNet Serial Card

Serial connection boards allow connection to supervision and remote management systems, thereby making it possible to display the main operating parameters and edit the main operational parameters. The BacNet serial board allows connection to supervision systems with the MS/TP protocol.

LON LonWorks Serial Card

Serial connection boards allow connection to supervision and remote management systems, thereby making it possible to display the main operating parameters and edit the main operational parameters. The LonWorks serial board allows connection to supervision systems with the FTT-10 protocol.

ETH Ethernet Serial Card

Serial connection boards allow connection to supervision and remote management systems, thereby making it possible to display the main operating parameters and edit the main operational parameters. The Ethernet serial board allows connection to supervision systems with the HTTP, SNMP, BAcnet/IP and Modbus/IP protocols. The Rj45 connector is placed on the back of the unit to make connection easier. A mini web server is installed in the serial board for remote display of the unit via html.

GRLD Datalink Local Netework

Datalink local netework management allows to have in place unit to unit communication in order to optimize the system operation both from efficiency and effectivness point of view.

OTHER ACCESSORIES

GCF Filter Covering Grill

The accessory is made off an aestetic grill placed on the back to cover the filters.

TECHNICAL SPECIFICATIONS

Coolblade DX

Unit size			12/12L	19/19L	25/25L
Total Cooling Capacity	(1)	kW	12.5	19.1	24.4
Sensible cooling capacity	(1)	kW	12.5	19.1	24.4
SHR			1.0	1.0	1.0
Total Cooling Capacity	(2)	kW	14.4	21.7	27.9
Sensible cooling capacity	(2)	kW	14.4	21.7	27.9
SHR			1.0	1.0	1.0
Total Cooling Capacity	(3)	kW	11.6	19.3	25.8
Sensible cooling capacity	(3)	kW	11.6	19.3	25.8
SHR			1.00	1.00	1.00
Fans					
Number			3	4	5
Nominal airflow		m^3/h	3,300	4,200	4,900
Min. air flow rate		m^3/h	2,150	2,730	3,190
Axial version					
Power input with nominal airflow		kW	0.14	0.25	0.41
Max. air flow rate		m^3/h	4000	4700	4900
Radial version, delivery from both sides					
Power input with nominal airflow			0.38	0.51	0.60
Max. air flow rate		m^3/h	3500	4500	5400
Radial version, delivery from one side					
Power input with nominal airflow			0.45	0.63	0.79
Max. air flow rate		m^3/h	3350	4200	4900
Noise Level					
Sound power level, suction side	(4)	dB(A)	71.0	72.3	73.4
Sound power level, discharge side	(4)	dB(A)	74.0	75.3	76.4
Sound power level, suction side	(5)	dB(A)	73.9	75.0	76.1
Sound power level, discharge side	(5)	dB(A)	78.3	79.5	80.4
Refrigerant circuit					
Suction connection		n°x mm	1x16	1x18	1x18
Liquid connection		n°x mm	1x12	1x12	1x16
Blue Box matching condensing unit					
Model			Epsilon Echos+LE 15	Epsilon Echos+LE 20	Epsilon Echos+LE 26
Compressor power input	(1)	kW	3.2	4.3	5.6
Compressor power input	(2)	kW	5.2	6.8	8.6
Fan power input		kW	0.3	0.8	1.3
Dimensions and weights of basic unit					
Length		mm	300	300	300
Depth		mm	1,000	1,000	1,000
Height	(6)	mm	2,003	2,003	2,003
Operating weight		kg	120	130	140
Dimensions and weight of "L" units					
Length		mm	300	300	300
Depth		mm	1,200	1,200	1,200
Height	(6)	mm	2,003	2,003	2,003
Operating weight		kg	160	170	180

All performance data are given at the following conditions: incoming air 35°C/27%RH

(1) Compressor speed 90rps, ambient air 35°C

(2) Compressor speed 120rps, ambient air 35°C

(3) Saturated evaporating temperature 12°C, saturated condensing temperature 45°C

(4) Axial fans, maximum air flow

(5) Radial fans, maximum airflow

(6) Height can be adjusted between 2003 and 2025mm

Coolblade ED+

Unit size			13/13L	21/21L
Total Cooling Capacity	(1)	kW	13.1	19.8
Sensible cooling capacity	(1)	kW	13.1	19.8
Compressor power input	(1)	kW	3.0	4.3
SHR	(1)		1.0	1.0
Total Cooling Capacity	(2)	kW	15.8	23.2
Sensible cooling capacity	(2)	kW	15.8	23.2
Compressor power input	(2)	kW	4.8	6.2
SHR	(2)		1.0	1.0
Total Cooling Capacity	(3)	kW	16.9	24.7
Sensible cooling capacity	(3)	kW	16.9	24.7
Compressor power input	(3)	kW	4.8	6.0
SHR	(3)		1.00	1.00
Fans				
Number			4	5
Nominal airflow		m^3/h	4,000	4,000
Min. air flow rate		m^3/h	2,800	2,800
Axial version				
Power input with nominal airflow		kW	0.258	0.405
Max. air flow rate		m^3/h	4,4000	4,000
Radial version, delivery from both sides				
Power input with nominal airflow			0,624	0,791
Max. air flow rate		m^3/h	4,550	5,400
Radial version, delivery from one side				
Power input with nominal airflow			0,624	0,791
Max. air flow rate		m^3/h	4,550	5,400
Noise Level				
Sound power level, suction side	(4)	dB(A)	73.1	73.4
Sound power level, discharge side	(4)	dB(A)	76.3	76.6
Sound power level, suction side	(5)	dB(A)	76.7	77.0
Sound power level, discharge side	(5)	dB(A)	80.0	80.3
Refrigerant circuit				
Suction connection		n°x mm	1x12	1x16
Liquid connection		n°x mm	1x12	1x12
Blue Box matching condensing unit				
Standard Model (AC/EC Fan/s)			NHNM 1145.3	NHNM 1245.2
Standard Model LN (AC/EC Fan/s)			NHLM 1150.4	NHLM 1245.3
Oversized Model (AC/EC Fan/s)			NHNM 1245.2	NHNM 1245.4
Oversized Model LN (AC/EC Fan/s)			NHLM 1245.3	NHLM 2245.2
HT Model (AC Fan/s)			NHNM 1245.4	NHNM 2245.2
Dimensions and weights of basic unit				
Length		mm	300	300
Depth		mm	1,000	1,000
Height	(6)	mm	2,003	2,003
Operating weight		kg	120	130
Dimensions and weight of "L" units				
Length		mm	300	300
Depth		mm	1,200	1,200
Height	(6)	mm	2,003	2,003
Operating weight		kg	160	170

All performance data are given at the following conditions: incoming air 35°C/27%RH

(1) Compressor speed 90 rps, saturated condensing temperature 45°C

(2) Compressor speed 120 rps, saturated condensing temperature 45°C, Axial Fans

(3) Compressor speed 120 rps, saturated condensing temperature 45°C, Radial Fans

(4) Axial fans, maximum air flow

(5) Radial fans, maximum airflow

(6) Height can be adjusted between 2003 and 2025mm

Coolblade CW - DW

Unit size			16/16L	27/27L	22/22L
Total Cooling Capacity	(1)	kW	16.5	27.2	21.8
Sensible cooling capacity	(1)	kW	16.5	27.2	21.8
NSEER with axial fans	(1)		125.9	63.8	50.9
NSEER with radial fans	(1)		43.6	44.3	35.3
Total Cooling Capacity	(2)	kW	19.0	31.4	25.2
Sensible cooling capacity	(2)	kW	19.0	31.4	25.2
NSEER with axial fans	(2)		145.2	73.8	59.0
NSEER with radial fans	(2)		50.4	51.3	41.0
Total Cooling Capacity	(3)	kW	14.6	24.3	19.3
Sensible cooling capacity	(3)	kW	14.6	24.3	19.3
NSEER with axial fans	(3)		111.3	56.9	45.0
NSEER with radial fans	(3)		38.5	39.5	31.2
Fans					
Number			3	5	5
Nominal airflow		m^3/h	3,200	4,800	4,800
Min. air flow rate		m^3/h	2,150	3,190	3,190
Axial version					
Power input with nominal airflow		kW	0.13	0.42	0.42
Max. air flow rate		m^3/h	3,400	4,800	4,800
Radial version, delivery from both sides					
Power input with nominal airflow			0.37	0.60	0.60
Max. air flow rate		m^3/h	3,600	5,200	5,200
Radial version, delivery from one side					
Power input with nominal airflow			0.42	0.79	0.79
Max. air flow rate		m^3/h	3,300	4,800	4,800
Hydraulic circuit					
Number of hydraulic circuits			1	1	2
Total pressure drop without valves	(1)	kPa	26	36	45
Total pressure drop with valves	(1)	kPa	46	60	79
In/out connections			G3/4"	G1"	2xG3/4"
Internal volume		dm^3	8.5	14.8	2x8,5
Noise Level					
Sound power level, suction side	(4)	dB(A)	71.1	73.4	73.4
Sound power level, discharge side	(4)	dB(A)	74.1	76.4	76.4
Sound power level, suction side	(5)	dB(A)	73.9	76.1	76.1
Sound power level, discharge side	(5)	dB(A)	78.3	80.4	80.4
Dimensions and weights of basic unit					
Length		mm	300	300	300
Depth		mm	1,000	1,000	1,000
Height	(6)	mm	2,003	2,003	2,003
Operating weight		kg	118	136	143
Dimensions and weight of "L" units					
Length		mm	300	300	300
Depth		mm	1,200	1,200	1,200
Height	(6)	mm	2,003	2,003	2,003
Operating weight		kg	132	151	159

All performance data are given at the following conditions: incoming air 35°C/27%RH

(1) Inlet/outlet water temperature 13/18°C

(2) Inlet/outlet water temperature 10/15°C

(3) Inlet/outlet water temperature 15/20°C

(4) Axial fans, maximum air flow

(5) Radial fans, maximum airflow

(6) Height can be adjusted between 2003 and 2025mm

ELECTRICAL DATA

Coolblade DX

Unit size			12/12L	19/19L	25/25L
Max. absorbed power	(1)	kW	0.25	0.33	0.42
Max. absorbed current	(1)	A	2.2	2.9	3.6
Max. absorbed power	(2)	kW	0.50	0.67	0.84
Max. absorbed current	(2)	A	4.2	5.6	7.0
Power supply		V/ph/Hz	230/1~/50 ±5%	230/1~/50 ±5%	230/1~/50 ±5%

(1) Axial fans

(2) Radial fans

Coolblade ED+

Unit size			13/13L	21/21L
Maximum absorbed power for unit only cooling	(1)	kW	6.0	10.0
Maximum absorbed current for unit only cooling	(1)	A	16.9	20.1
Maximum absorbed power for unit only cooling	(2)	kW	7.0	11.0
Maximum absorbed current for unit only cooling	(2)	A	19.4	23.5
Delta power absorption for electrical heaters		kW	+3.3	+3.3
Delta current absorption for electrical heaters		A	+14.3	+14.3
Delta power absorption for humidifier		kW	+1.1	+1.1
Delta current absorption for humidifier		A	+4.9	+4.9
Maximum absorbed power for unit cooling + heating + humidification	(1)	kW	10.4	14.4
Maximum absorbed current for unit cooling + heating + humidification	(1)	A	36.1	39.3
Maximum absorbed power for unit cooling + heating + humidification	(2)	kW	11.4	15.4
Maximum absorbed current for unit cooling + heating + humidification	(2)	A	38.6	42.7
Power supply		V/ph/Hz	230/1~/50 ±5%	400/3~/50 ±5% + Neutral

(1) Axial fans

(2) Radial fans

Coolblade CW - DW

Unit size			16/16L	27/27L	22/22L
Max. absorbed power	(1)	kW	0.25	0.42	0.42
Max. absorbed current	(1)	A	2.2	3.6	3.6
Max. absorbed power	(2)	kW	0.5	0.8	0.8
Max. absorbed current	(2)	A	4.2	7.0	7.0
Power supply		V/ph/Hz	230/1~/50 ±5%	230/1~/50 ±5%	230/1~/50 ±5%

(1) Axial fans

(2) Radial fans

NOISE LEVELS

COOLBLADE DX-CW-DW (Axial Fans)

Supply side

Model	Sound power level octave-band [dB] Central frequency [Hz]								A-weighted sound power level discharge side [dB(A)]
	63	125	250	500	1000	2000	4000	8000	
Coolblade DX12/12L - CW16/16L	33.1	51.3	65.3	66.8	69.6	69.5	62.3	**51.3**	**74.1**
Coolblade DX19/19L	34.3	52.5	66.5	68.0	70.8	70.7	63.5	**52.5**	**75.3**
Coolblade DX25/25L - CW27/27L - DW22/22L	35.3	53.5	67.5	70.0	71.8	71.6	64.4	**53.5**	**76.4**

Suction side

Model	Sound power level octave-band [dB] Central frequency [Hz]								A-weighted sound power level supply side [dB(A)]
	63	125	250	500	1000	2000	4000	8000	
Coolblade DX12/12L - CW16/16L	31.7	51.7	67.9	69.4	66.9	63.1	54.9	**43.9**	**71.1**
Coolblade DX19/19L	33.0	52.9	69.1	70.6	68.1	64.3	56.1	**45.1**	**72.3**
Coolblade DX25/25L - CW27/27L - DW22/22L	33.9	53.9	70.1	71.6	69.1	65.3	57.0	**46.0**	**73.4**

COOLBLADE DX-CW-DW (Radial Fans)

Supply side

Model	Sound power level octave-band [dB] Central frequency [Hz]								A-weighted sound power level discharge side [dB(A)]
	63	125	250	500	1000	2000	4000	8000	
Coolblade DX12/12L - CW16/16L	36.4	48.4	61.7	73.8	73.5	73.3	65.5	**58.8**	**78.3**
Coolblade DX19/19L	37.6	49.6	62.9	75.0	74.7	74.5	66.7	**60.0**	**79.5**
Coolblade DX25/25L - CW27/27L - DW22/22L	38.6	50.6	63.9	76.0	75.7	75.4	67.7	**61.0**	**80.4**

Suction side

Model	Sound power level octave-band [dB] Central frequency [Hz]								A-weighted sound power level supply side [dB(A)]
	63	125	250	500	1000	2000	4000	8000	
Coolblade DX12/12L - CW16/16L	34.0	47.8	61.4	72.4	69.2	66.7	60.1	**51.3**	**73.9**
Coolblade DX19/19L	35.2	49.0	62.6	73.6	70.4	67.9	61.3	**52.5**	**75.0**
Coolblade DX25/25L - CW27/27L - DW22/22L	36.2	50.0	63.6	74.6	71.4	68.9	62.3	**53.5**	**76.1**

COOLBLADE ED+ (Axial Fans)

Supply side

Model	Sound power level octave-band [dB]								A-weighted sound power level discharge side [dB(A)]
	Central frequency [Hz]								
	63	125	250	500	1000	2000	4000	8000	
Coolblade ED+ 13	43.8	48.6	56.0	67.3	72.9	71.5	64.9	**53.4**	**76.3**
Coolblade ED+ 21	44.3	49.0	56.4	67.6	73.2	71.8	65.0	**53.3**	**76.6**

Suction side

Model	Sound power level octave-band [dB]								A-weighted sound power level supply side [dB(A)]
	Central frequency [Hz]								
	63	125	250	500	1000	2000	4000	8000	
Coolblade ED+ 13	28.2	49.6	67.7	62.8	67.9	67.3	59.9	**47.6**	**73.1**
Coolblade ED+ 21	28.7	50.0	68.1	63.1	68.2	67.6	60.0	**47.5**	**73.4**

COOLBLADE ED+ (Radial Fans)

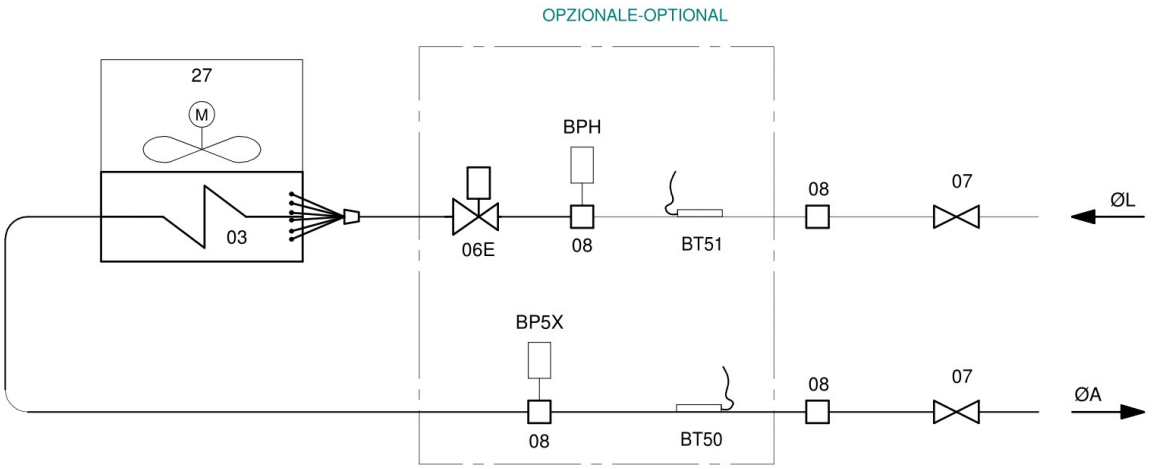
Supply side

Model	Sound power level octave-band [dB]								A-weighted sound power level discharge side [dB(A)]
	Central frequency [Hz]								
	63	125	250	500	1000	2000	4000	8000	
Coolblade ED+ 13	46.8	51.8	59.2	70.8	76.4	75.5	68.9	**57.5**	**80.0**
Coolblade ED+ 21	47.3	52.2	59.6	71.1	76.7	75.8	69.0	**57.4**	**80.3**

Suction side

Model	Sound power level octave-band [dB]								A-weighted sound power level supply side [dB(A)]
	Central frequency [Hz]								
	63	125	250	500	1000	2000	4000	8000	
Coolblade ED+ 13	31.2	52.8	70.9	66.3	71.4	71.3	63.9	**51.7**	**76.7**
Coolblade ED+ 21	31.7	53.2	71.3	66.6	71.7	71.6	64.0	**51.6**	**77.0**

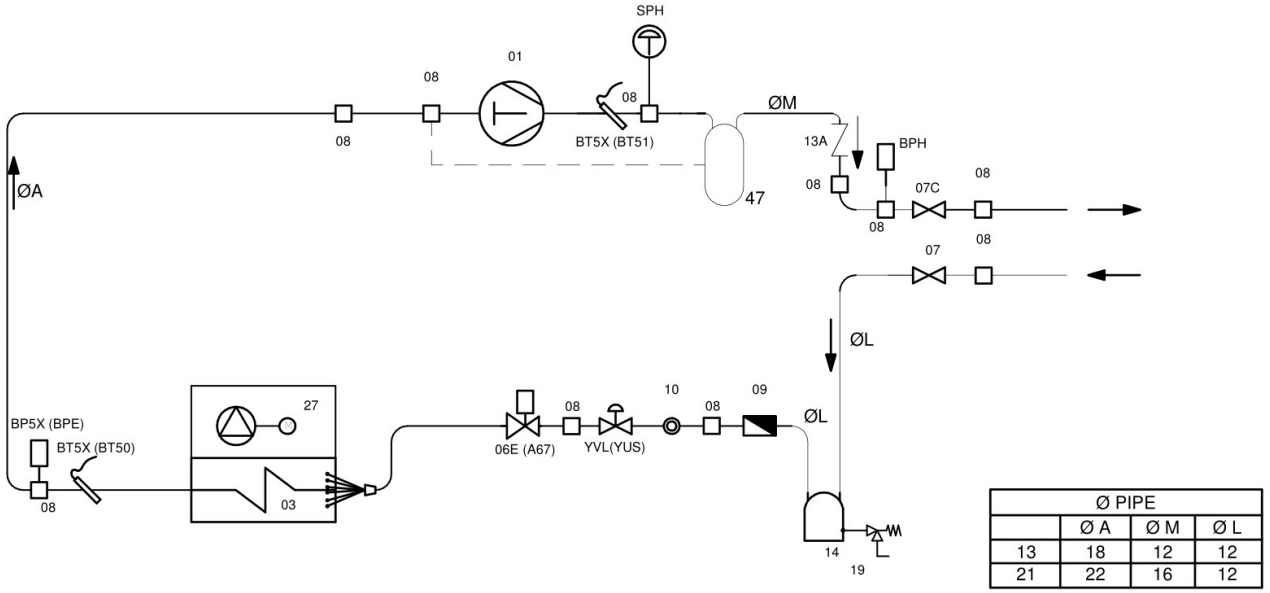
REFRIGERANT DIAGRAMS
COOLBLADE DX



03	Evaporatore	Evaporator
06E	Valvola di Espansione Elettronica	Electronic Expansion Valve
07	Rubinetto Linea del Liquido	Liquid Line Valve
08	Presa di Carica	Charging Connection
27	Ventlatore EC	EC Fan
BPH	Trasduttore di Alta Pressione	High Pressure Transducer
BP5X	Trasduttore di Pressione Valvola Elettronica	Pressure Transducer Electronic Expansion Valve
BT5X	Sonda di Temperatura Valvola Elettronica	Temperature Probe Electronic Expansion Valve

TUBO RAME - COPPER PIPE (Ø mm)			
TAGLIA - SIZE	12	19	25
ØA	Ø16	Ø18	
ØL	Ø12		Ø16

COOLBLADE ED+



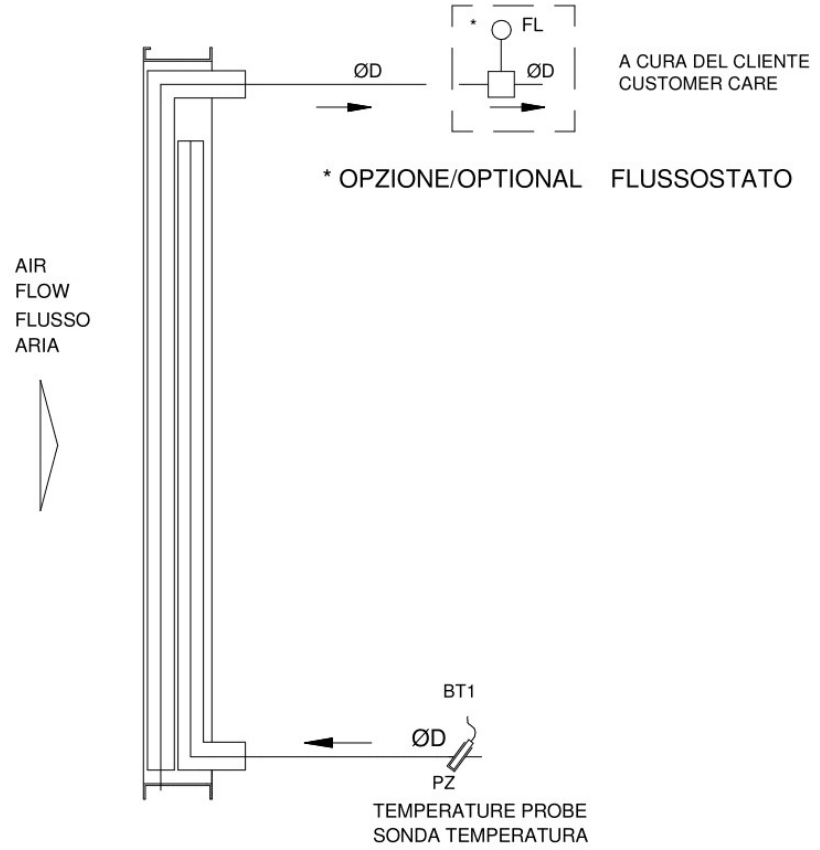
Ø PIPE			
	Ø A	Ø M	Ø L
13	18	12	12
21	22	16	12

01	Compressore	Compressor
03	Evaporatore	Evaporator
06E	Valvola di Espansione Elettronica	Electronic Expansion Valve
07	Rubinetto Linea del Liquido	Liquid Line Valve
07C	Rubinetto Linea di Mandata	Discharge Line Valve
08	Presa di Carica	Charging Connection
09	Filtro Linea Liquido	Liquid Line Filter
10	Indicatore umidita'	Moisture Indicator Sight Glass
13A	Valvola di RItegno Linea di Mandata	Delivery Line Check Valve

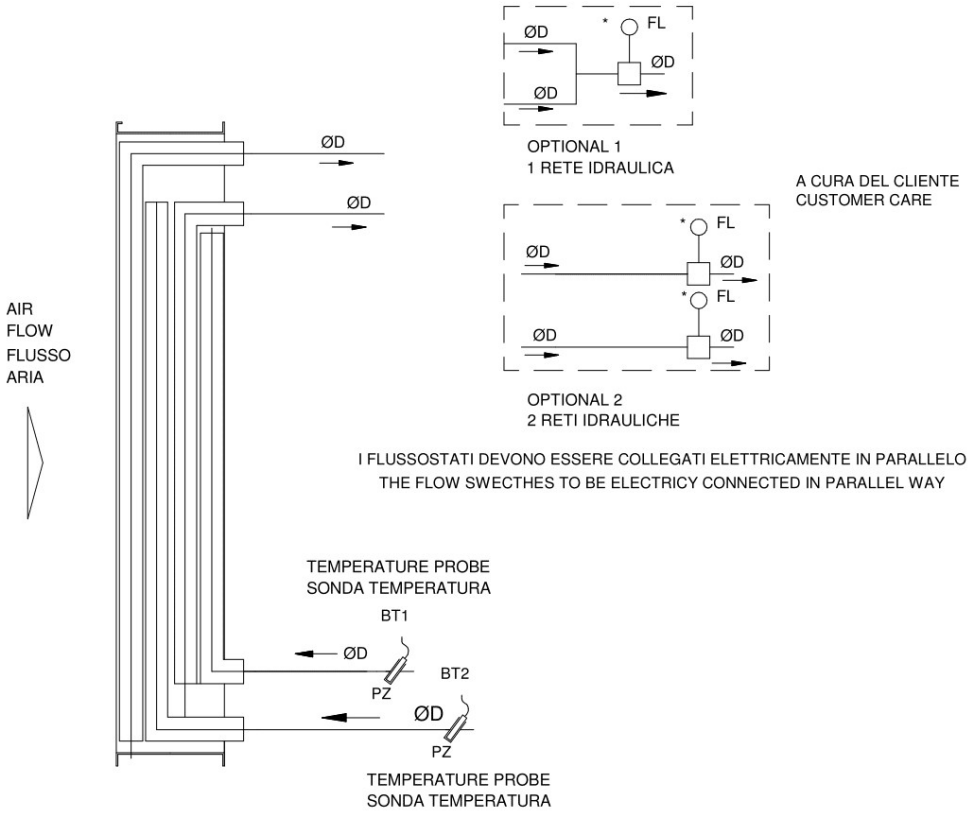
14	Ricevitore di Liquido	Liquid Receiver
19	Valvola di Sicurezza	Safety Valve
27	Ventilatore EC	EC Fan
47	Separatore Olio	Oil Separator
BPH	Trasduttore di Alta Pressione	High Pressure Transducer
BP5X	Trasduttore di Pressione Valvola Elettronica	Pressure Transducer Electronic Expansion Valve
BT5X	Sonda di Temperatura Valvola Elettronica	Temperature Probe Electronic Expansion Valve
SPH	Pressostato Alta Pressione	High Pressure Switch
YVL	Valvola Solenoide Linea del Liquido	Liquid Line Solenoid Valve

HYDRAULIC DIAGRAMS
COOLBLADE CW-DW

size 16/16L/27/27L

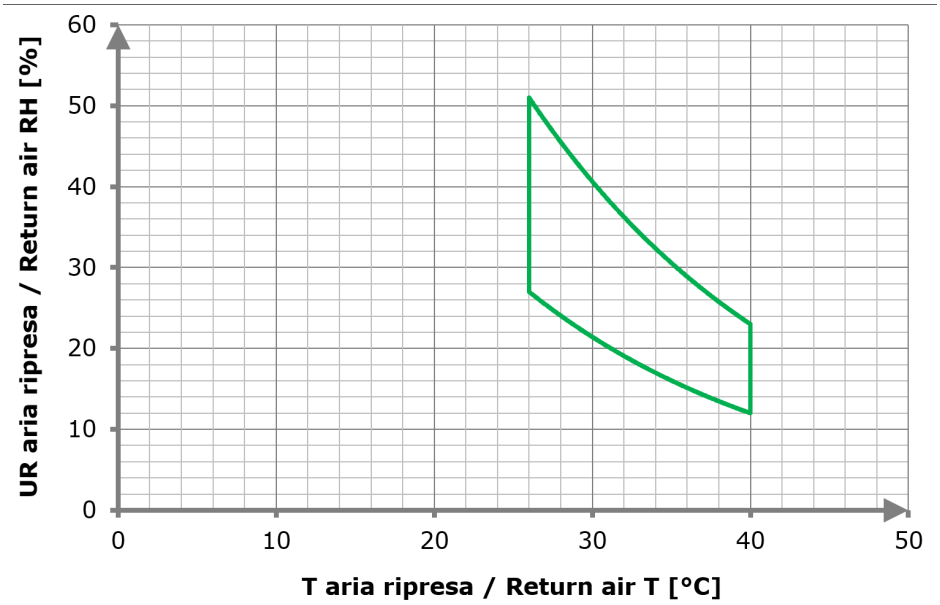


size 22/22L



OPERATING LIMITS – COOLBLADE DX

As concerns the combination of temperatures and relative humidities, it is strongly recommended that the design conditions of the return air (hot aisle) fall within the limits specified below:

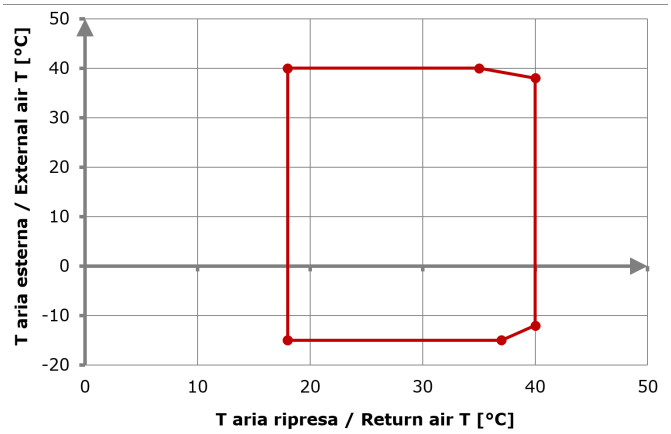


It should be emphasised that the standard design temperatures of a hot aisle/cold aisle system with containment are usually higher than 30°C; however, Coolblade DX units can also operate at lower return air temperatures, within the limits stated below.

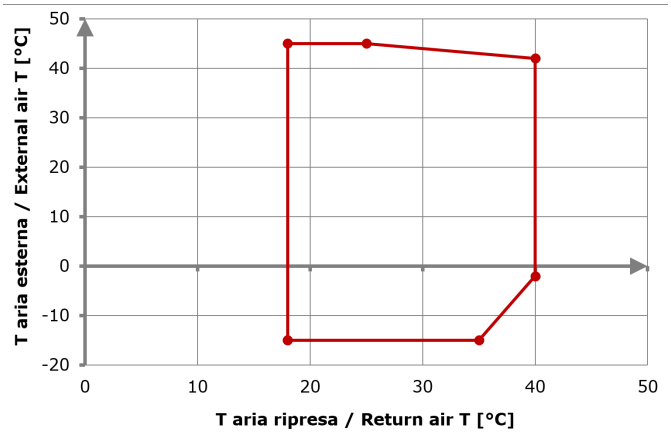
Coupled to Epsilon Echos + LE condensing unit

The operating limits indicated below are valid only for the standard coupling (see the "technical specifications" section).

COOLBLADE DX - EPSILON ECHOS+ LE



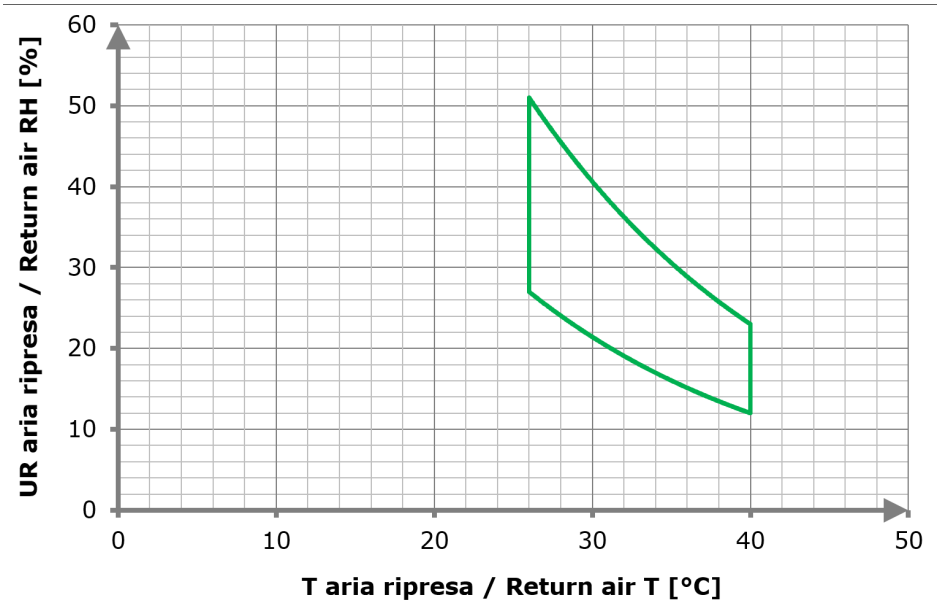
Condensing unit at maximum capacity (compressor at 120rps)



Condensing unit at rated capacity (compressor at 90rps)

OPERATING LIMITS – COOLBLADE ED+

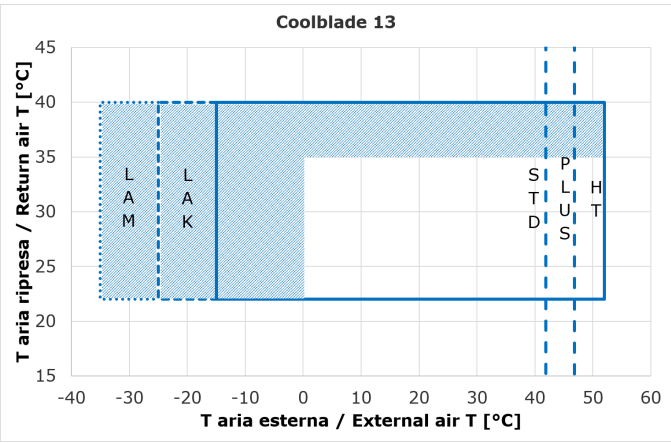
As concerns the combination of temperatures and relative humidities, it is strongly recommended that the design conditions of the return air (hot aisle) fall within the limits specified below:

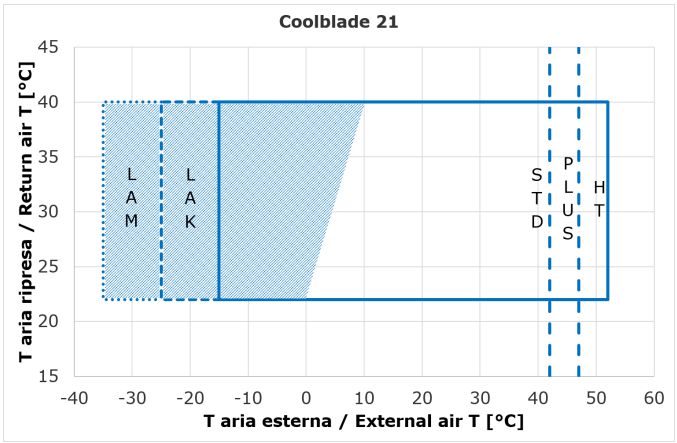


As concerns the combination of temperatures and relative humidities, it is strongly recommended that the design conditions of the return air (hot aisle) fall within the limits specified below:

COOLBLADE ED+ - REMOTE CONDENSER RC GREEN

Below charts representing Coolblade limits based upon external temperatures, once coupled with RC Green remote air cooled condensers.





STD_PLUS_HT With condenser provided from Blue Box and fan speed regulator. Temperature limit is only an indication. The real value has to be verified using the selection Software (it varies based upon the load, working conditions, piping length)

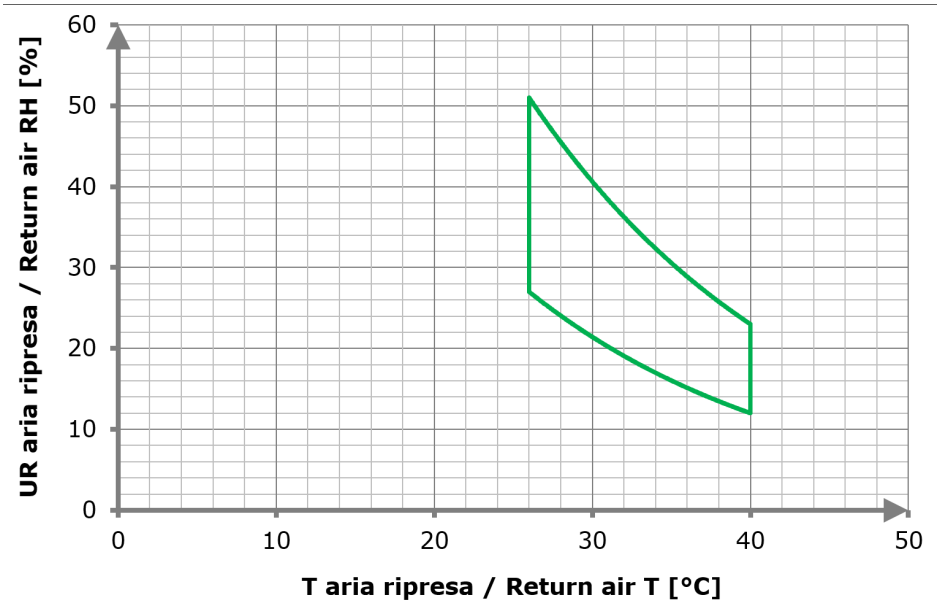
LAK Low Ambient Kit for condensing control at low external temperature.

LAM Oversized Low Ambient Kit for condensing control at extremely low external temperature.

On shaded areas compressor might limit its fan speed due to working envelope control, in such case cooling capacity will be reduced.

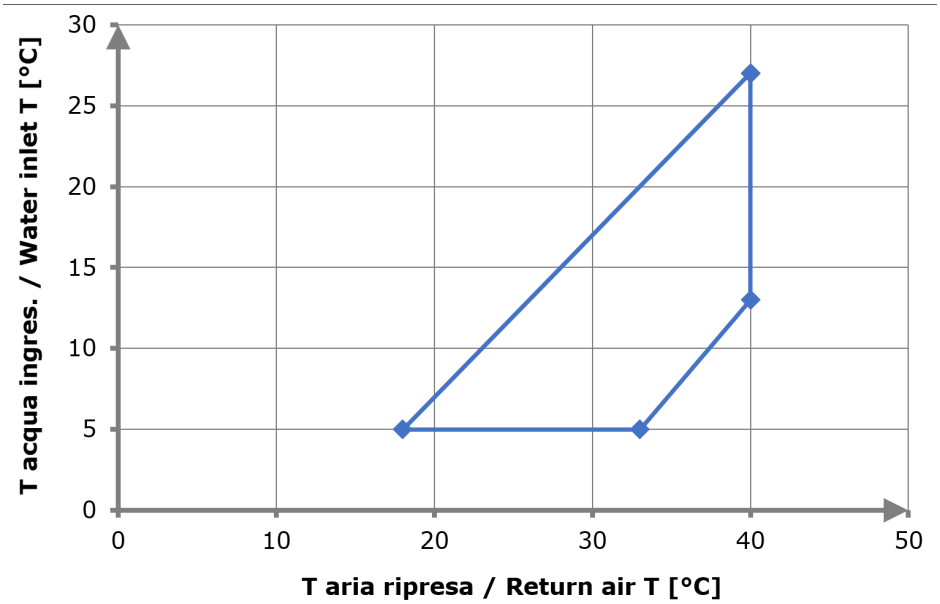
OPERATING LIMITS – COOLBLADE CW-DW

As concerns the combination of temperatures and relative humidities, it is strongly recommended that the design conditions of the return air (hot aisle) fall within the limits specified below:



It should be emphasised that the standard design temperatures of a hot aisle/cold aisle system with containment are usually higher than 30°C; however, Coolblade CW-DW units can also operate at lower return air temperatures, within the limits stated below.

The operating limits indicated below refer to the optimal operation of the units. Outside the indicated limits, undesirable condensate and dehumidification problems, high head losses on hydraulic side or insufficient heat exchange may occur.

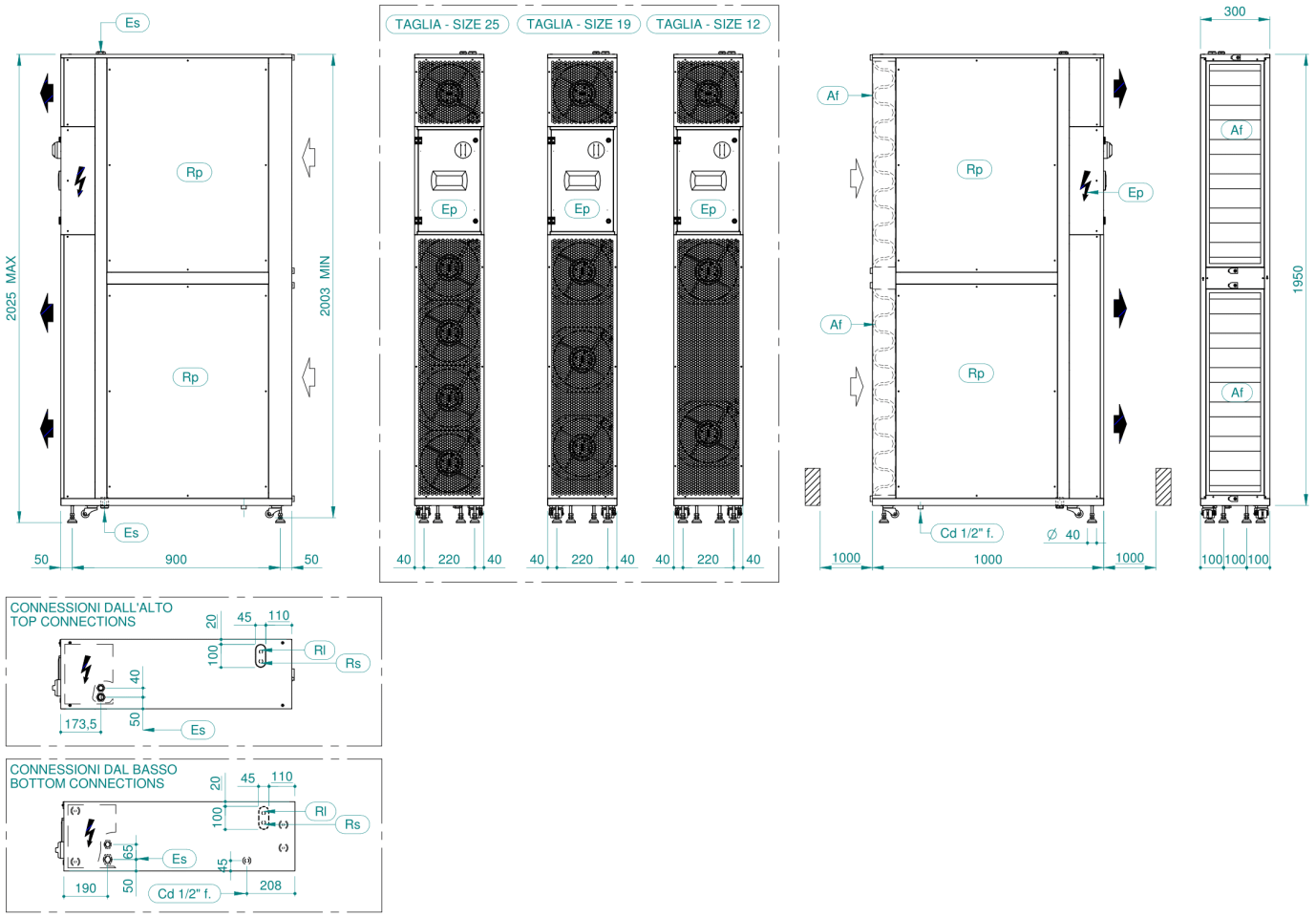


The maximum percentage of glycol is 50%.

DIMENSIONAL DIAGRAMS

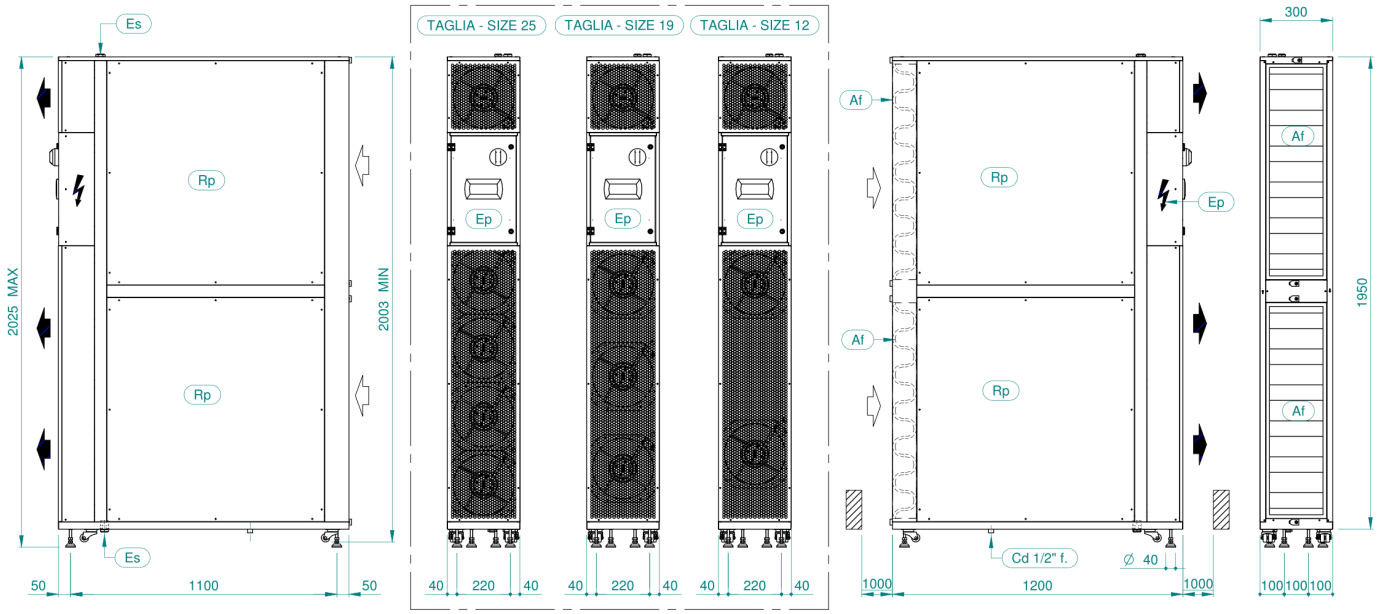
COOLBLADE DX A - AXIAL FANS
DEPTH 1000

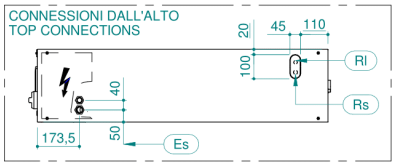
A4G613 - A

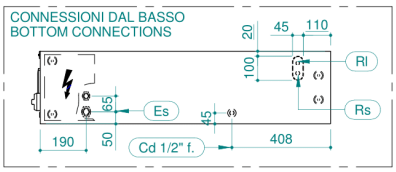


COOLBLADE DX A - AXIAL FANS
DEPTH 1200

A4G636 - A

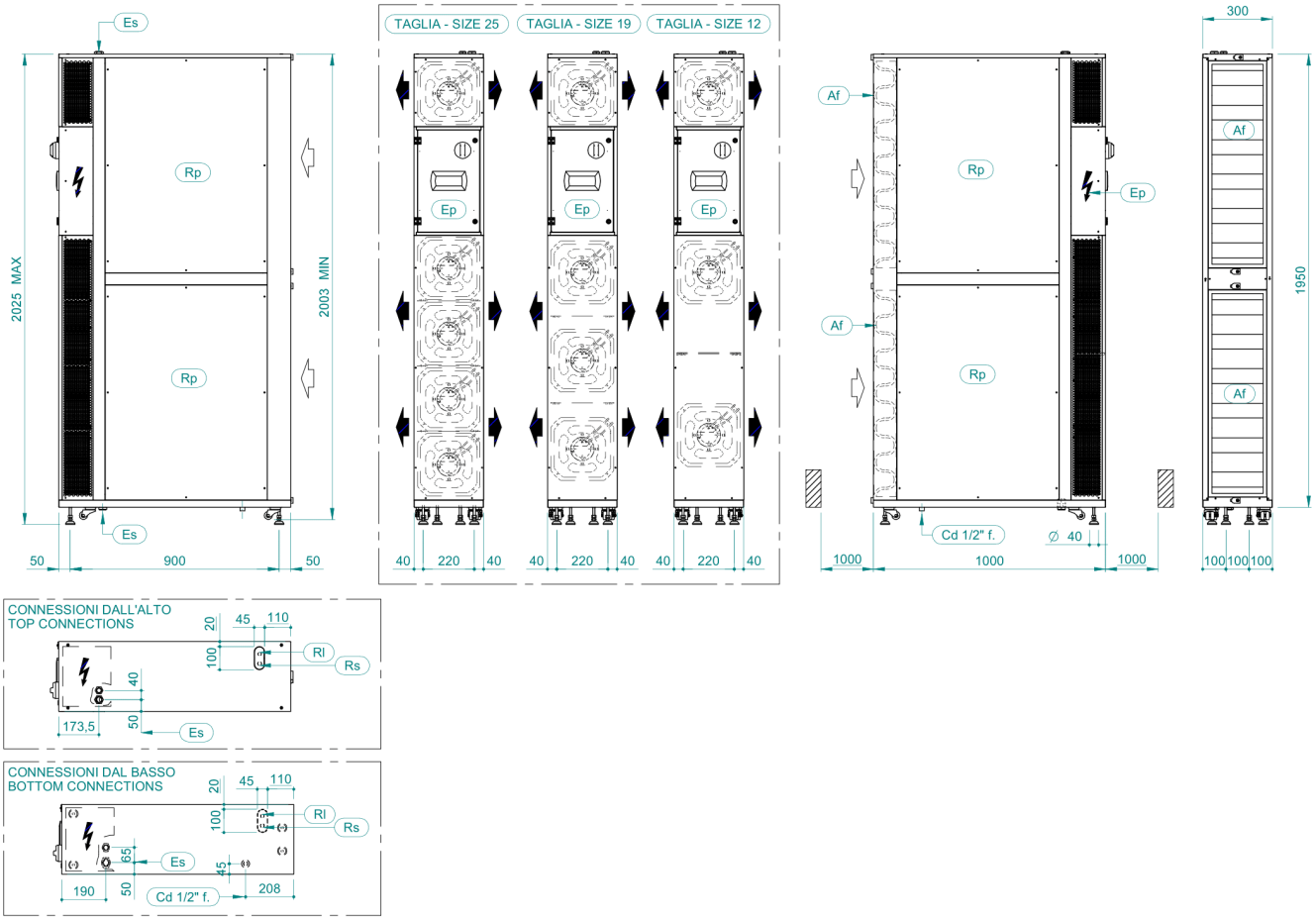






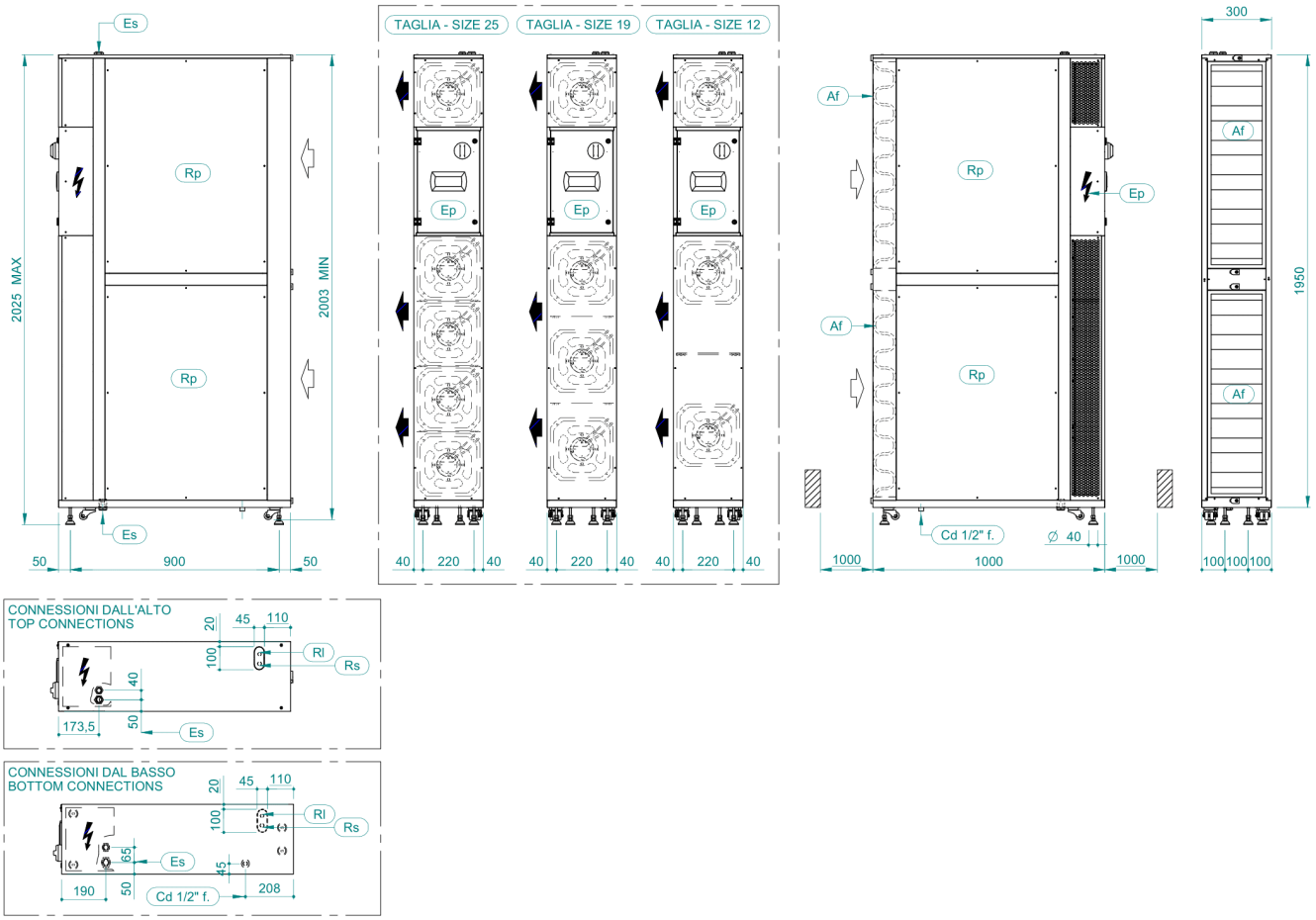
COOLBLADE DX R - RADIAL FANS
DEPTH 1000 (AIR DELIVERY FROM BOTH SIDES)

A4G614 - A



COOLBLADE DX RR - RADIAL FANS
DEPTH 1000 (AIR DELIVERY FROM THE RIGHT)

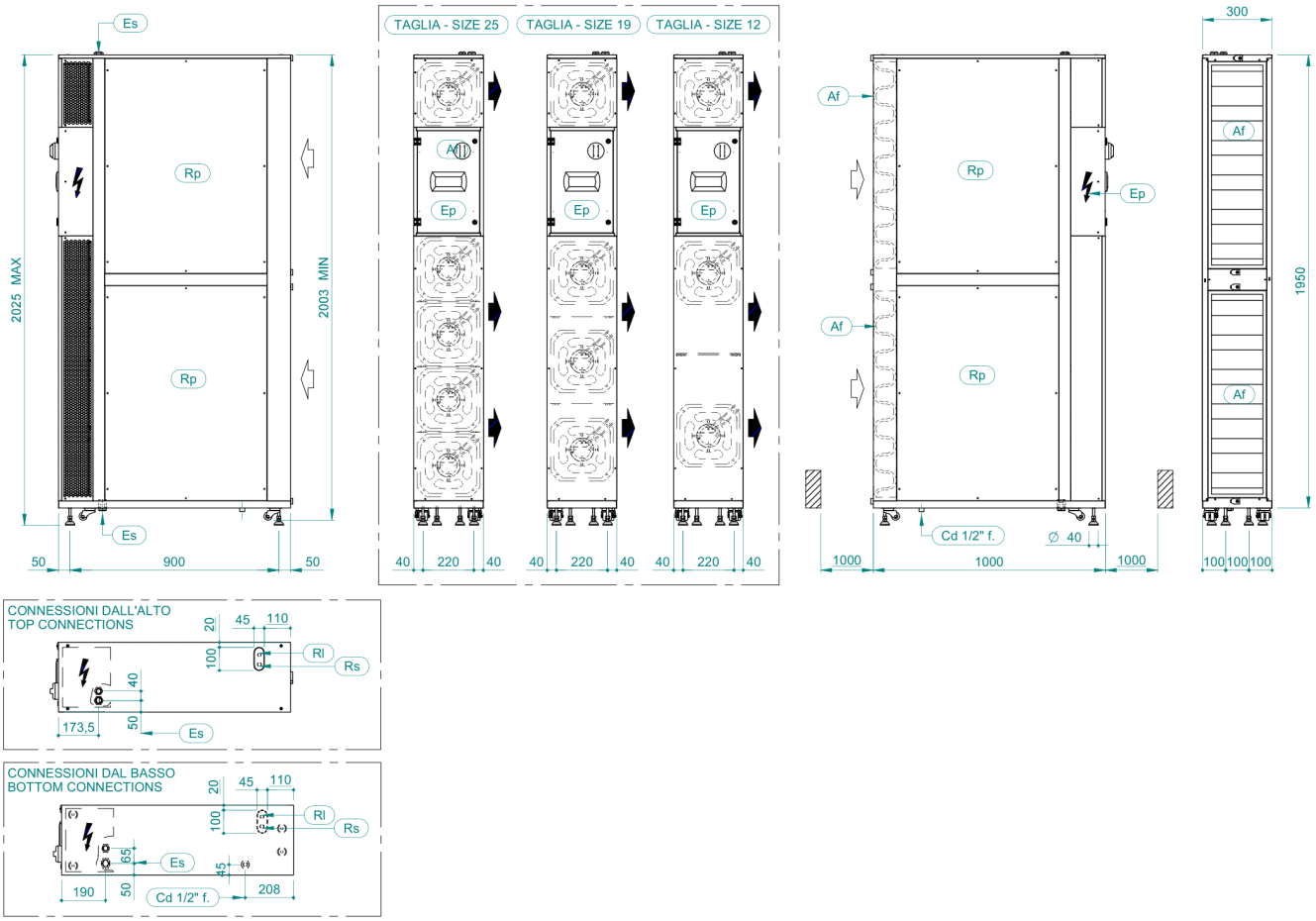
A4G614 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

COOLBLADE DX RL - RADIAL FANS
DEPTH 1000 (AIR DELIVERY FROM THE LEFT)

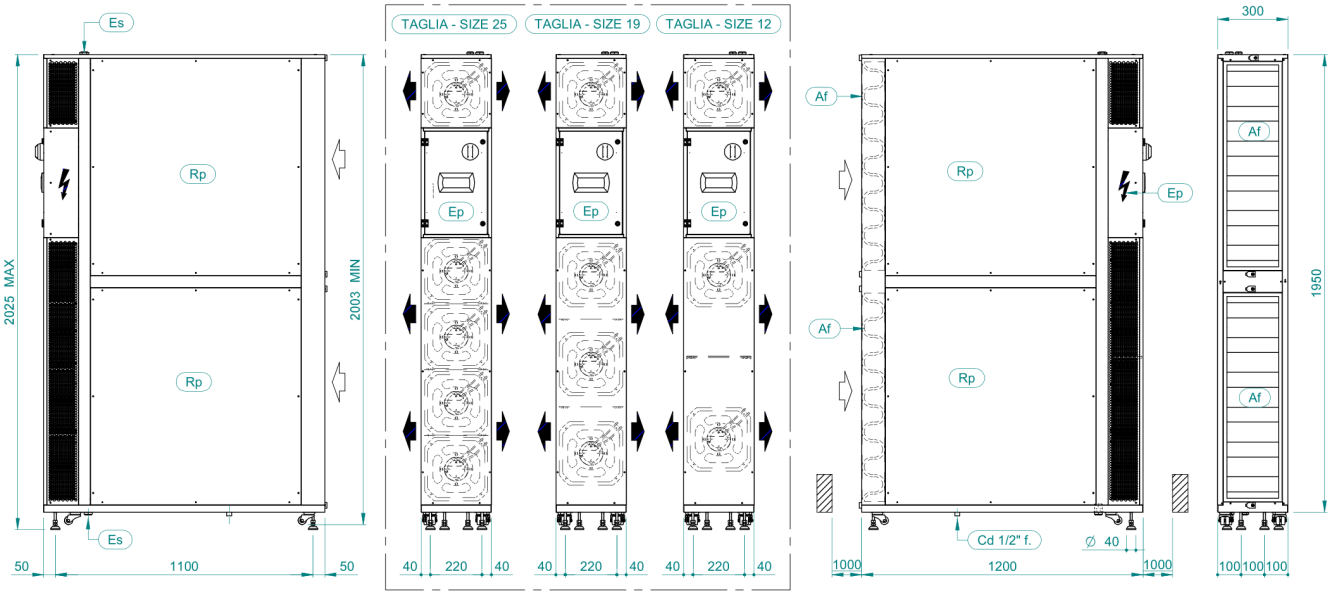
A4G614 - A

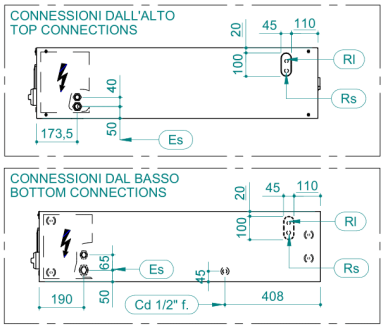


Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

COOLBLADE DX R - RADIAL FANS
DEPTH 1200 (AIR DELIVERY FROM BOTH SIDES)

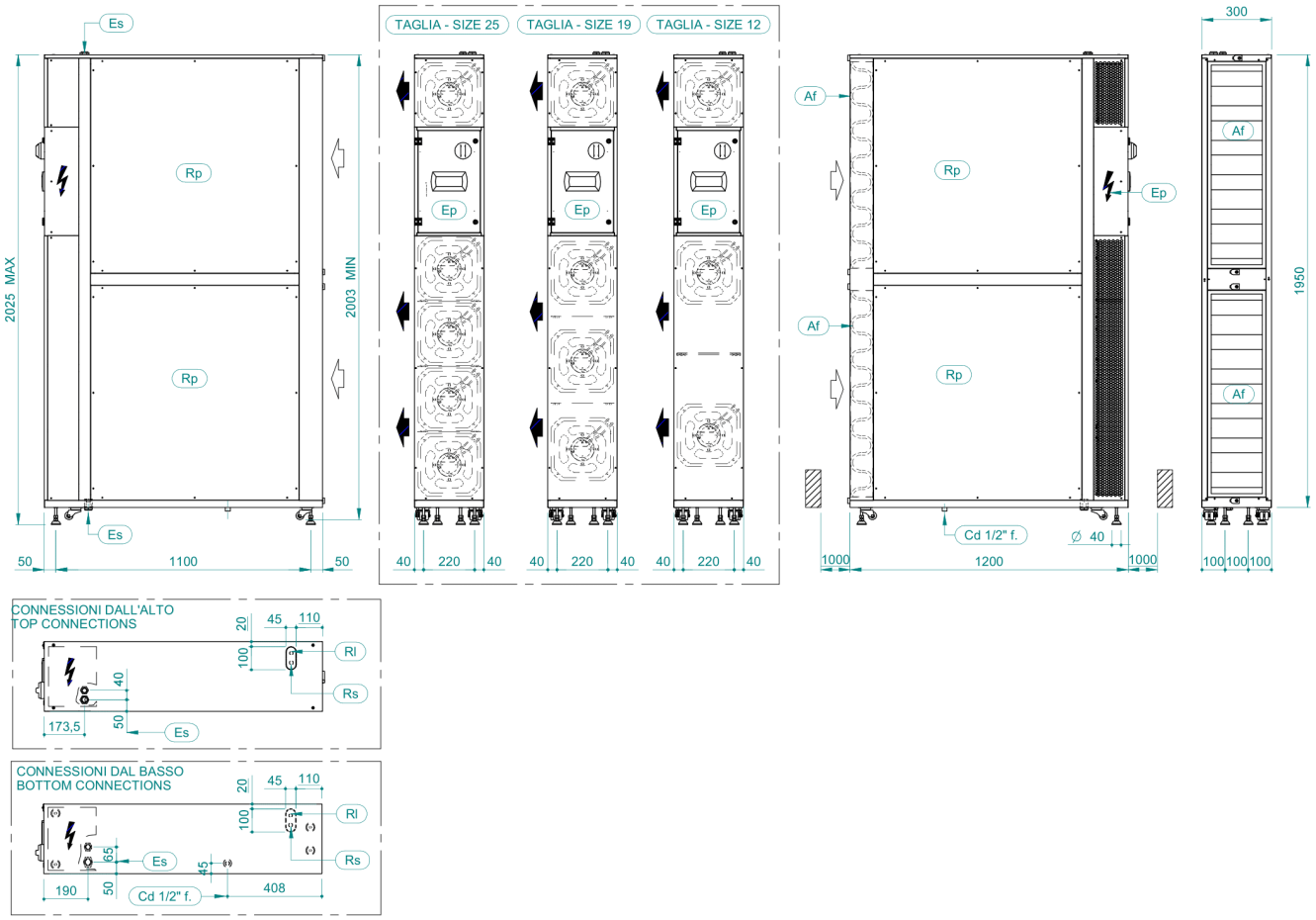
A4G637 - A





COOLBLADE DX RR - RADIAL FANS
DEPTH 1200 (AIR DELIVERY FROM THE RIGHT)

A4G637 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

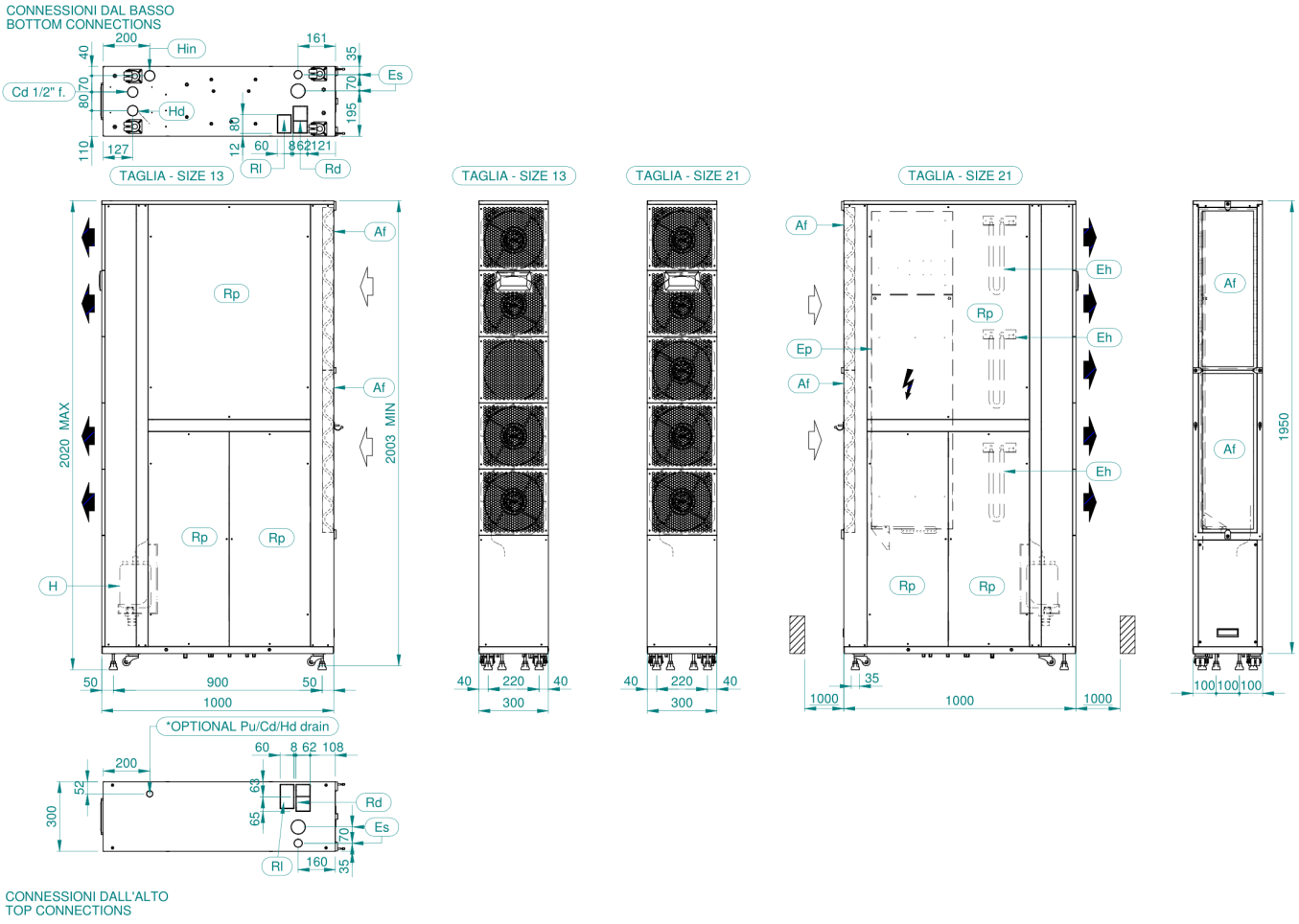
COOLBLADE DX RL - RADIAL FANS
DEPTH 1200 (AIR DELIVERY FROM THE LEFT)

A4G637 - A

Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

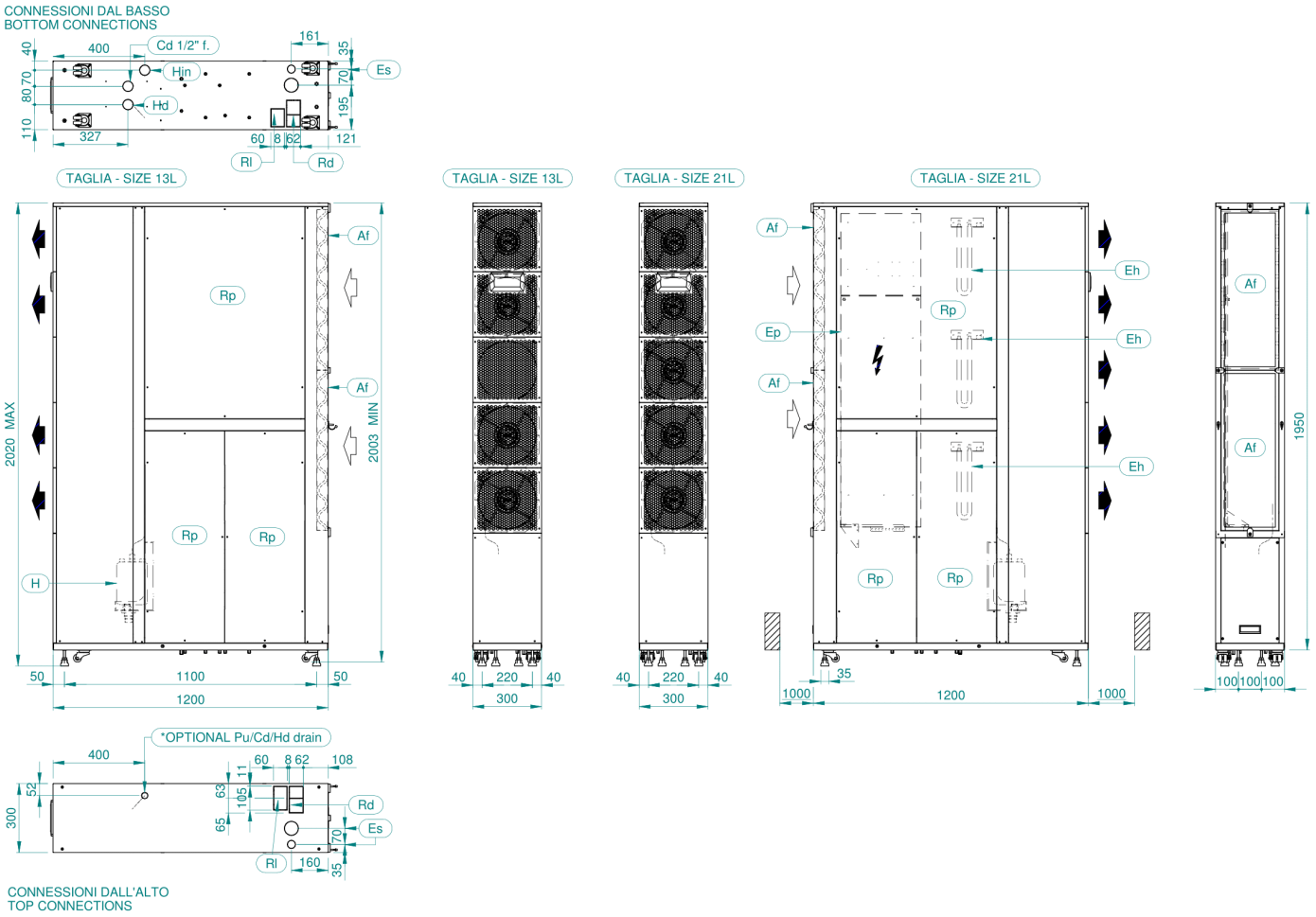
COOLBLADE ED+ A - AXIAL FANS
DEPTH 1000

DDIM000375 - A



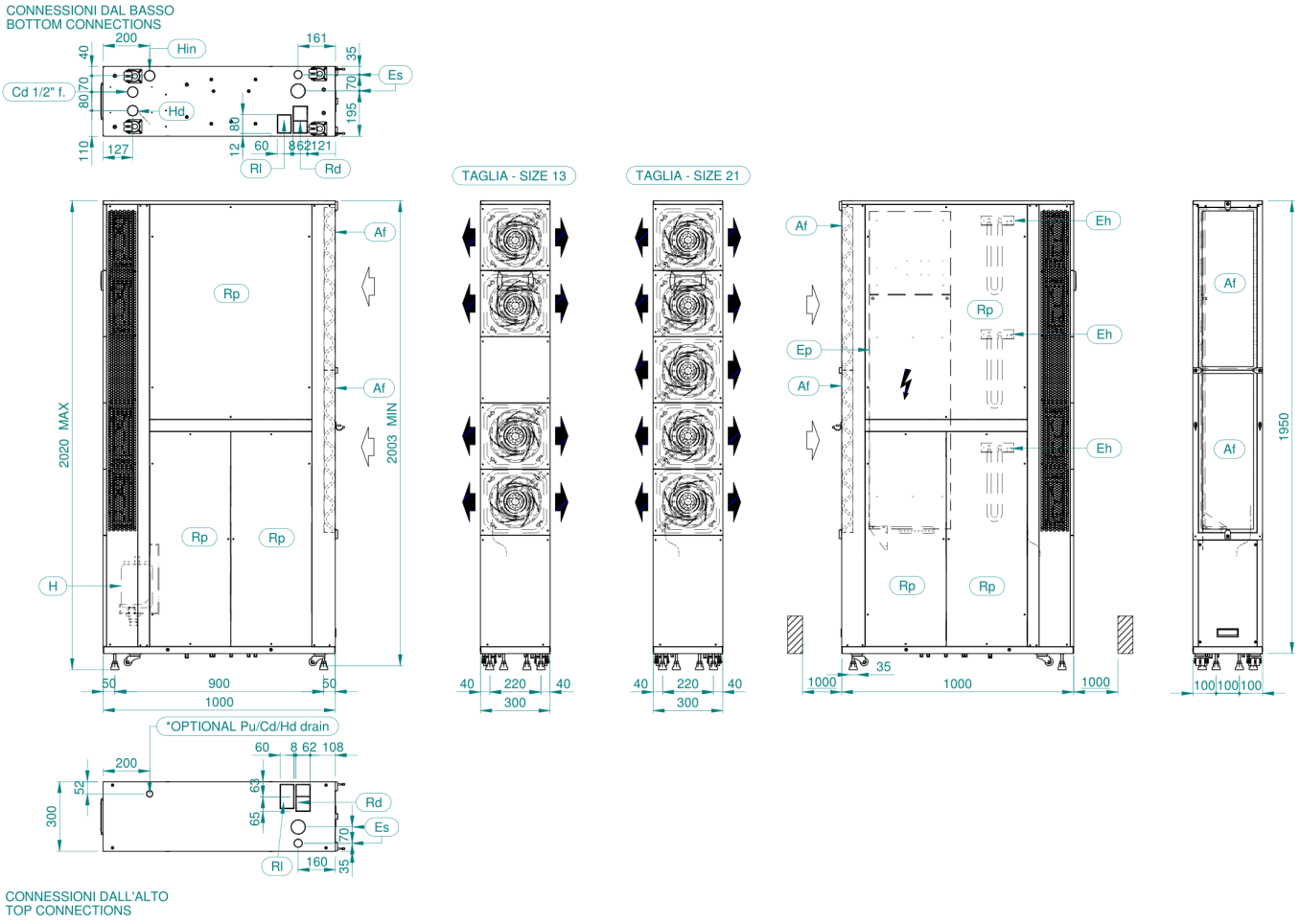
COOLBLADE ED+ A - AXIAL FANS
DEPTH 1200

DDIM000381 - A



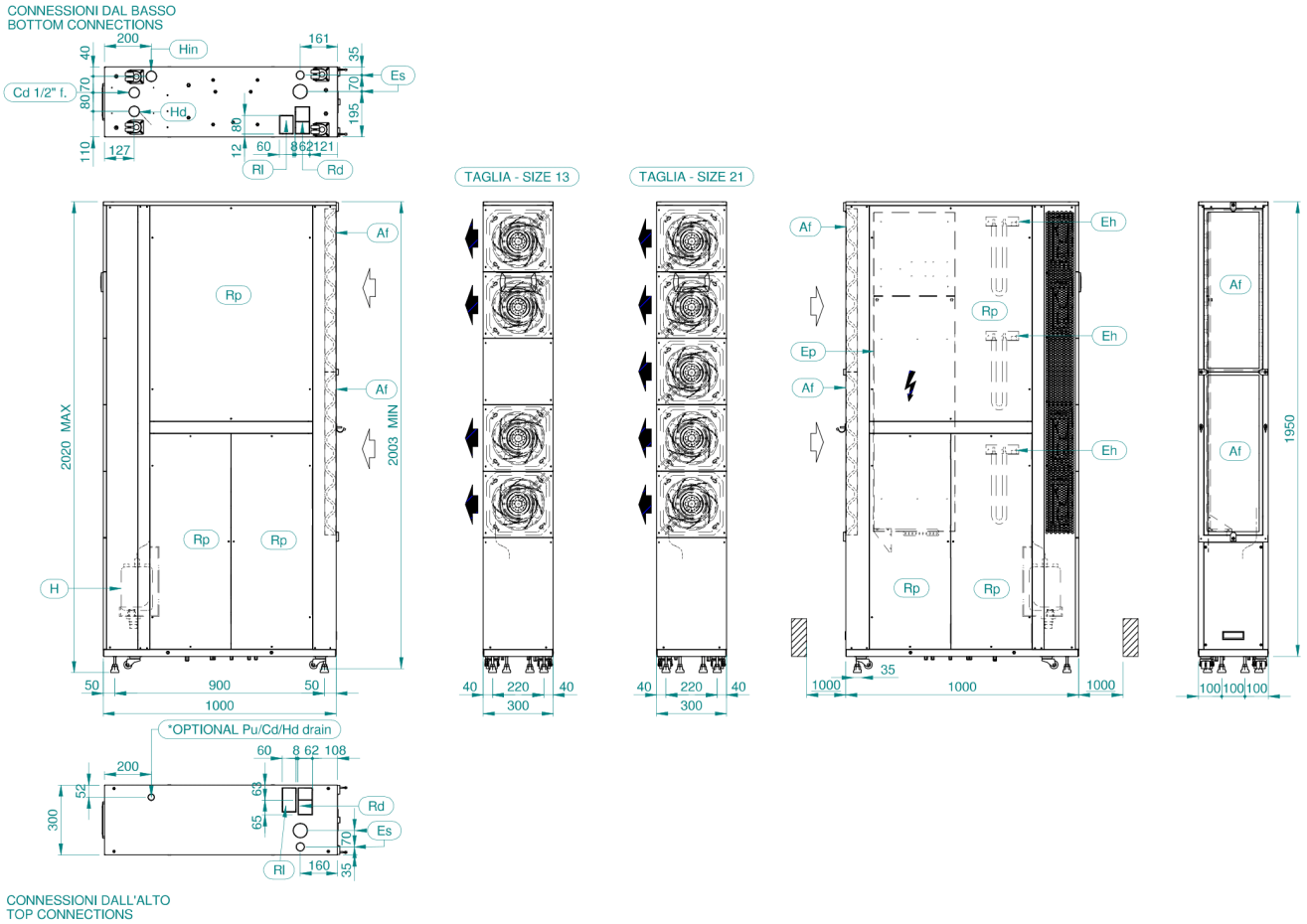
COOLBLADE ED+ R - RADIAL FANS
DEPTH 1000 (AIR DELIVERY FROM BOTH SIDES)

DDIM000368 - A



COOLBLADE ED+ RR - RADIAL FANS
DEPTH 1000 (AIR DELIVERY FROM THE RIGHT)

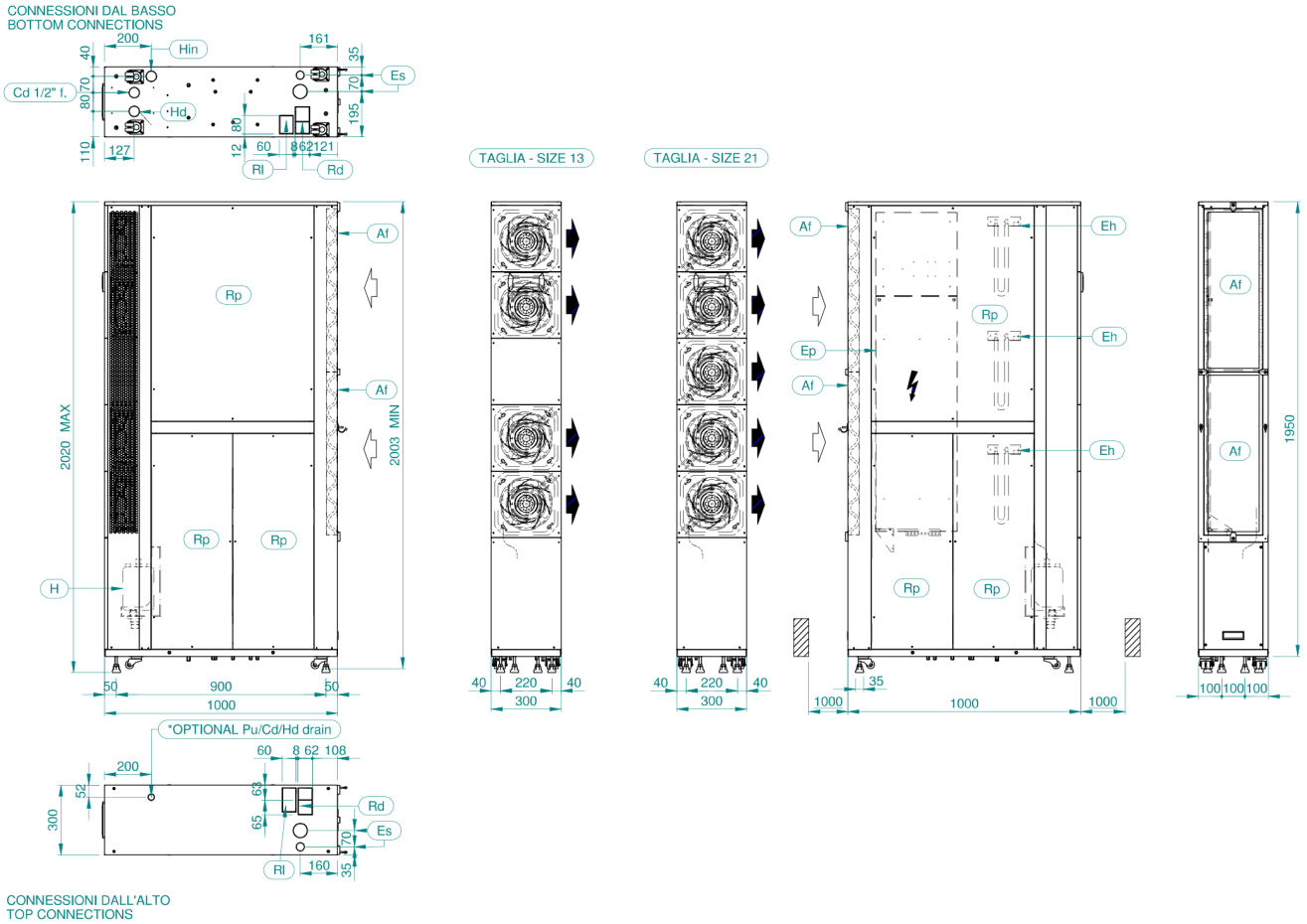
DDIM000368 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

COOLBLADE ED+ RL - RADIAL FANS
DEPTH 1000 (AIR DELIVERY FROM THE LEFT)

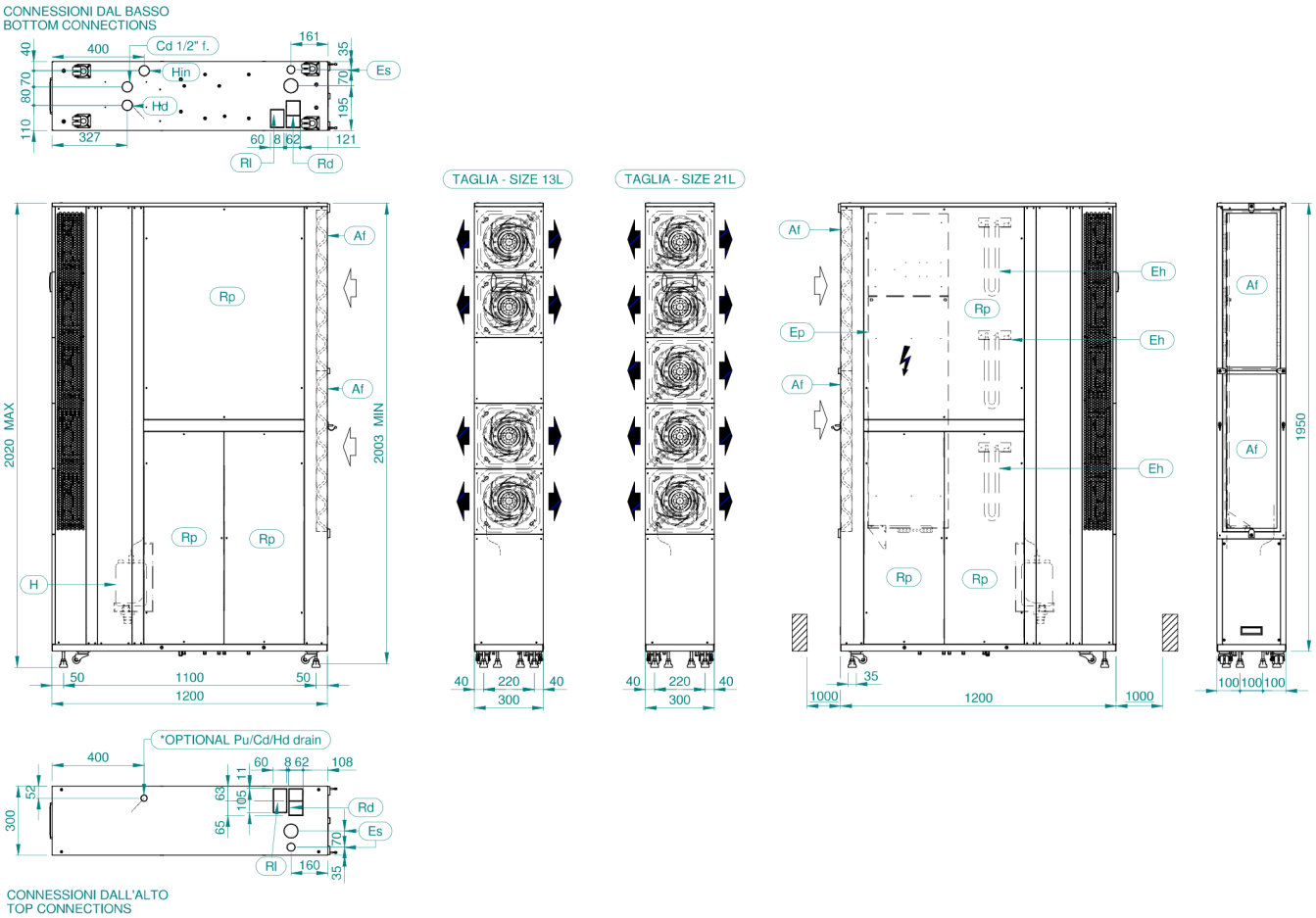
DDIM000368 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

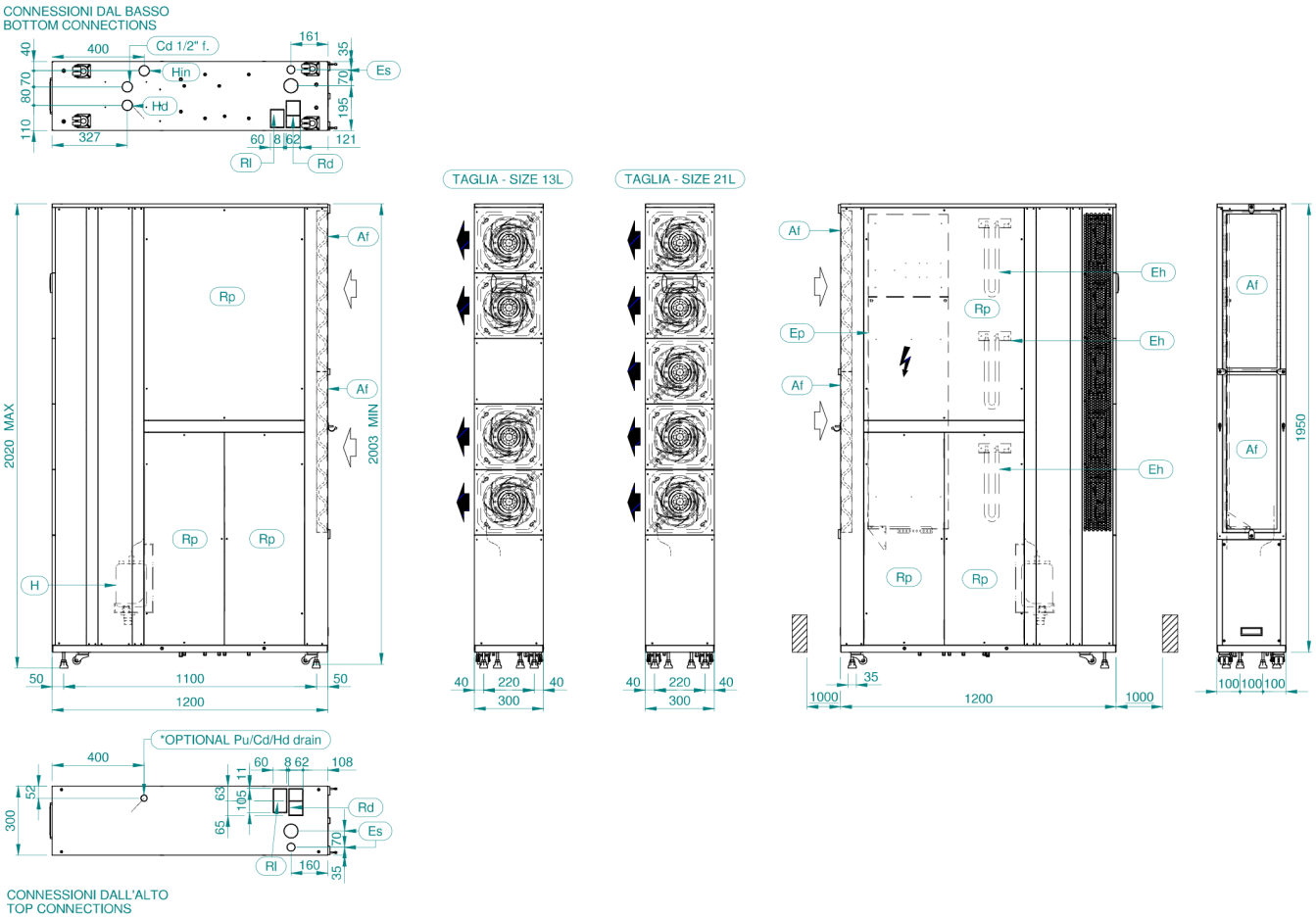
COOLBLADE ED+ R - RADIAL FANS
DEPTH 1200 (AIR DELIVERY FROM BOTH SIDES)

DDIM000382 - A



COOLBLADE ED+ RR - RADIAL FANS
DEPTH 1200 (AIR DELIVERY FROM THE RIGHT)

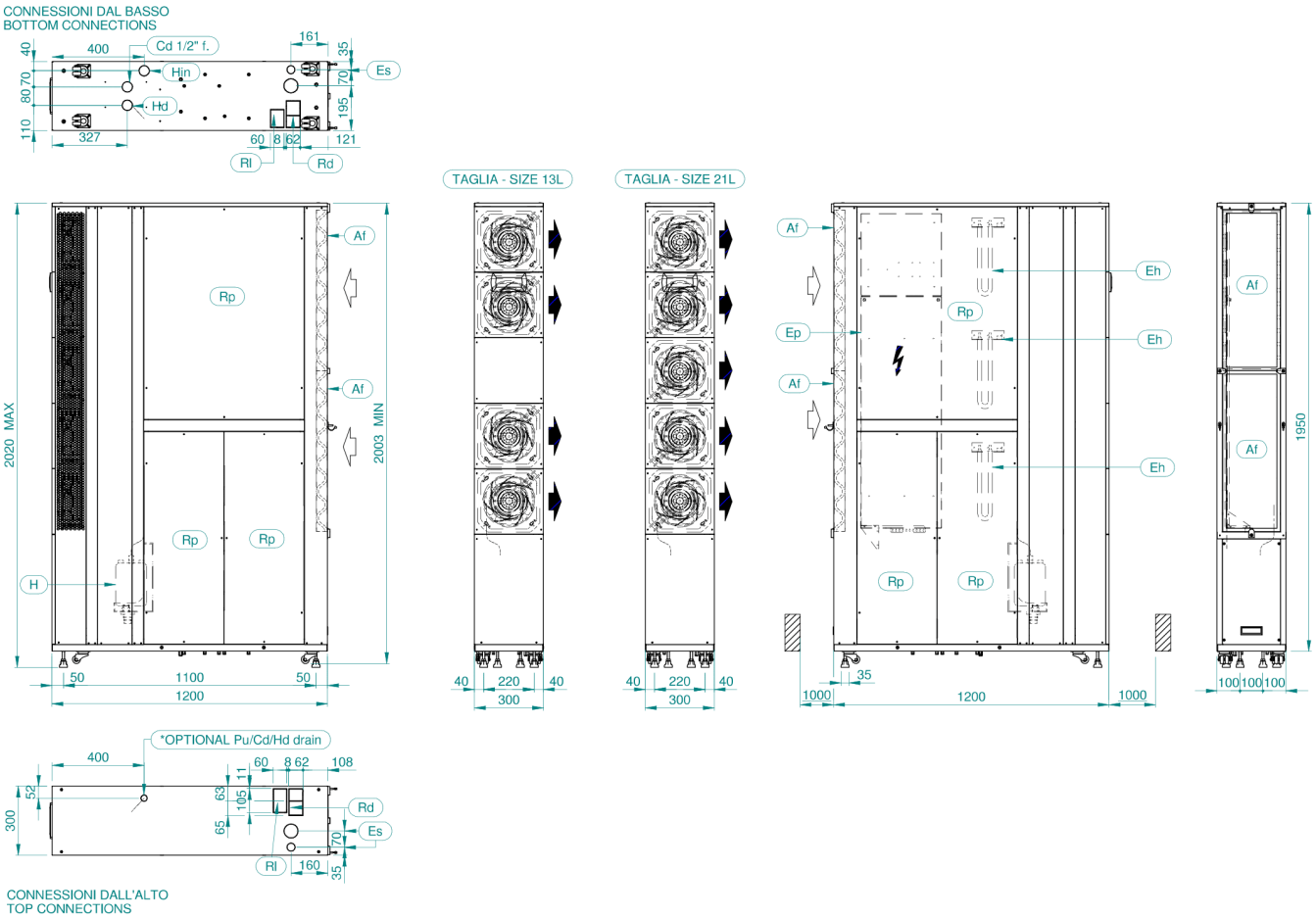
DDIM000382 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

COOLBLADE ED+ RL - RADIAL FANS
DEPTH 1200 (AIR DELIVERY FROM THE LEFT)

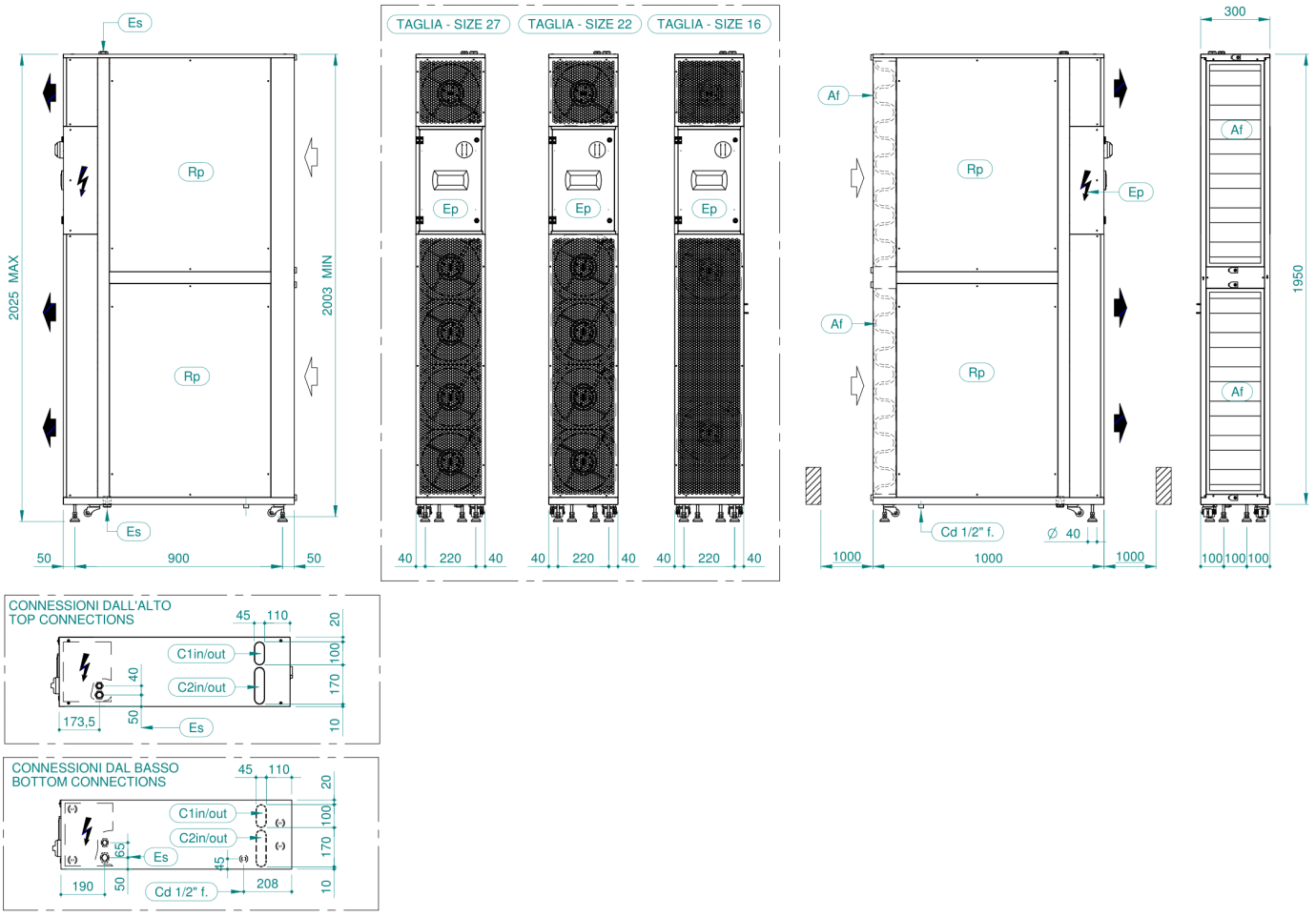
DDIM000382 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

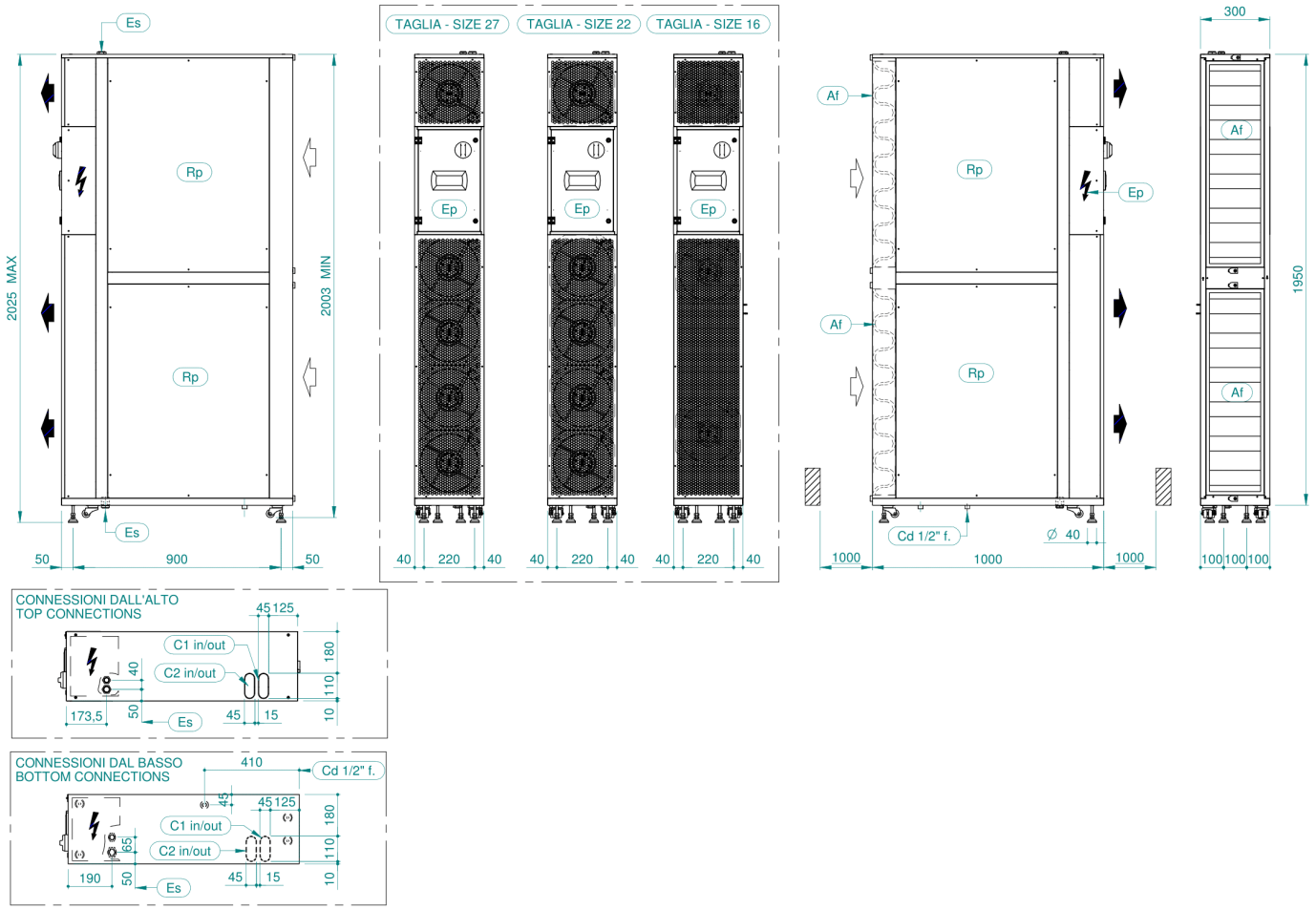
COOLBLADE CW DW A - AXIAL FANS
DEPTH 1000 (WITHOUT VALVES)

A4G859 - A



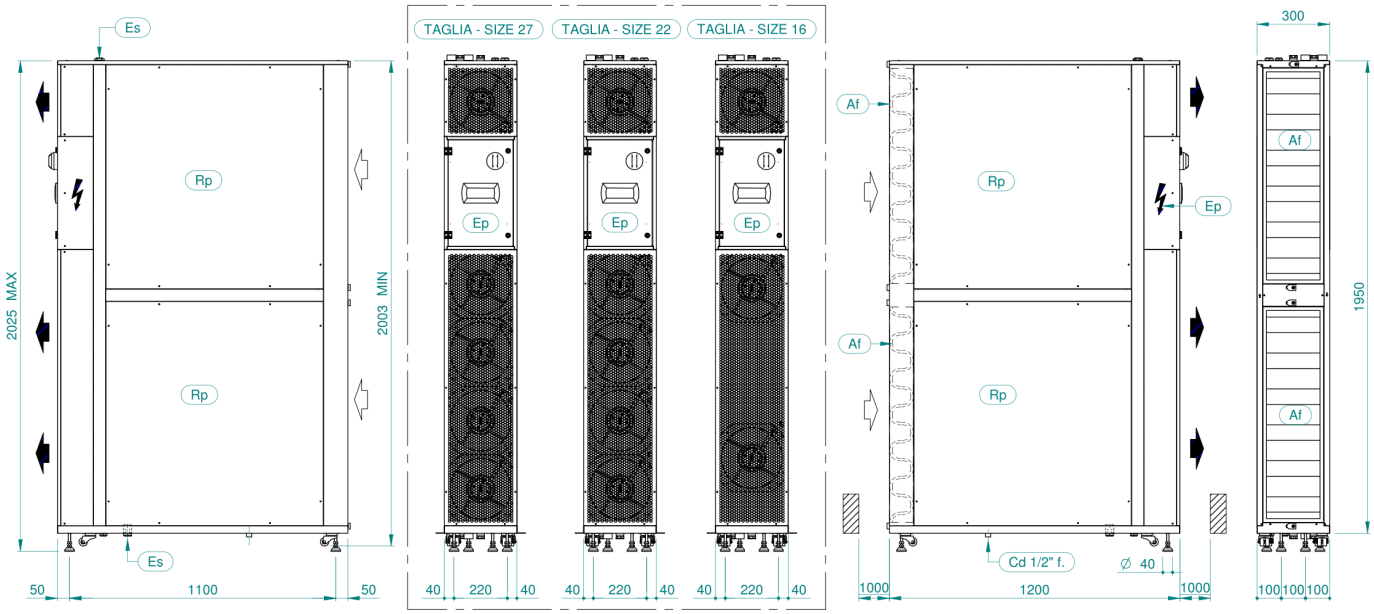
COOLBLADE CW DW A - AXIAL FANS
DEPTH 1000 (WITH VALVES)

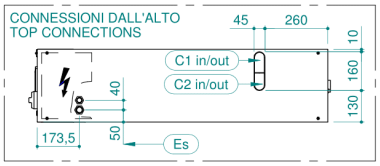
A4G857 - A

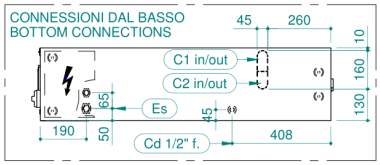


COOLBLADE CW DW A - AXIAL FANS
DEPTH 1200 (WITHOUT VALVES)

A4G854 - A

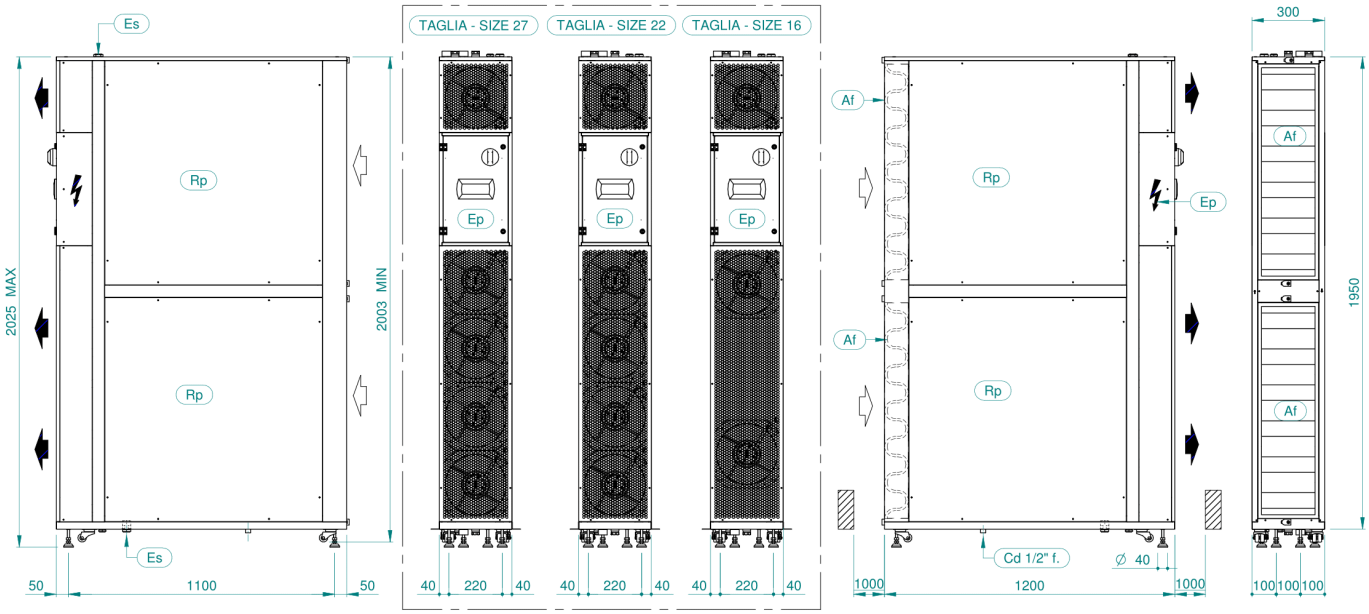


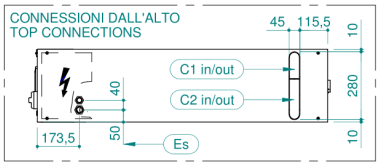


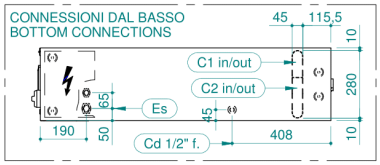


COOLBLADE CW DW A - AXIAL FANS
DEPTH 1200 (WITH VALVES)

A4G736 - A

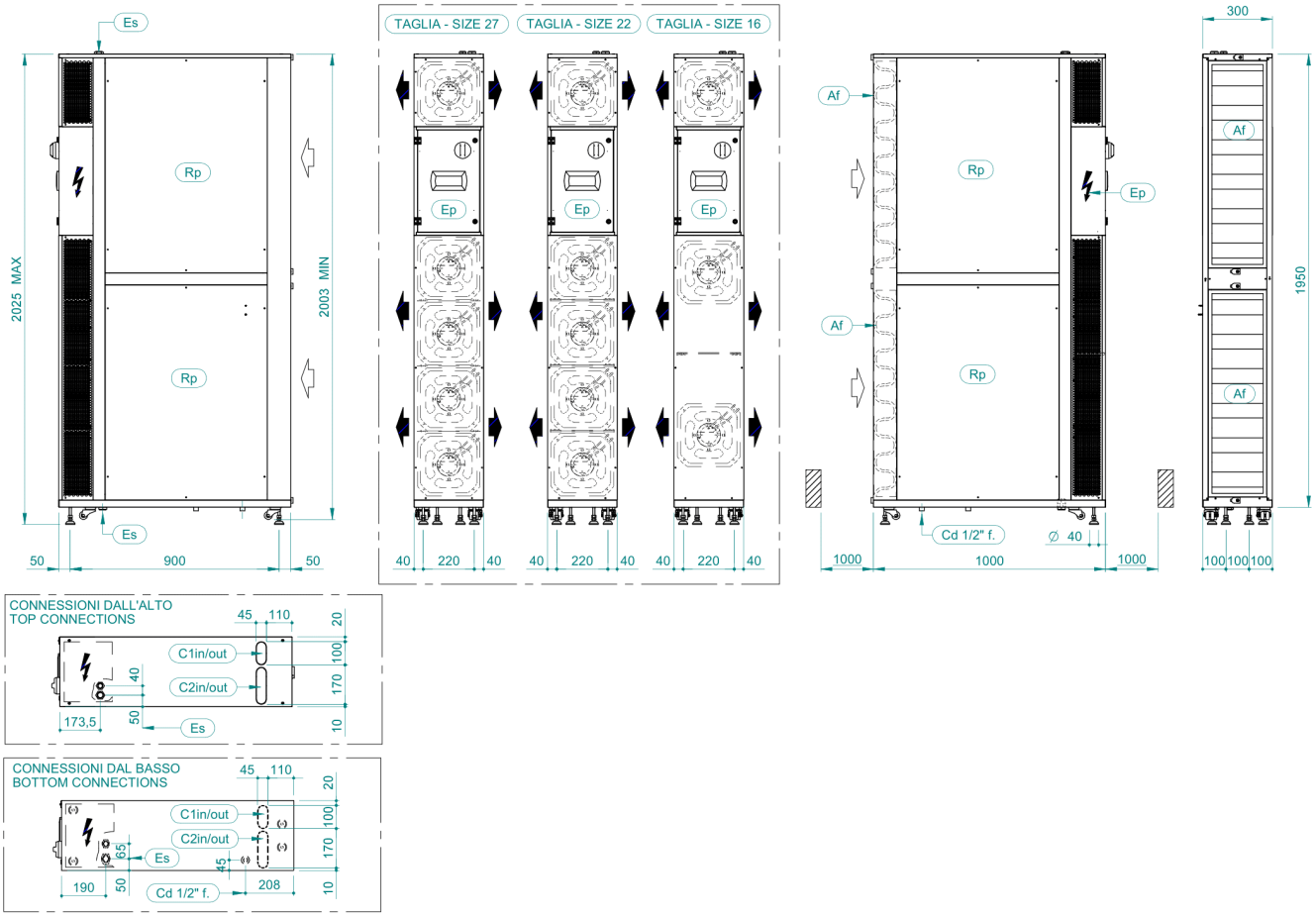






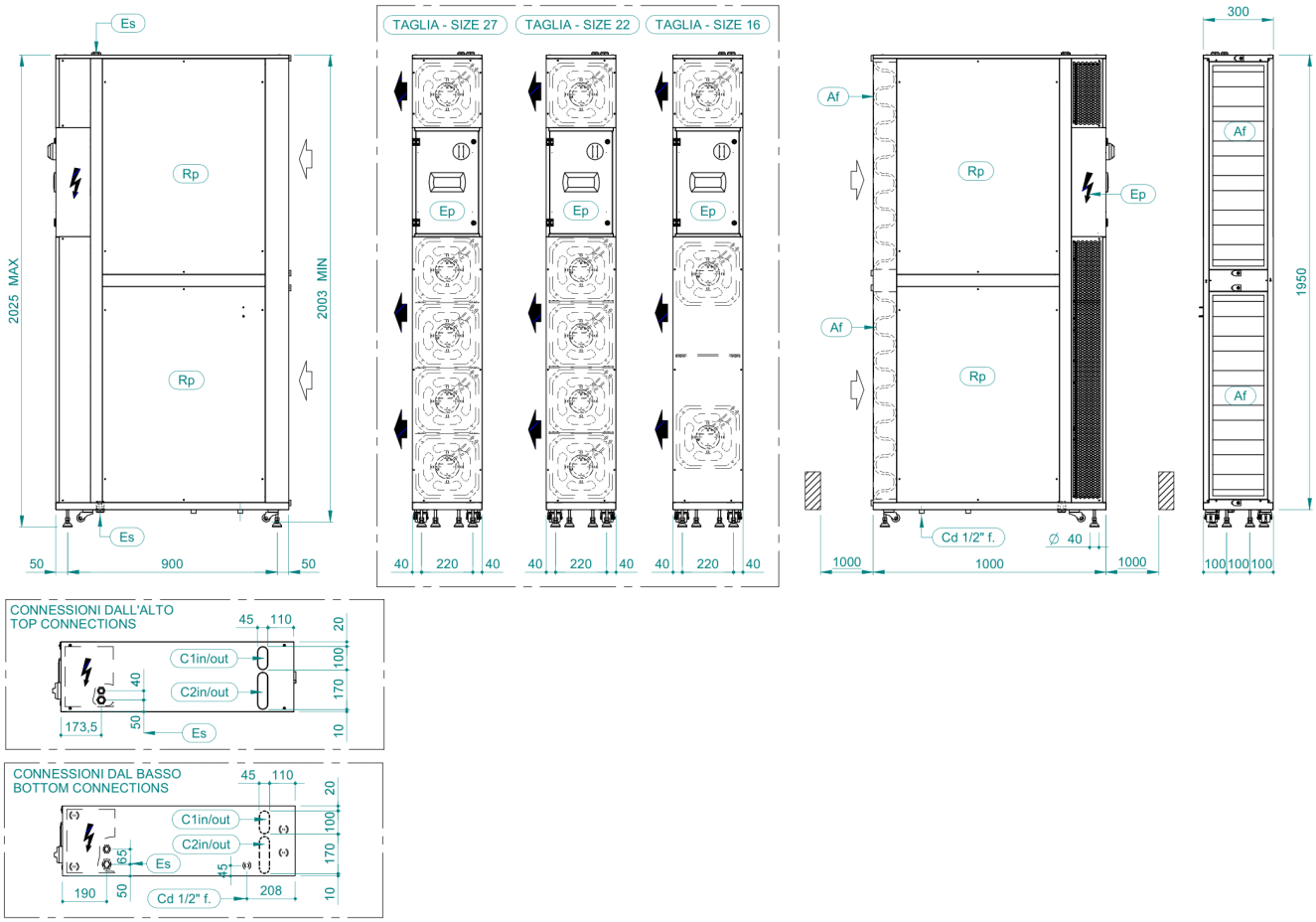
COOLBLADE CW DW R - RADIAL FANS
DEPTH 1000 (WITHOUT VALVES)

A4G860 - A



COOLBLADE CW DW RR - RADIAL FANS DEPTH 1000 (WITHOUT VALVES)

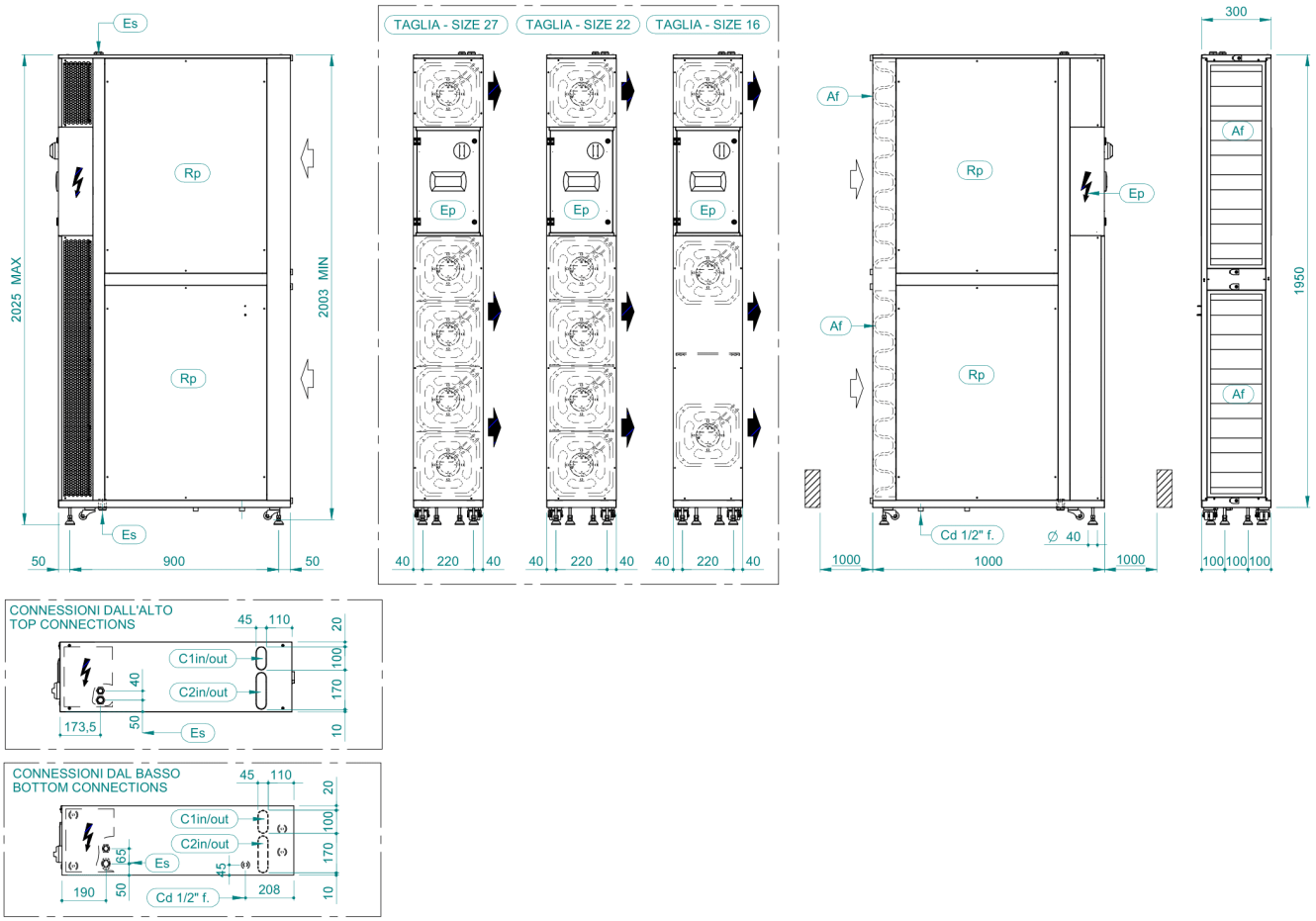
A4G860 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

COOLBLADE CW DW RL - RADIAL FANS DEPTH 1000 (WITHOUT VALVES)

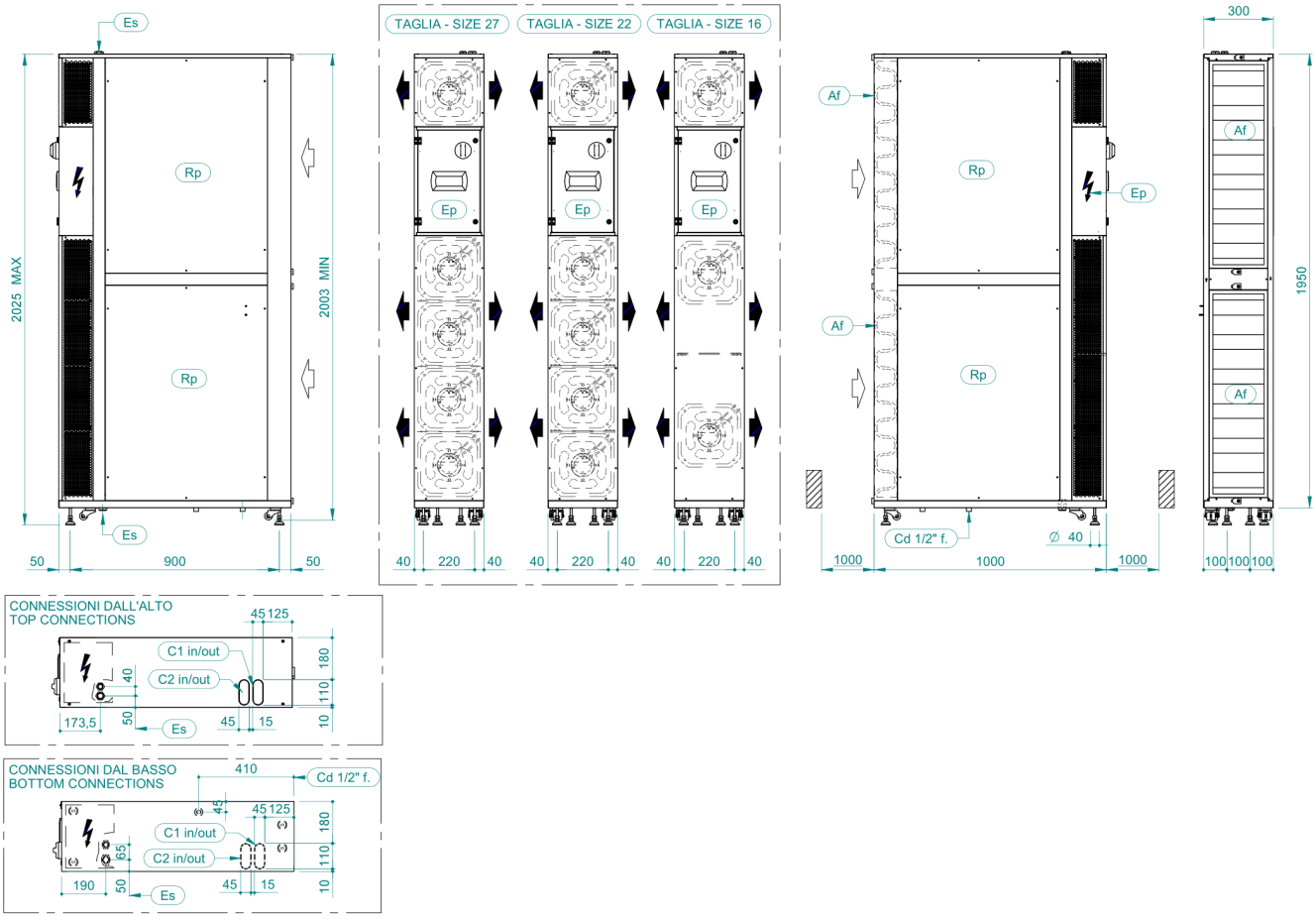
A4G860 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

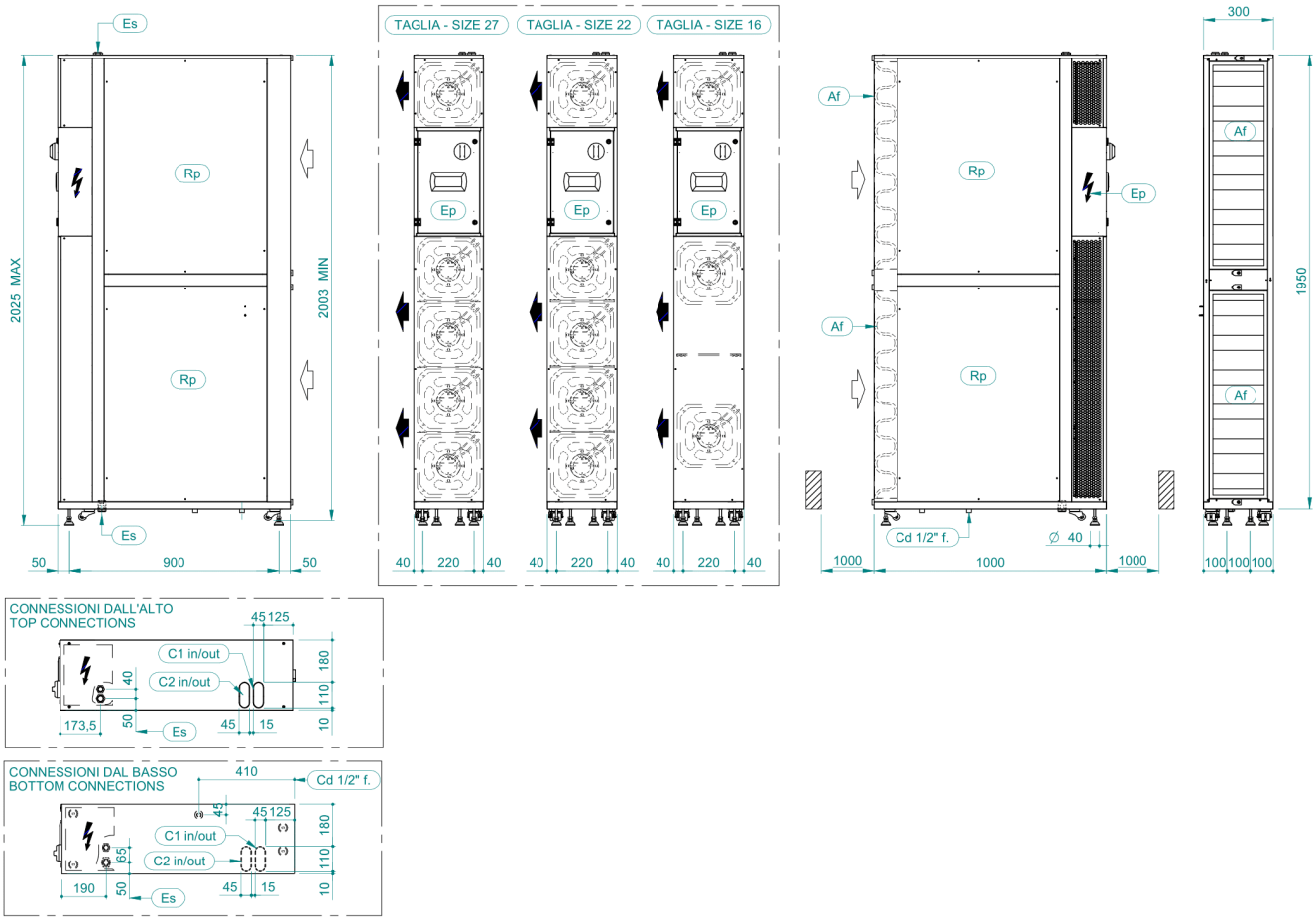
COOLBLADE CW DW R - RADIAL FANS
DEPTH 1000 (WITH VALVES)

A4G858 - A



COOLBLADE CW DW RR - RADIAL FANS DEPTH 1000 (WITH VALVES)

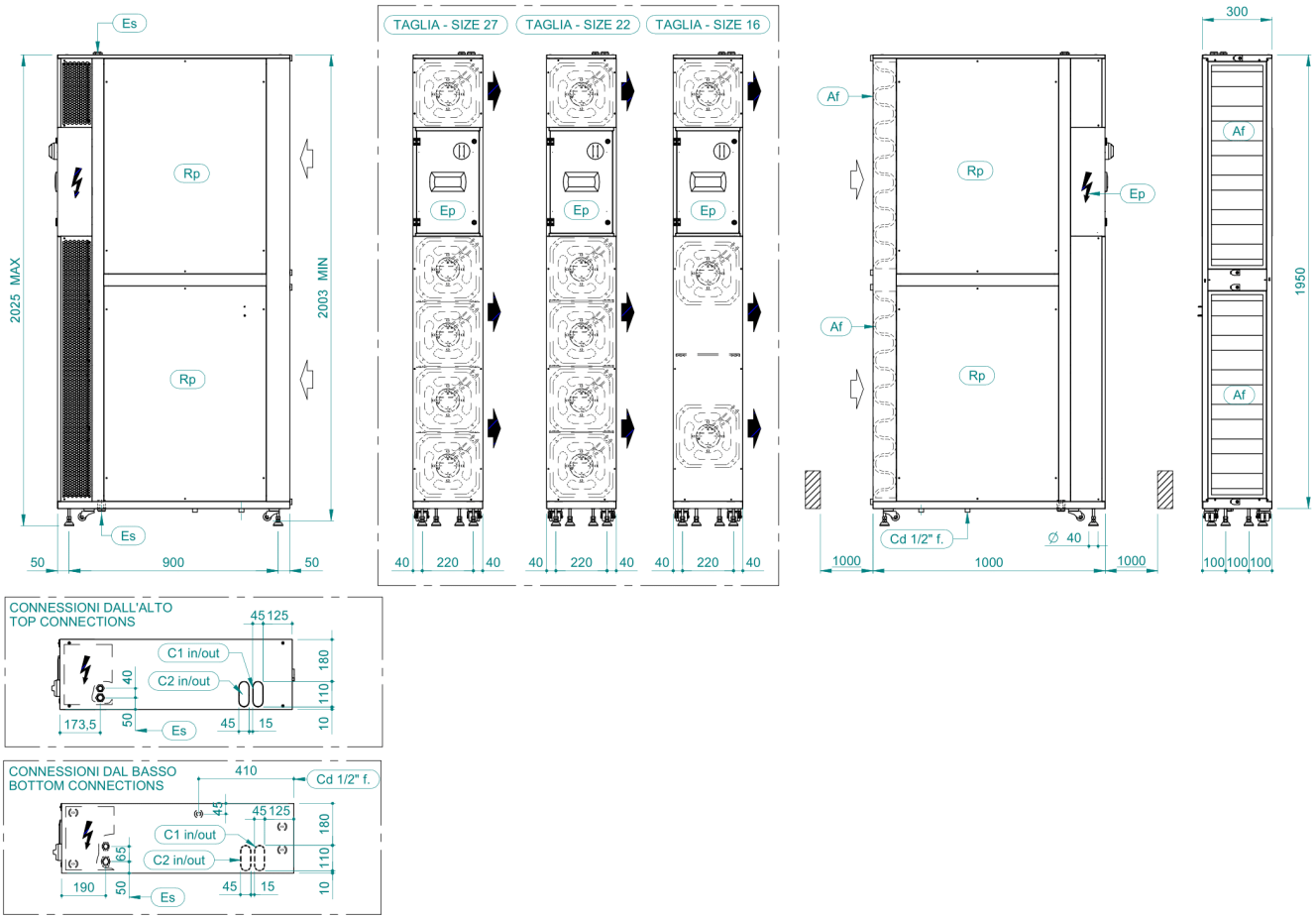
A4G858 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

COOLBLADE CW DW RL - RADIAL FANS DEPTH 1000 (WITH VALVES)

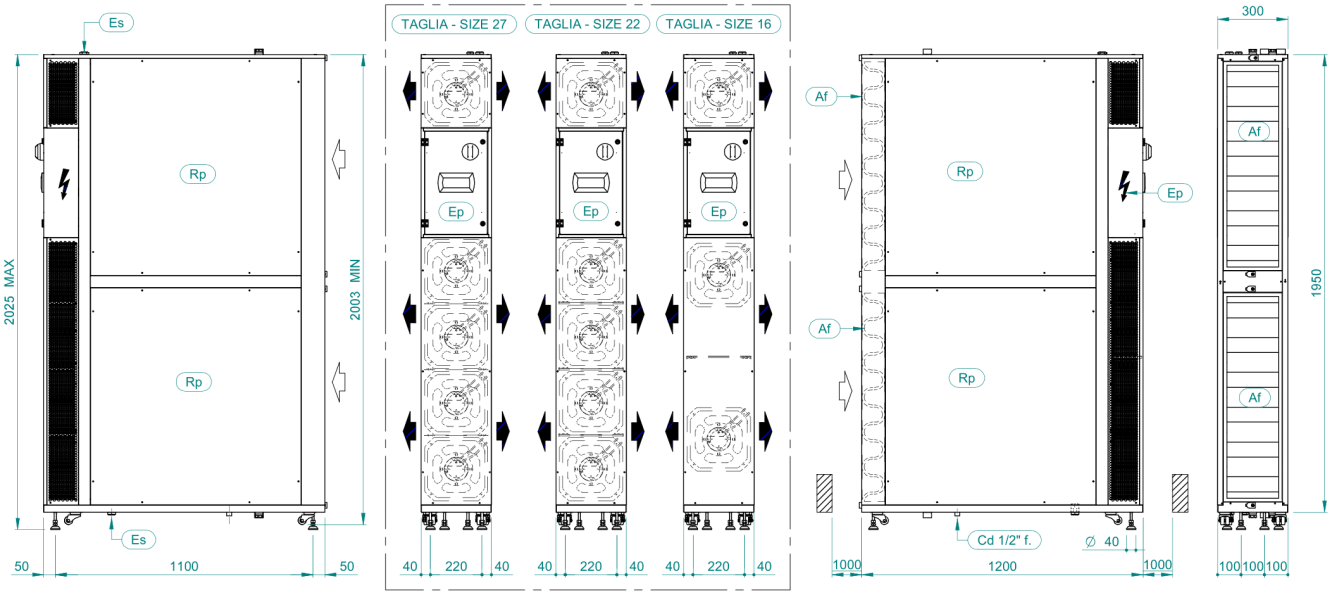
A4G858 - A

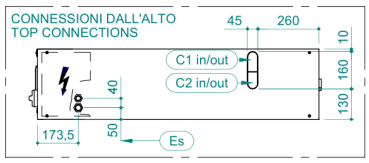


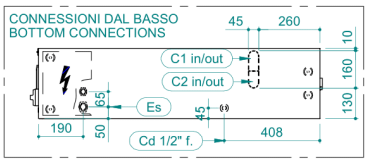
Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

COOLBLADE CW DW R - RADIAL FANS
DEPTH 1200 (WITHOUT VALVES)

A4G855 - A

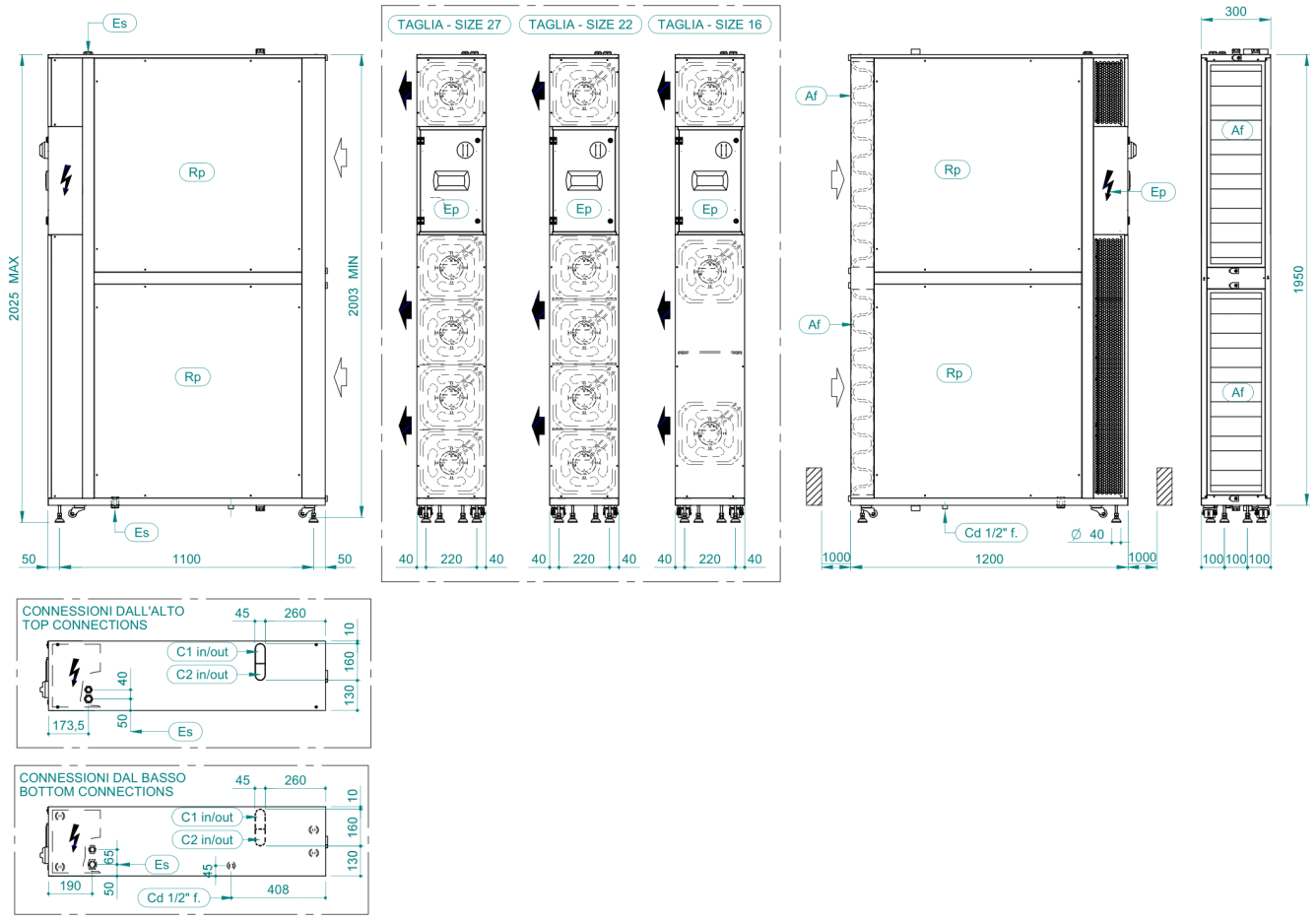






COOLBLADE CW DW RR - RADIAL FANS DEPTH 1200 (WITHOUT VALVES)

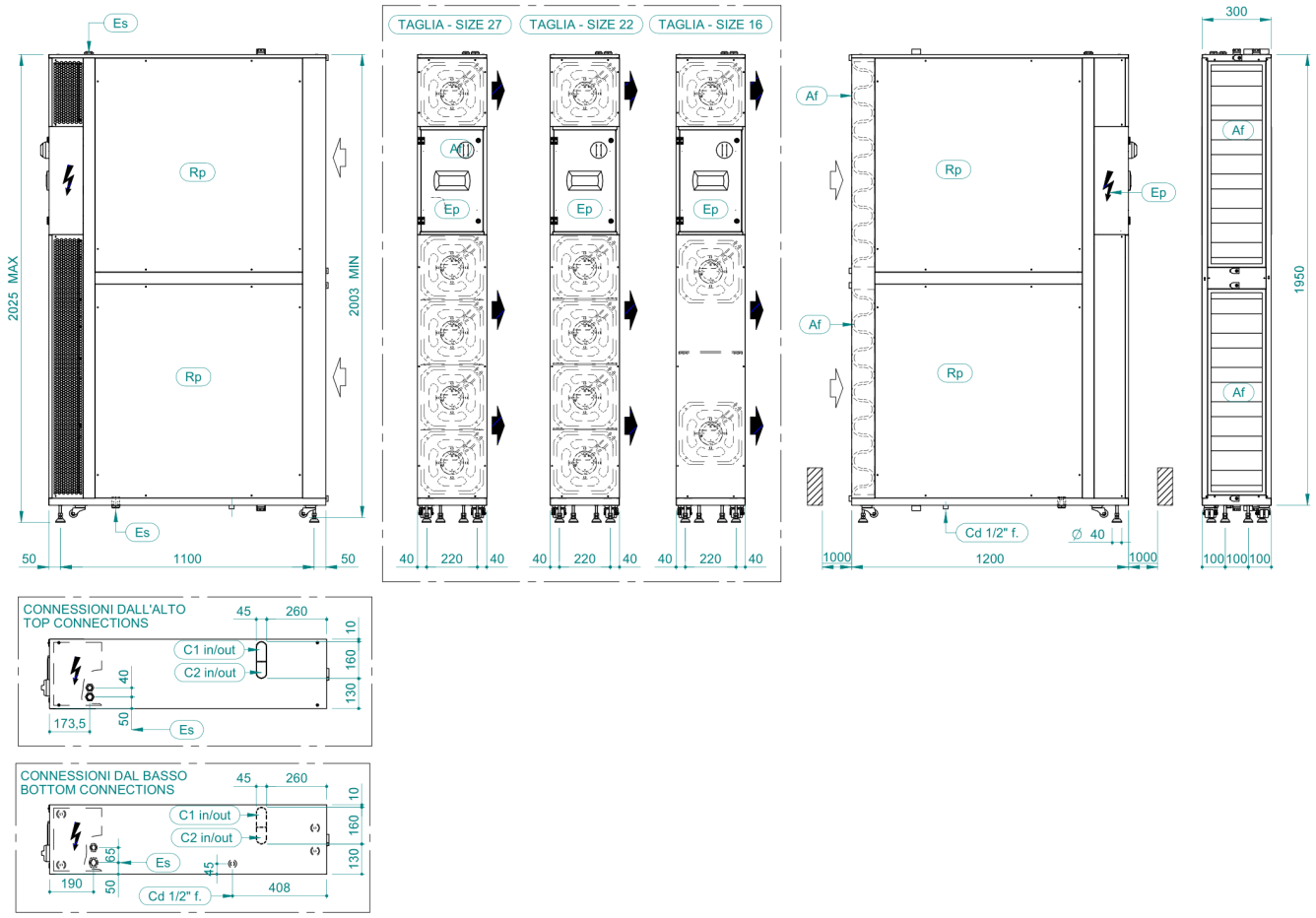
A4G855 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

COOLBLADE CW DW RL - RADIAL FANS DEPTH 1200 (WITHOUT VALVES)

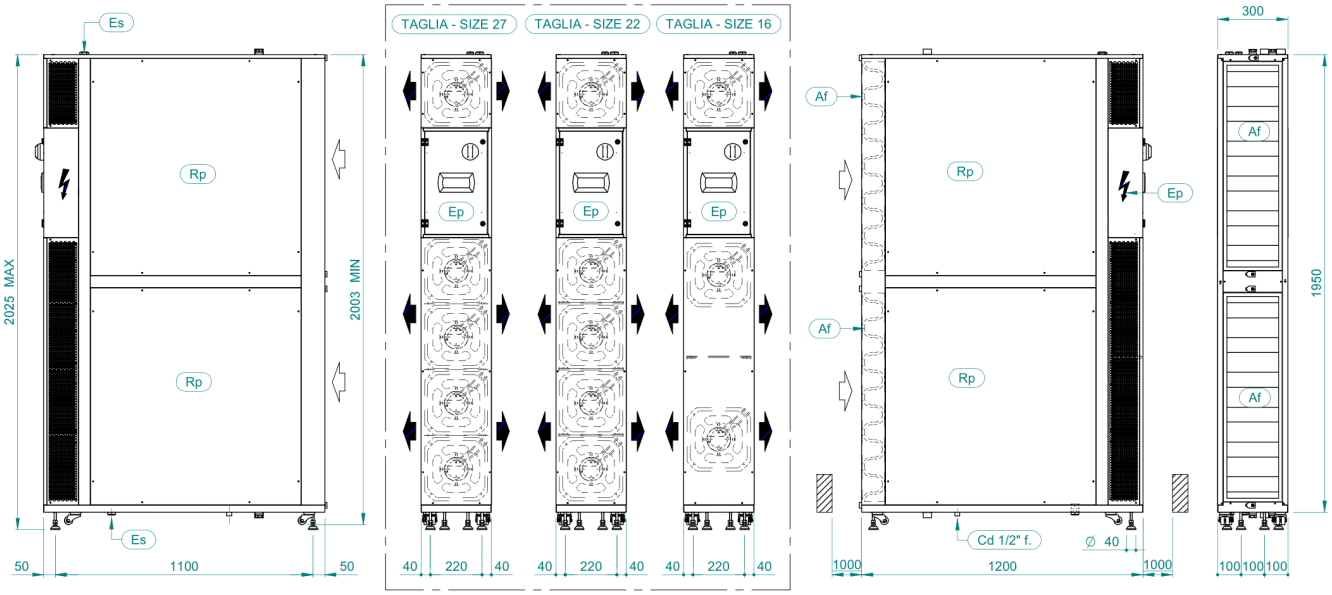
A4G855 - A

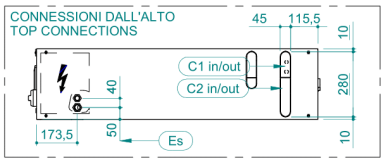


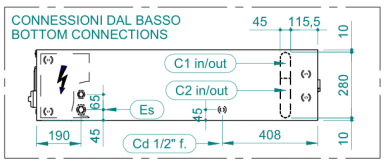
Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

COOLBLADE CW DW R - RADIAL FANS
DEPTH 1200 (WITH VALVES)

A4G853 - A

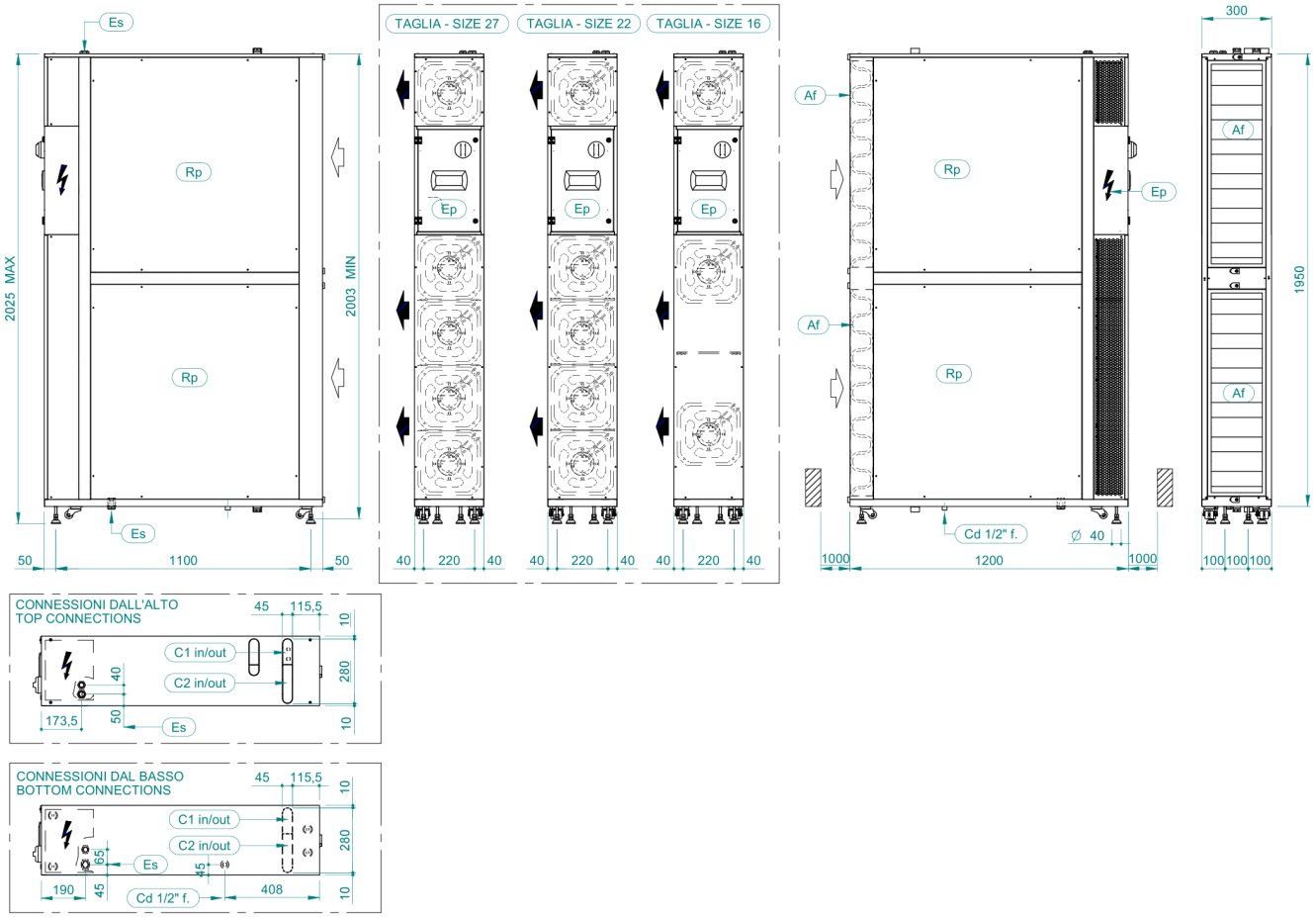






COOLBLADE CW DW RR - RADIAL FANS DEPTH 1200 (WITH VALVES)

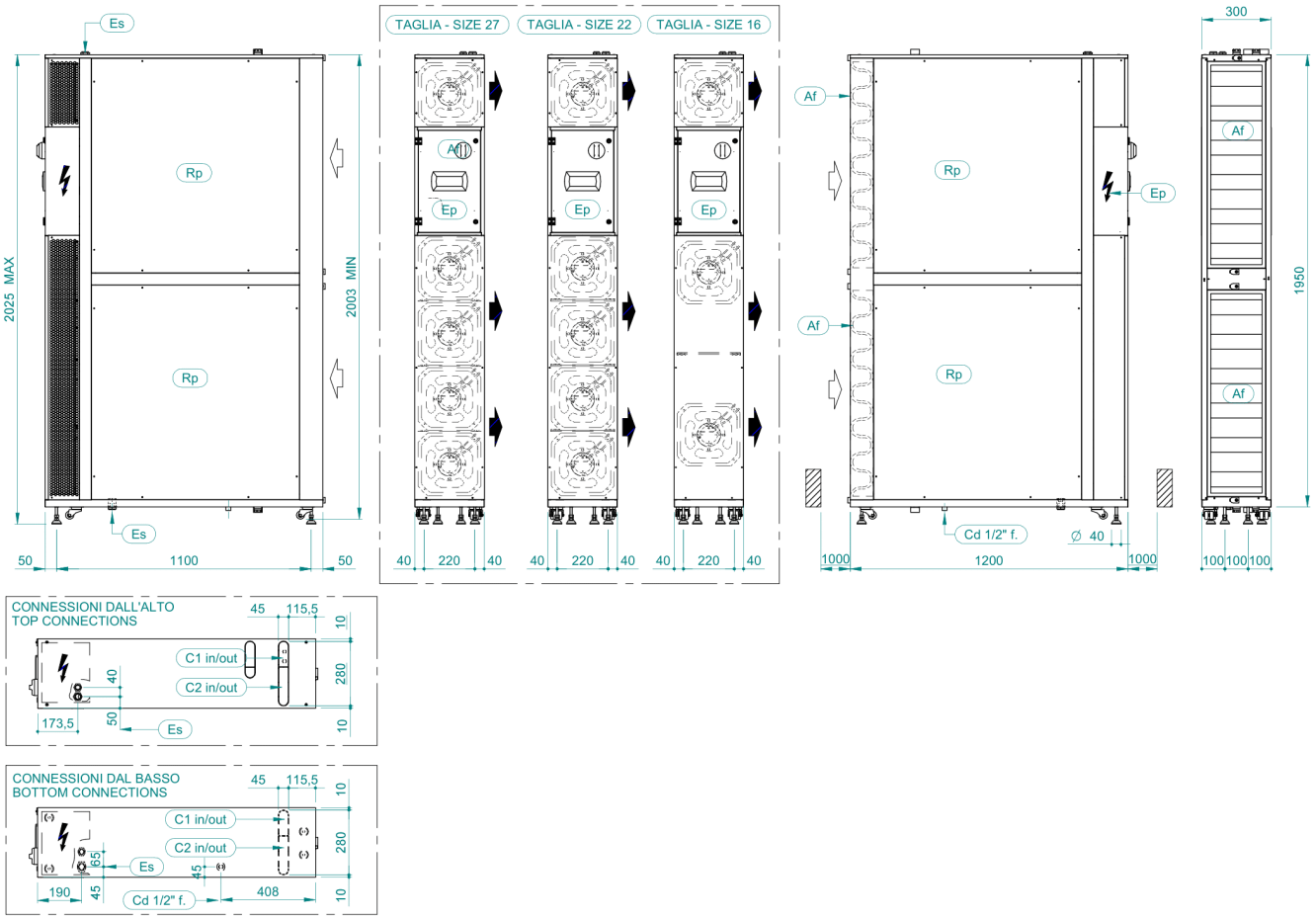
A4G853 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

COOLBLADE CW DW RL - RADIAL FANS DEPTH 1200 (WITH VALVES)

A4G853 - A



Warning! The air exhaust side is the one as seen looking at the unit from the top, orienting the unit according to the path of the air flow inside it.

INSTALLATION TIPS

POSITIONING

- Coolblade units are perfectly balanced, but they are tall and slender and have their centre of gravity about halfway up, so care must be taken when handling and positioning them.
- Strictly comply with the clearance spaces indicated in the catalogue.
- Coolblade units are designed and made for interior use only. The hydraulic circuits are not provided with freeze protection.

ELECTRICAL CONNECTIONS

- Always consult the attached wiring diagram, which provides all the instructions necessary for making the electrical connections.
- Electrical connections to be made for Coolblade units: it is possible to carry one or two (based upon the unit configuration) single-phase/three phases (depending on the unit size) power lines and connect both to the disconnect switch. For Coolblade CW-DW-DW it will be possible to choose which power supply to use through the disconnect switch/selector switch on the unit For all the units if fitted with accessory DAA (Dual power supply with automatic changeover) will be possible to select the preferred line.
- For unit Coolblade DX: if the power supply comes from the external unit, connect it to just one of the incoming lines available on the Coolblade DX unit.
- Power up the COOLBLADE units.
- Before accessing the internal parts of the Coolblade CW-DW-DX unit, power it down by turning the six-pole selector switch, which also acts as disconnect switch, to position "0".
- Before accessing the internal parts of the Coolblade ED+, power it down by turning the main disconnection switch (Placed on the back behind the filters) to position "0".
- The power supply line must be protected in accordance with current regulations.

HYDRAULIC AND REFRIGERANT CONNECTIONS

- If the hydraulic connections are carried out from the bottom, thoroughly vent the hydraulic system, with pumps switched off, by operating the air valves of the Coolblade units. This procedure is particularly important because even small air bubbles can cause reduced performance of the finned pack heat exchanger of the Coolblade units. If the hydraulic connections are carried out from the top, the air vent must be positioned by the customer on the highest point of the system.
- Make the hydraulic circuit with inclusion of the typical components used in closed hydraulic circuits (for example, expansion vessel, flow switch, storage tank, air valves, shutoff valves, anti-vibration couplings, etc.).
- Make the refrigerant connections strictly following the instructions provided with the installation, operation and maintenance manual, in particular as regards the brazewelding, cleaning, vacuum and charging operations.

START-UP AND MAINTENANCE

- Strictly follow the instructions given in the operation and maintenance manual. These operations must in any case be carried out by qualified persons.

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Company directed and coordinated by Investment Latour (Sweden)