

Coolblade BTd In Rack

8÷30 kW



General

Coolblade In Rack has been designed for IT Cooling applications. Thanks to the extremely compact design Coolblade In Rack can fit inside any different rack type, thus allowing a cooling solution as closed loop (in rack) or open loop (in row).

Configurations

DX: Direct expansion air conditioning unit for coupling to external motocondensing unit.

CW: Direct expansion air conditioning units air cooled, with DC-Inverter scroll compressor.

Strengths

- ▶ Extremely compact design to fit inside any different 42U (or bigger) rack design
- ▶ Application Flexibility (chilled water and direct expansion versions; open and closed loop solutions; etc...)
- ▶ Installation flexibility (top and bottom connections; top and lateral unit handling; etc...)
- ▶ Design for a simple and easy maintenance (Hot Swappable EC Fans; quick connectors for all power and signal cables; etc...)
- ▶ Extremely efficient design with minimum air side pressure drops

BlueBox 
by Swegon

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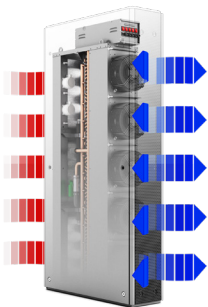
APPLICATION

Coolblade In Rack has been designed with an extremely compact design to allow its installation within different rack types. Two versions are available: Open Loop and Closed Loop. Open Loop solution allows the unit installation as In Row (within the rows of racks). Closed Loop solution allows instead the installation as In Rack (closed air circuit inside a unique frame). Unit 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 servers are arranged in opposing rows, so that they are facing the same aisle; the result is the creation of alternately one or more cold (in front of the servers) and hot aisles (behind the servers).

For Closed Loop application it's more correct defining cold/hot areas (created in the space within the server/unit and the frame of the overall rack) instead that aisles. Anyhow working and installation logics remain the same.

Coolblade In Rack units draw in hot air directly from the hot aisle/area and put it, cooled, into the cold aisle/area. Coolblade In Rack units are installed inside different type of racks. A sufficient number of racks containing Coolblade In Rack units are then 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.

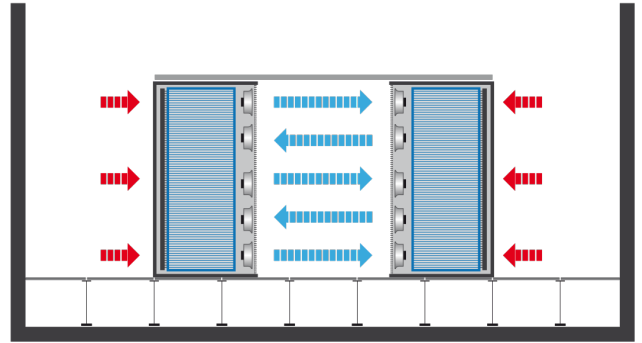
In case of In Row applications maximization of energy efficiency is obtained with so-called containment, through which the hot and/or cold areas are isolated, thereby preventing any air bypass or recirculation between the two sections.



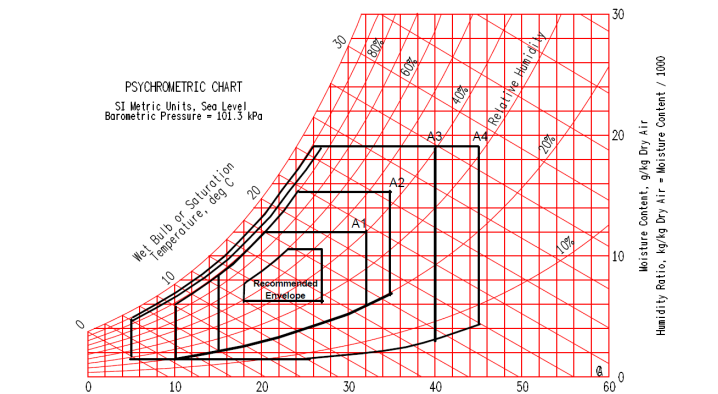
In Case of In Rack applications the same effect is naturally achieved thanks to the specific solution design.



It should also be emphasized that this type of application does not require a raised floor for air distribution. A moderately high raised floor for just power or refrigerant distribution might be used as well, anyhow this is not necessary having units as standard top and bottom connections.

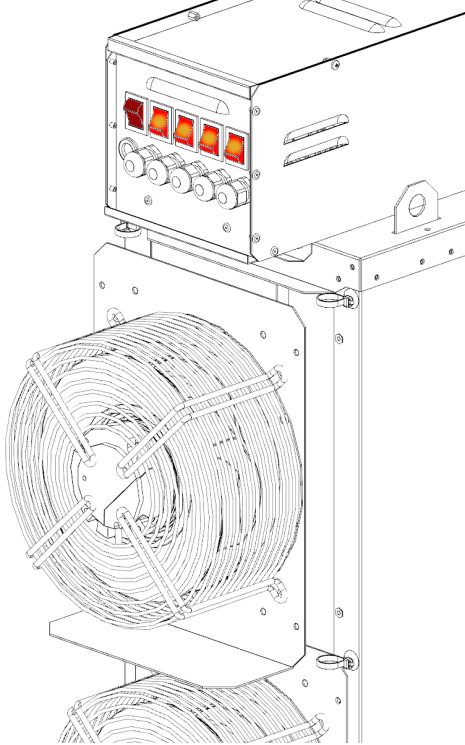


Coolblade In Rack units manage the heat load using various methods and strategies, which can vary according to the specific installation method and the type of cooling system; in any case, with reference to the ASHRAE guidelines (TC9.9 /2011).



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/area); 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 front of the servers (this last functionality is valid only for chilled water or direct expansion systems with modulation of cooling capacity).

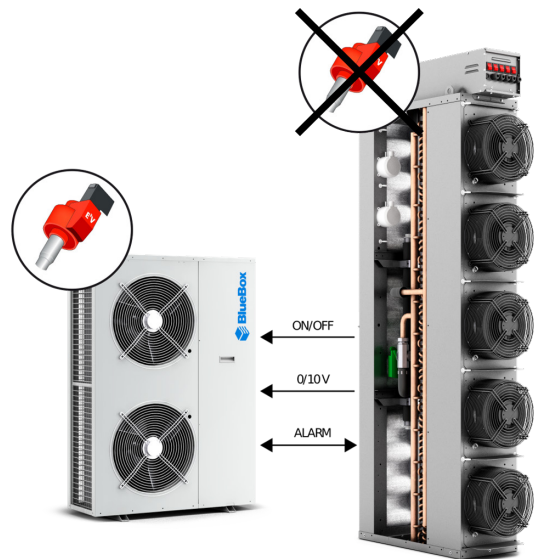
The unit design allows a quick fan replacement without the need of stopping the entire cooling, granting the full availability (Hot Swappable).



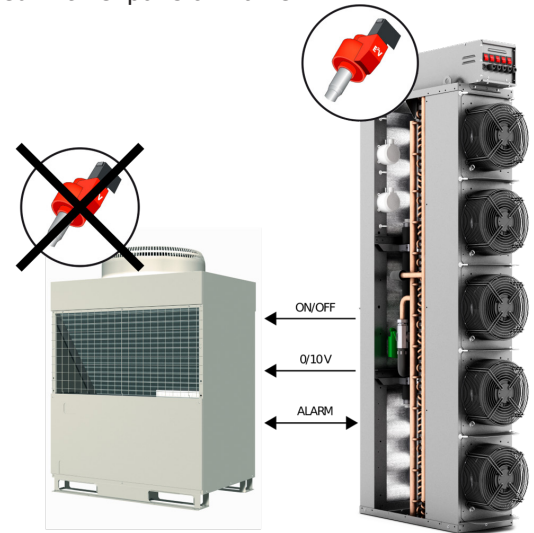
Direct expansion units, provided with evaporating coils, are designed to be connected to an external condensing unit, which can indifferently be provided with a variable speed or fixed speed compressor. It is possible to use condensing units provided with expansion valve (which therefore feed the internal 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.

For chilled water applications, Coolblade are also available as CW (Single circuit chilled water circuit with or without valve).



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



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

CONFIGURATION

Configuration example:

Coolblade BTD IR DX OL 24
 1 2 3 4 5

1	Series	Coolblade BTD
2	Version	In Rack
3	Type	DX: direct expansion CW: chilled water, single water circuit
4	Fan Section	OL: Open Loop CL: Closed Loop
5	Size	24: Cooling Capacity (at nominal catalogue conditions)

SPECIFICATIONS

DIMENSIONS AND CONFIGURATION

Coolblade In Rack units dimensions are for Open Loop version 290x770x1943 (width x depth x height, expressed in mm) or for Closed Loop version 290x722x1943. All units are provided with copper coils with aluminum fins, fans, electrical control panel and electronic microprocessor controller; Open Loop units have also filters at the air inlet. Air is always sucked in from the back, 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.

STRUCTURE

The structural frame is fabricated from polished sheet-steel with oven-baked epoxy polyester powder coating. The unit color is RAL9005 (Black) with textured finished. Units are provided with hooks embedded to the structure, which allow unit lifting from the top. 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. The unit design allows each fan maintenance keeping the unit in operation (Hot Swappable). Air flow is constantly monitored by a differential pressure switch, which signals an alarm condition when there is no flow.

AIR FILTERS (Only for Open Loop version)

The non-regenerable air filter is class ISO Coarse 35% (according to ISO 16890; G2 - EN779) and is designed to minimize head loss while maintaining an adequate level of filtration. The filters are pleated and contained in a 50mm-thick galvanized 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 COIL AND HYDRAULIC CIRCUIT (CW units)

The Coolblade In Rack CW units are provided with handling coils with copper tubes and high turbulence aluminum fins, with hydrophilic coating.

A condensate drip tray is positioned under the handling coil. It's integrated into the base of the unit and therefore it's painted and protected with silicones suited for high temperatures. 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.

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.

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 100 alarms.
- Display of the status of controlled devices.
- Display of the status of inputs and outputs of the microprocessor.

The electrical panel is inside an electrical box positioned on the top of the unit. The box has quick connectors for all power and signal cables. This allows an easy accessibility in case of needs (the box can be removed both from the front as from the back)

The standard power supply is 230V/1~/50Hz for all sizes. The following potential-free contacts are supplied in the terminal board as standard:

- remote ON/OFF;
- serious alarm;
- minor alarm (message).

BLUE THINK DATA

The Blue Think Data software fully incorporates the know-how and expertise of Swegon-Blue Box in Data Cooling applications. Blue Think Data is developed and constantly updated in-house through a continual improvement process.



Blue Think Data was conceived for the best functionality of the various units and systems installed in multiple machines, and at the same time it guarantees the highest safety level for both the components and application.

Blue Think Data incorporates the following key functions:

- control of return temperature;
- control of delivery temperature; (only for units with variable speed compressor or modulating chilled water valve)
- delivery temperature restriction;
- multiple solutions for ventilation control (with modulating fans and their options);
- advanced alarm management: recording of 100 alarms in the memory, division of alarms into two categories (minor and serious alarms), smart automatic reset;
- auto restart after a voltage failure;
- function for quick restart (only if the Black Out Restart option has been selected);
- integrated clock for timer-controlled switch-on/off and setpoint variation according to time bands;
- password-protected levels of access to parameter setup pages, protection against undesired tampering or tampering by unauthorised/non qualified staff;
- multi language interface, which the operator can select in real time;
- management of multiple locally networked units (up to 32) for integrated and optimised operation (if the corresponding option has been selected).

The graphic interface was designed for immediate feedback on the operating condition as well as for easy and efficient access to the various functionalities.



The standard unit offers the following control system interfaces, which are always included and active:

- a Modbus RS485 serial port for reading and writing purposes;
- a RJ45 port for IP communication, including a reading and writing Modbus TCP/IP, available as standard.

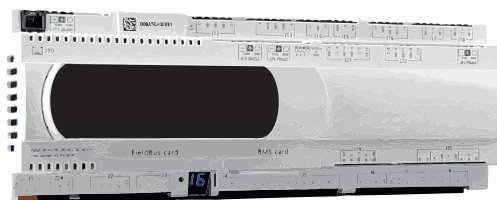
Supervision via WEB is always available with the RJ45 port. When the machine IP address is queried via web browser from any computer connected to the same local network to which the units are linked, access can be gained to the unit web page (password-protected access).

This solution is especially convenient and efficient to view the machine status or to perform maintenance. The solution does not require any dedicated software or hardware and it gives access to a set of graphs which are launched to monitor the trends of the main operating parameters of the unit in real time (temperature, humidity, air flow rate, etc.).



HARDWARE

The operating hardware consists of the following elements:



input/output boards including a 32-bit, 100 MHz microprocessor, with a 128-Mbyte non-volatile (FLASH) memory, 90Mbyte of which are available as file storage, and a 16 Mbyte data memory (RAM). Three different board sizes are used to optimise the number of inputs and outputs with respect to the application;



a humidifier-specific I/O board (which is therefore only fitted if this option is selected) communicating with the master board in serial mode;



a driver for the electronic expansion valve (where this option is selected) to pilot the electronic valve and integrate its data and functions in the machine. Communication with the master board is in serial mode.



The graphic terminal is a 4.3" touch screen panel. The electronic technology featured and the 65.000 colour display help manage high quality images and advanced functions. The touch screen panel is also designed for easier man-machine interaction as it makes screen browsing much more user-friendly.

The display is also supplied with a LED bar featuring different message-associated colours. The machine status can be viewed at any time without having to go close to the display.

Another innovative feature is the front position of the USB outlet for easier access without the use of specific tools.

Type	LCD TFT
Resolution	480 x 272 Wide
Display active area	4.3", diagonal
Colours	67 K
Back-lighting	LCD - Lifetime 20k hrs @ 25 °C
Touchscreen	Resistive
System LED indicators	8-colour notification bar

STANDARD FEATURES

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

- Air flow alarm.
- Water leakage sensor (flooding alarm).
- Thermal overload protection (internal) for each fan.

TESTING

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

DESCRIPTION OF ACCESSORIES

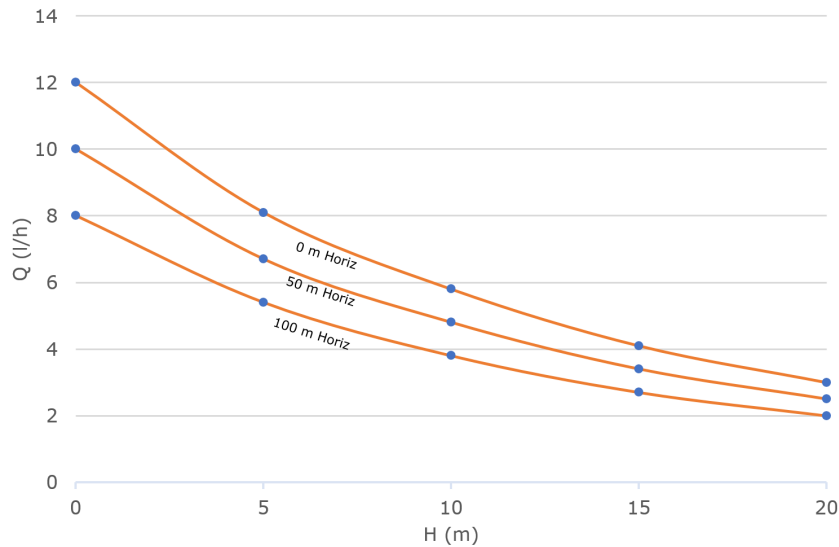
HYDRAULIC ACCESSORIES

PSC Condensate booster 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.

All sizes Main specifications

- Length: 160 mm
- Width: 43 mm
- Height: 34 mm
- Power supply: 230 V - 1 ph - 50/60 Hz
- Max. absorption: 16 W



VRM3 3-way chilled water valve

In chilled water units, this allows control of the supply temperature.

Chilled water valves are brass body, ball valves with equal percentage flow on the straight line and linear flow on the bypass line, including threaded female connectors. These valves are supplied with a modulating, micro-processor-controlled servo onboard the machine with 0-10V signal.

SPECIFICATIONS

Model	Kvs (straight line)	Kvs (Bypass line)	max. differential pressure [kPa]
14	6.3	4.0	240
18	6.3	4.0	240
23	10	6.3	240

VRM2 2-way chilled water valve

In chilled water units, this allows control of the supply temperature in variable water flow rate applications.

The 2-way solution is obtained by closing the bypass line. The technical specifications are the same as the 3-way solution.

AERAILIC CIRCUIT OPTIONS

AF Dirty filters alarm

Differential pressure sensor used to monitor any head loss through the filters and to warn about the critical threshold setpoint having been exceeded



FG6 Higher efficiency filters (ISO Coarse 75% - G4)

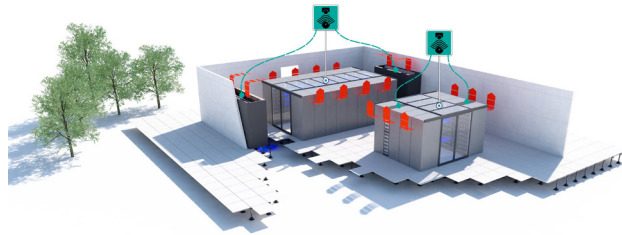
For those applications which need an higher filtration grade, higher efficiency filters are available. Coolblade can therefore be made available with ISO Coarse 75% (according to ISO 16890 - corresponding to EU4 Eurovent BSEN - 779-4/5 - MERV8 with reference to ASHRAE 52.2 - 75% by ASHRAE 52.1). This accessory can be available only with radial fans.

CPR Remote pressure delta control

This option is used to check the radial fan speed required to keep the differential air pressure setpoint constant. Units are supplied with a differential sensor with two pressure outlets to be fitted remotely. The sensor is used to check values around zero, i.e. with pressures that switch from negative to positive and vice versa. This is the ideal solution to contain the cold or hot aisle and it contributes to the optimisation of the air flows as it balances the unit flow rate with the server-processed flow rate through pressure balancing in the compartmentalised aisle.

If multiple units operate in the same area, the regulation value may be set to the min.-medium-max. pressure value sensed by each individual transducer.

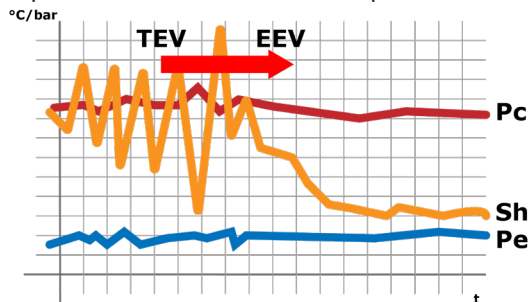
Min ESP	-50 Pa
Max ESP	+50 Pa



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.



The graph above illustrates the improvement achieved in the controller and in the superheating value (Sh), in parallel with the performance of the evaporation (Pe) and condensing (Pc) pressures, in cases where an electronic valve (E2V) is used.

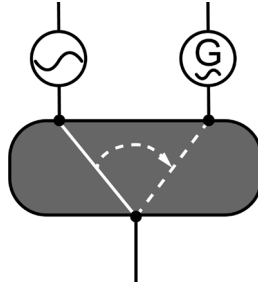
ELECTRICAL ACCESSORIES

A216 Power supply 230 V - 1 ph - 60 Hz
60Hz power supply for single-phase sizes in the range.

DAA Dual power supply with automatic switchover

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.

As the two sources do not switch instantly, the unit will be switched off, first, and then switched on automatically. If controller switch-off is to be avoided, thus reducing the subsequent switch-on times, a capacitive condenser (BORU) is available as option to keep the controller operational during the switching phase.



BORU Blackout restart

For quicker restart after a power failure (blackout), the unit can be supplied with capacitive electrical condensers to keep the controller operational for 15 - 20 seconds (depending on its use). This allows for quicker cooling system restart as soon as the power supply is restored (or switches to the other line in cases with dual power supply).



FUMO Smoke sensor

For smoke detection with sensors placed on the unit or in its vicinity This optical sensor is approved at national level by the Ministry of the Interior and it is type-approved at international level in conformity with harmonized European regulations CEN EN 54 part 7 and 8. It can protect an area of 81 sq.m (9x9).

The sensor is supplied bulk for installation on site. As it operates correctly with air speeds below 0.2 m/s, it must be installed outside the unit (not inside it).



The picture on the left shows a fire sensor (FUOCO - FIRE), whereas the picture on the right shows a smoke sensor (FUMO - SMOKE).

FUOC Fire sensor

For fire detection with sensors placed on the unit or in its vicinity 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 49 sq.m (7x7).

The sensor is supplied bulk for installation on site. As it operates correctly with air speeds below 0.2 m/s, it must be installed outside the unit (not inside it).

REFF 24V relay for remote smoke/fire sensor

If an external fire/smoke detection system needs to be connected to the units, a 24V relay may be required for connection of the potential-free alarm contact from the field to the microprocessor in the unit.

ALMT No voltage alarm

The No Voltage alarm is a potential-free contact in the terminal board in the electrical control panel. It is closed when the unit is energised.

MUSR Multi sensor (4) on return line

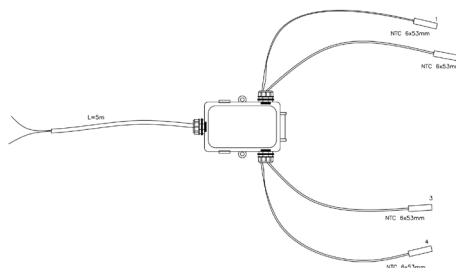
Solution with 4 sensors detecting the return temperatures and calculating the average for multi-point reading of the temperature and for more accurate temperature regulation. The option is supplied separately from the unit and it must be wired on site, based on the specific length requirements of the application layout.

The option connection cable to the unit is 5m long and the cable of each sensor is 6m long.

MUSM Multi sensor (4) on delivery line

Solution with 4 sensors detecting the delivery temperatures and calculating the average for multi-point reading of the temperature and for more accurate temperature regulation. The option is supplied separately from the unit and it must be wired on site, based on the specific length requirements of the application layout.

The option connection cable to the unit is 5m long and the cable of each sensor is 6m long.



CP Single potential free operating contacts

All standard units offer the opportunity to remote the signals/functions below through potential-free contacts:

- remote switch-on/off.
- serious alarm;
- Minor alarm (message).

If the configuration is supplemented with the CP option, potential-free contacts are made available in addition to those listed above for the following purposes:

- fan status;

SAN Tape extension flood sensor

The tape extension flood sensor (SAN) consists of a 25m long tape extension sensor. This solution provides for coverage of a larger area around the unit.



The picture shows both the single-point flood sensor (SAL) and the tape extension sensor (SAN).

SAL Single-point flood sensor

The flood detection sensor is the recommended solution to monitor possible water leaks which are not visible to the naked eye, typically underneath raised floors. The single-point flood sensor (SAL) consists in a single-point sensor wired to the electrical control panel, which is provided with a long enough cable to position the sensor close to the unit.

The microprocessor warns about the relevant alarm and either switches off the unit or not, based on the selected alarm configuration (serious alarm or simple message).

SA2 2 x Single-point flood sensor

SA2 consists of two single-point sensors: one sensor is wired to the control panel, the other is supplied bulk for installation on site at the required point.

SA3 3 x Single-point flood sensor

SA3 consists of three single-point sensors: one sensor is wired to the control panel, the other two are supplied bulk for installation on site at the required point.

CWDS Chilled water dynamic setpoint

A chilled water system consists of two separate sub-systems: internal units and external chillers (possibly, free cooling type). At partial loads and with a constant flow rate to the primary circuit (or a variable flow rate below the min. flow rate thresholds), the chiller system outputs water at the standard setpoint and this water is then partially recirculated either inside the unit (3-way valves) or through the flow separation system (tank, piping, etc.). This reflects into a system energy inefficiency.

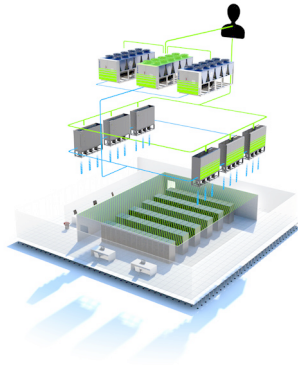
As the highest amount of energy is consumed by the chiller unit, in the ideal operating condition the chiller setpoint should be modified dynamically so as to deliver water to the air conditioners at the highest temperature possible, compatibly with the thermal load. This exponentially improves the system efficiency: as the water temperatures are increased, evaporation improves (in direct expansion mode) and the hours of free cooling increase remarkably.

Solutions have been developed over time to increase the water setpoint of the external chiller unit in an inversely proportional manner, for instance, through a 0-10V proportional signal upon an internal load request. This type of solutions only partly responds to the needs of modern Data Centres. The 0-10V only is a strong limitation in terms of point to point connection of each individual machine (when the connection is lost, the signal is lost too). Additionally, it does not efficiently provide for temperature control on the air delivery line (a far more critical factor as it directly impacts the temperature in front of the servers).

With the CWDS option, direct and smart communication is guaranteed between the set of internal machines and the external chillers, which are supplied by Swegon-Blue Box. Communication is not implemented through one single analog signal, but via continuous exchange of information at a higher level.

This is how internal units dynamically change the water setpoint of the connected chillers, based on the cold water valve position. More specifically, the more the valve is closed, the more the water temperature setpoint is increased; on the other hand, if the valve tends to its max. opening, the internal units will require the chillers to reduce their water setpoint. This prevents sudden disturbance to negatively affect the temperature/pressure in the room.

The aim of the logic is to stabilise the water temperature to such condition that the valve opens in the area where its energy consumption is optimised, leaving a margin for reaction under sudden peak loads, if any.



TR1 1 x Remote temperature sensor

This option is used to command temperature regulation and ventilation based on the values measured by a sensor that is installed in a remote position from the unit (at a max. distance of 30m) and in a closer position to the equipment that requires conditioning.

Where multiple units are fitted, each unit can be supplied with one sensor and the operator can choose whether to use the min., medium or max. value as the reference value.

TR2 2 x Remote temperature sensor

This option is used to command temperature regulation and ventilation with the help of two sensors installed in remote positions from the unit (each at a max. distance of 30m). The setpoint of the reference value can be the min., medium or max. value of both sensors.

Where multiple units are installed, the value (min., medium, max.) can be calculated as an average of the measurements by all featured sensors.

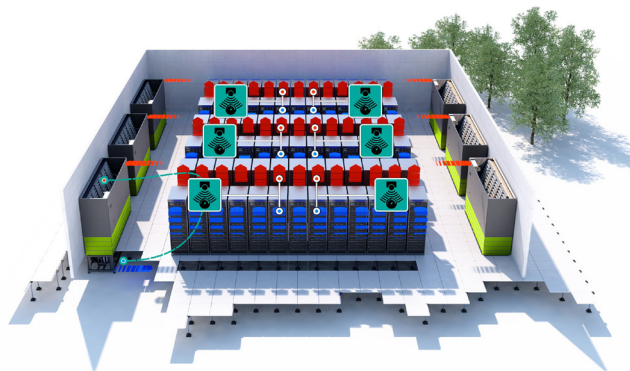
This option is also designed for use of the T Delta controller. This controller solution is conceived to balance the air flow rate processed by the conditioners with the air flow rate processed by the servers in the most accurate and continuous way possible.

The controller can pilot machine ventilation in such way that the difference (delta) between the unit input and output temperature is equal to the difference processed by the servers. For instance. If the application has either hot or cold aisle containment, the regulation of the cold source (compressor / valve) can be set to keep the delivery temperature constant and the fan regulation can be set so that the T delta between the input and output temperature (and the air flow rate as a result) is equal to the delta measured between the front and the back of the servers (including their flow rate).

The efficiency of this solution is enhanced with multiple units. When multiple units are fitted, a higher number of remote readings will be available and their min., medium and max. values can be processed.

The controller changes the fan speed iteratively, according to a logic by which the speed is either increased or reduced until the controller senses the correct air flow. For instance. When the delta temperature processed by the units is greater than the remote reference delta temperature, the controller will increase the fan speed through a small incremental step. The opposite will apply if the delta temperature measured in the machine is smaller than the remote reference delta.

The control is thus extremely regular and precise and brisk actions on the ventilation system are prevented, which may eventually disturb the conditions in front of the servers.



TR3 3 x Remote temperature sensor

This option is used to command temperature regulation and ventilation with the help of three sensors installed in remote positions from the unit (each at a max. distance of 30m). The setpoint of the reference value can be the min., medium or max. value of both sensors.

Where multiple units are installed, the value (min., medium, max.) can be calculated as an average of the measurements by all featured sensors.

TUR1 1 x Remote temperature and humidity sensor

This option is used to command temperature regulation and ventilation and to regulate humidity (either relative or absolute) with the help of a sensor installed in a remote position from the unit (at a max. distance of 30m). in a closer position to the equipment that requires conditioning.

Where multiple units are fitted, each unit can be supplied with one sensor and the operator can choose whether to use the min., medium or max. value as the reference value.

TUR2 2 x Remote temperature and humidity sensor

This solution is under all aspects equivalent to the solution with two sensors for remote temperature detection only (each at a max. distance of 30m from the unit). The only significant difference is that the remote sensors in this case can be used to also manage the control of the overall humidity in the room.

TUR3 3 x Remote temperature and humidity sensor

This option is used to command temperature regulation and ventilation, and to regulate humidity (either relative or absolute), with the help of three sensors installed in remote positions from the unit (at a max. distance of 30m). The setpoint of the reference value can be the min., medium or max. value of both sensors.

Where multiple units are installed, the value (min., medium, max.) can be calculated as an average of the measurements by all featured sensors.

NETWORK ACCESSORIES

BAC BacNet 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 BacNet serial board allows connection to supervision systems with the MS/TP protocol.

The monitoring solution is BTL-certified (BACnet Testing Laboratories) and ensures that the system is developed and tested according to the highest standards in the industry.

This option is mutually incompatible with the GLO option (Gateway per Lonworks).



PBA BACnet protocol over IP (Ethernet)

The controller is set for use, in read and write mode, of the BACnet port on IP protocol.

By default, the programming gives read-only access to the control of the unit. Enabling of read/write access should be requested when ordering.

The monitoring solution is BTL-certified (BACnet Testing Laboratories) and ensures that the system is developed and tested according to the highest standards in the industry.



PSN SNMP protocol

The accessory consists of a gateway that allows Ethernet connection to a SNMP manager supervision system.



GLO Modbus Lonworks Gateway

With this accessory, a RS485/Lon gateway is installed inside the electrical control panel.

By default, the programming gives read-only access to the control of the unit. Enabling of read/write access should be requested when ordering.

This option is mutually incompatible with the BAC option (BacNet serial protocol).



GRLD Datalink local network management

The local network Datalink is managed for communication among the various air conditioning units for the purpose of optimising system operation in terms of control efficiency and effectiveness.

TECHNICAL SPECIFICATIONS

Coolblade BTDX In Rack DX

Unit size			OL 9	CL 9	OL 14	CL 14	OL 20	CL 20	OL 24	CL 24
Total refrigeration capacity	(1)	kW	8.7	9.9	14.0	15.8	18.9	21.2	21.5	23.6
Sensible cooling capacity	(1)	kW	8.7	9.9	14.0	15.8	18.9	21.2	21.5	23.6
SHR			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Fans										
Number			2	2	3	3	4	4	5	5
Nominal air flow rate		m ³ /h	2300	2350	3200	3350	3900	4100	4200	4200
Min. air flow rate		m ³ /h	1100	1100	1600	1600	1800	1800	2000	2000
Power input with nominal airflow		kW	0.32	0.32	0.49	0.50	0.65	0.64	0.74	0.60
Max. air flow rate		m ³ /h	2300	2400	3200	3400	3900	4100	4200	4200
Noise levels										
Sound power level on suction side		dB(A)	74.8	75.5	75.3	76.1	75.9	76.7	76.5	77.3
Sound power level on supply side		dB(A)	78.2	79.0	78.8	79.5	79.3	80.1	79.9	80.7
Refrigerant circuit										
Suction connection		n°x mm	1x16	1x16	1x16	1x16	1x16	1x16	1x16	1x16
Liquid connection		n°x mm	1x12	1x12	1x12	1x12	1x12	1x12	1x12	1x12
Blue Box matching condensing unit										
Model			Epsilon Echos+-LE 9	Epsilon Echos+-LE 9	Epsilon Echos+LE 15	Epsilon Echos+LE 15	Epsilon Echos+LE 20	Epsilon Echos+LE 20	Epsilon Echos+LE 26	Epsilon Echos+LE 26
Total refrigeration capacity	(2)	kW	8.1	9.9	13.4	15.5	18.8	21.2	23.8	25.6
Sensible cooling capacity	(2)	kW	8.1	9.9	13.4	15.5	18.8	21.2	23.8	25.6
Power input condensing unit Epsilon Echos+ LE	(2)	kW	2.0	2.4	3.2	3.5	5.2	5.2	7.0	7.0
Total refrigeration capacity	(3)	kW	10.7	11.5	15.1	16.9	21.0	23.3	25.9	27.8
Sensible cooling capacity	(3)	kW	10.7	11.5	15.1	16.9	21.0	23.3	25.9	27.8
Power input condensing unit Epsilon Echos+ LE	(3)	kW	3.2	3.4	4.5	4.9	7.1	7.0	9.6	9.5
Dimensions and weights of basic unit										
Length		mm	290	290	290	290	290	290	290	290
Depth		mm	770	722	770	722	770	722	770	722
Height		mm	1943	1943	1943	1943	1943	1943	1943	1943
Operating weight		kg	60	60	66	66	72	72	78	78

(1) Saturated evaporating temperature 12°C, saturated condensing temperature 45°C; OL Version Air 35°C 27%; CL Version Air 40°C 20%

(2) Compressor speed 90 rps, External air temperature 35°C; OL Version Air 35°C 27%; CL Version Air 40°C 20%

(3) Compressor speed 120 rps, External air temperature 35°C; OL Version Air 35°C 27%; CL Version Air 40°C 20%

Coolblade BTD In Rack CW

Unit size			OL 14	CL 14	OL 18	CL 18	OL 23	CL 23
Total refrigeration capacity	(1)	kW	13.1	17.1	17.4	22.8	20.8	26.2
Sensible cooling capacity	(1)	kW	13.1	17.1	17.4	22.8	20.8	26.2
SHR	(1)		1.00	1.00	1.00	1.00	1.00	1.00
Fans								
Number			3	3	4	4	5	5
Nominal air flow rate		m3/h	3180	3300	3850	4050	4200	4200
Min. air flow rate		m3/h	1000	1000	1200	1200	1400	1400
Power input with nominal airflow		kW	0.50	0.49	0.65	0.65	0.82	0.64
Max. air flow rate		m3/h	3200	3300	3850	4050	4200	4200
HYDRAULIC CIRCUIT								
Total pressure drop without valves	(1)	kPa	50	52	34	60	32	48
Total pressure drop with valves	(1)	kPa	63	74	57	100	45	68
Connectors			G3/4"	G3/4"	G3/4"	G3/4"	G1"	G1"
Internal volume		dm ³	4.9	4.9	7.1	7.1	9.2	9.2
Noise levels								
Sound power level on suction side		dB(A)	75.3	76.1	75.9	76.7	76.5	77.3
Sound power level on supply side		dB(A)	78.8	79.5	79.3	80.1	79.9	80.7
Dimensions and weight								
Length		mm	290	290	290	290	290	290
Depth		mm	722	770	722	770	722	770
Height		mm	1943	1943	1943	1943	1943	1943
Operating weight		kg	66	66	72	72	78	78

(1) Water 13°C / 18°C; OL Version Air 35°C 27%; CL Version Air 40°C 20%

ELECTRICAL DATA

Coolblade BTD In Rack DX

Unit size		OL/CL 9	OL/CL 14	OL/CL 20	OL/CL 24
Max. absorbed power	kW	0.33	0.50	0.67	0.84
Max. absorbed current	A	2.8	4.2	5.6	7.0
Power supply	V/ph/Hz	230/1~/50 ±5%	230/1~/50 ±5%	230/1~/50 ±5%	230/1~/50 ±5%

Coolblade BTD In Rack CW

Unit size		OL/CL 14	OL/CL 18	OL/CL 23
Max. absorbed power	kW	0.5	0.67	0.8
Max. absorbed current	A	4.2	5.6	7.0
Power supply	V/ph/Hz	230/1~/50 ±5%	230/1~/50 ±5%	230/1~/50 ±5%

NOISE LEVELS

COOLBLADE IN RACK DX -Supply side

Model	Sound power level in octave band [dB]								Total [dB(A)]	
	Central frequency [Hz]								Lw	Lp
	63	125	250	500	1000	2000	4000	8000		
9 OL	68.8	68.9	69.8	71.1	72.5	73.7	68.8	59.4	78.2	64.2
9 CL	70.3	69.9	70.8	71.9	73.3	74.5	69.2	59.8	79.0	65.0
14 OL	69.8	69.7	70.6	71.7	73.1	74.3	69.0	59.6	78.8	64.8
14 CL	71.3	70.7	71.6	72.5	73.9	75.1	69.4	60.0	79.5	65.5
20 OL	70.8	70.5	71.4	72.3	73.7	74.9	69.2	59.8	79.3	65.3
20 CL	72.3	71.5	72.4	73.1	74.5	75.7	69.6	60.2	80.1	66.1
24 OL	71.8	71.3	72.2	72.9	74.3	75.5	69.4	60.0	79.9	65.9
24 CL	73.3	72.3	73.2	73.7	75.1	76.3	69.8	60.4	80.7	66.6

COOLBLADE IN RACK DX -Suction side

Model	Sound power level in octave band [dB]								Total [dB(A)]	
	Central frequency [Hz]								Lw	Lp
	63	125	250	500	1000	2000	4000	8000		
9 OL	66.9	66.5	68.4	69.5	70.2	69.0	64.5	51.8	74.8	60.8
9 CL	68.4	67.5	69.4	70.3	71.0	69.8	64.9	52.2	75.5	61.5
14 OL	67.9	67.3	69.2	70.1	70.8	69.6	64.7	52.0	75.3	61.3
14 CL	69.4	68.3	70.2	70.9	71.6	70.4	65.1	52.4	76.1	62.1
20 OL	68.9	68.1	70.0	70.7	71.4	70.2	64.9	52.2	75.9	61.9
20 CL	70.4	69.1	71.0	71.5	72.2	71.0	65.3	52.6	76.7	62.7
24 OL	69.9	68.9	70.8	71.3	72.0	70.8	65.1	52.4	76.5	62.5
24 CL	71.4	69.9	71.8	72.1	72.8	71.6	65.5	52.8	77.3	63.2

COOLBLADE IN RACK CW -Supply side

Model	Sound power level in octave band [dB]								Total [dB(A)]	
	Central frequency [Hz]								Lw	Lp
	63	125	250	500	1000	2000	4000	8000		
14 OL	68.0	68.1	69.0	70.4	71.8	73.0	68.2	58.8	77.6	63.5
14 CL	69.5	69.1	70.0	71.2	72.6	73.8	68.6	59.2	78.3	64.3
18 OL	69.0	68.9	69.8	71.0	72.4	73.6	68.4	59.0	78.1	64.1
18 CL	70.5	69.9	70.8	71.8	73.2	74.4	68.8	59.4	78.9	64.8
23 OL	70.0	69.7	70.6	71.6	73.0	74.2	68.6	59.2	78.7	64.6
23 CL	71.5	70.7	71.6	72.4	73.8	75.0	69.0	59.6	79.4	65.4

COOLBLADE IN RACK CW -Suction side

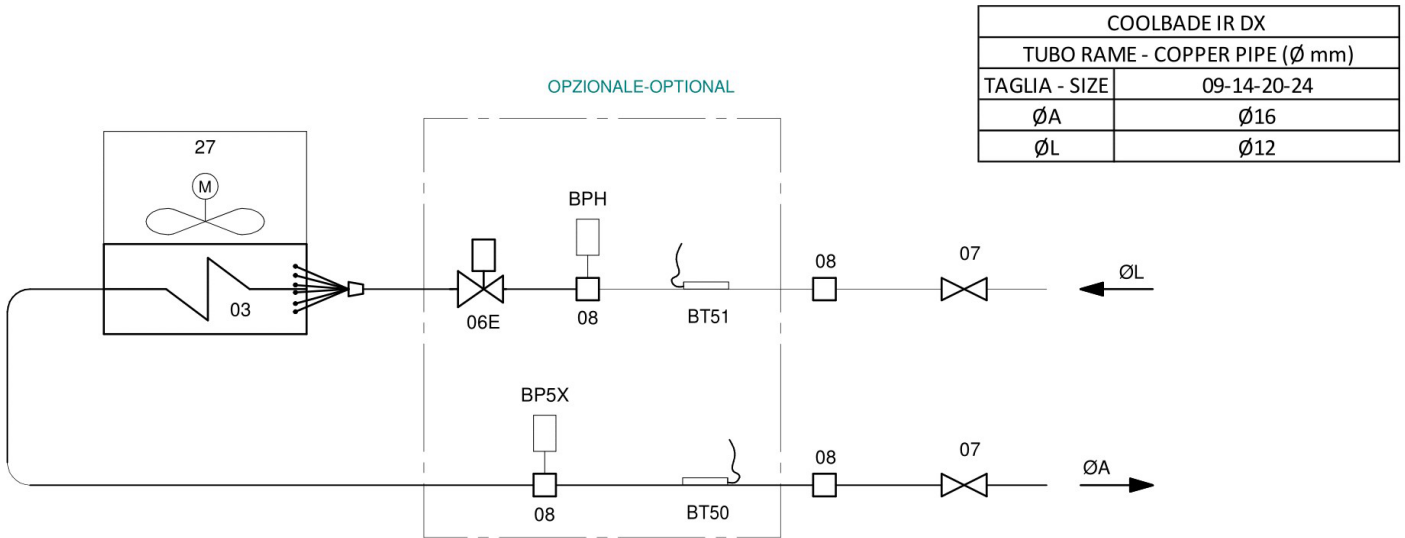
Model	Sound power level in octave band [dB]								Total [dB(A)]	
	Central frequency [Hz]								Lw	Lp
	63	125	250	500	1000	2000	4000	8000		
14 OL	66.3	65.7	67.9	68.8	69.5	68.8	63.9	52.0	75.5	61.5
14 CL	67.8	66.7	68.9	69.6	70.3	69.6	64.3	52.4	75.0	61.0
18 OL	67.3	66.5	68.7	69.4	70.1	69.4	64.1	52.2	76.1	62.1
18 CL	68.8	67.5	69.7	70.2	70.9	70.2	64.5	52.6	75.6	61.6
23 OL	68.3	67.3	69.5	70.0	70.7	70.0	64.3	52.4	75.4	61.4
23 CL	69.8	68.3	70.5	70.8	71.5	70.8	64.7	52.8	76.2	62.2

Lp: Sound pressure level at 2 m free field weighted "A" method

Lw: Sound power level weighted "A" method

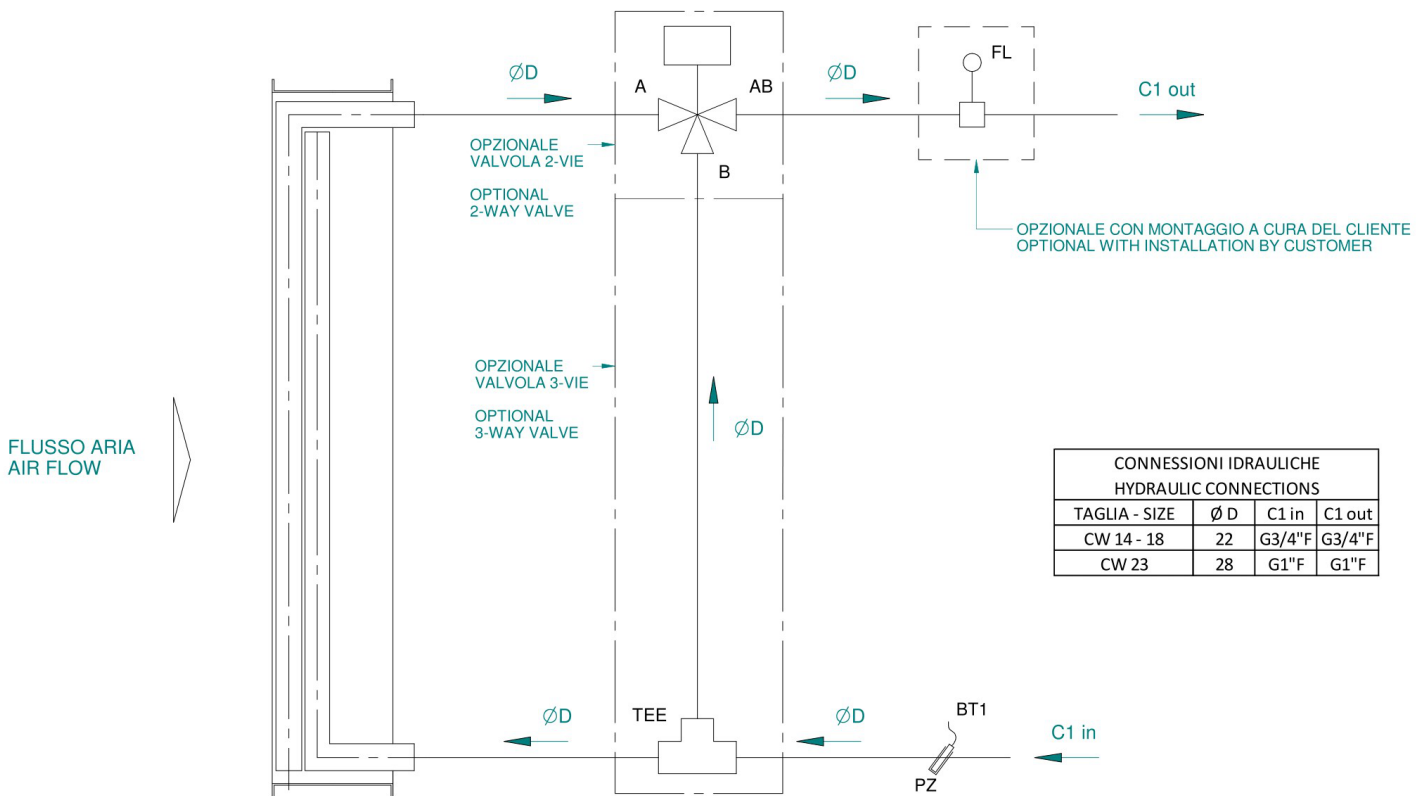
REFRIGERANT DIAGRAMS

COOLBLADE BTD IN RACK DX



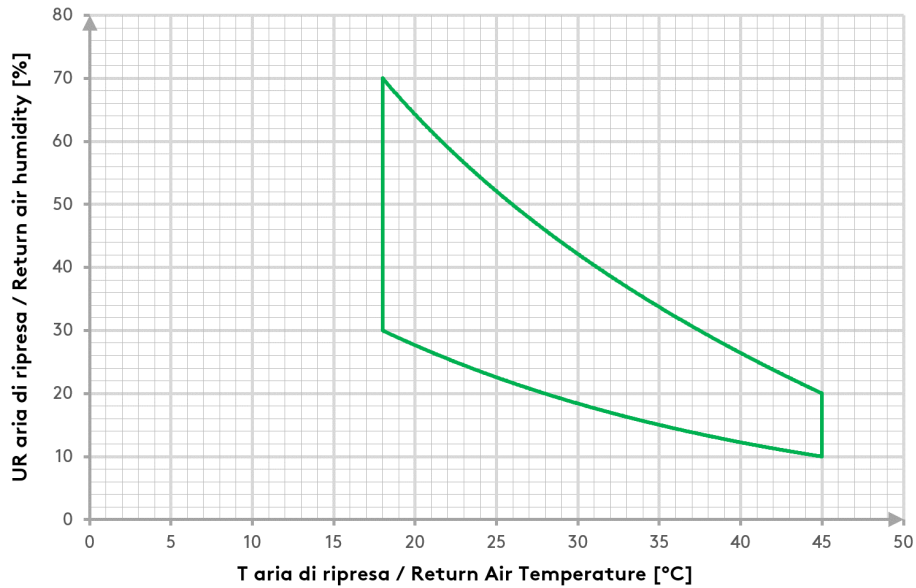
HYDRAULIC DIAGRAMS

COOLBLADE BTD IN RACK CW



OPERATING LIMITS – COOLBLADE BTD IN RACK 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:

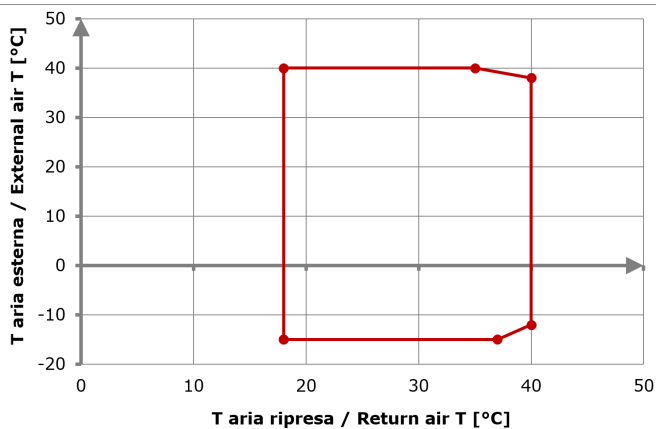


It should be emphasised that the standard design temperatures of a hot aisle/cold aisle system with containment are usually higher than 30°C; however, Coolblade DX units can also operate at lower return air temperatures, within the limits stated below.

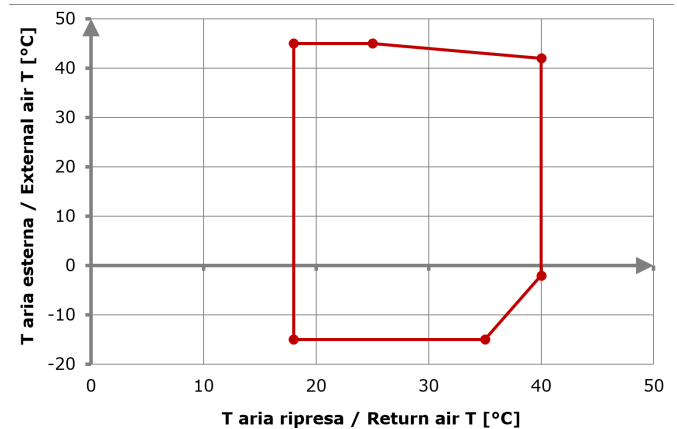
COOLBLADE BTD IN RACK DX - EPSILON ECHOS+ LE

Coupled to Epsilon Echos + LE condensing unit

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



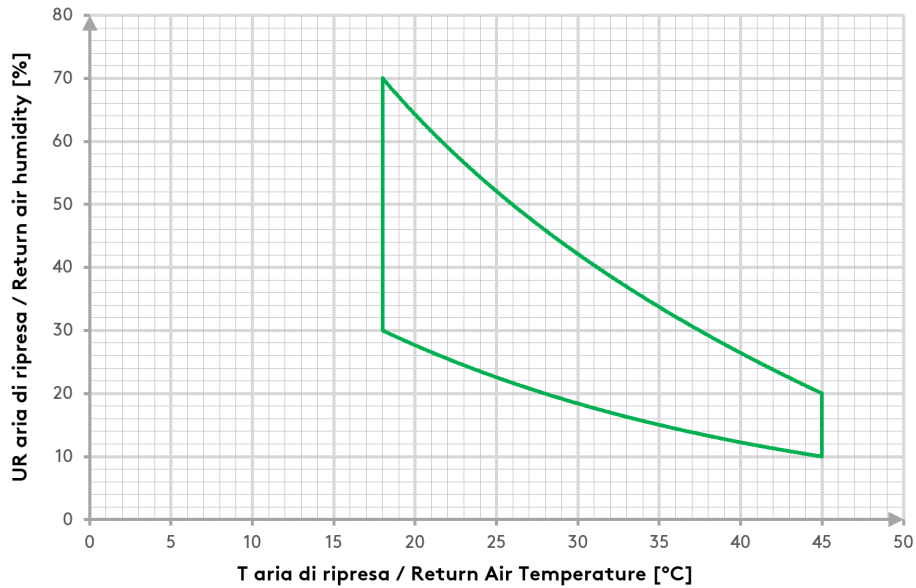
Condensing unit at maximum capacity (compressor at 120rps)



Condensing unit at rated capacity (compressor at 90rps)

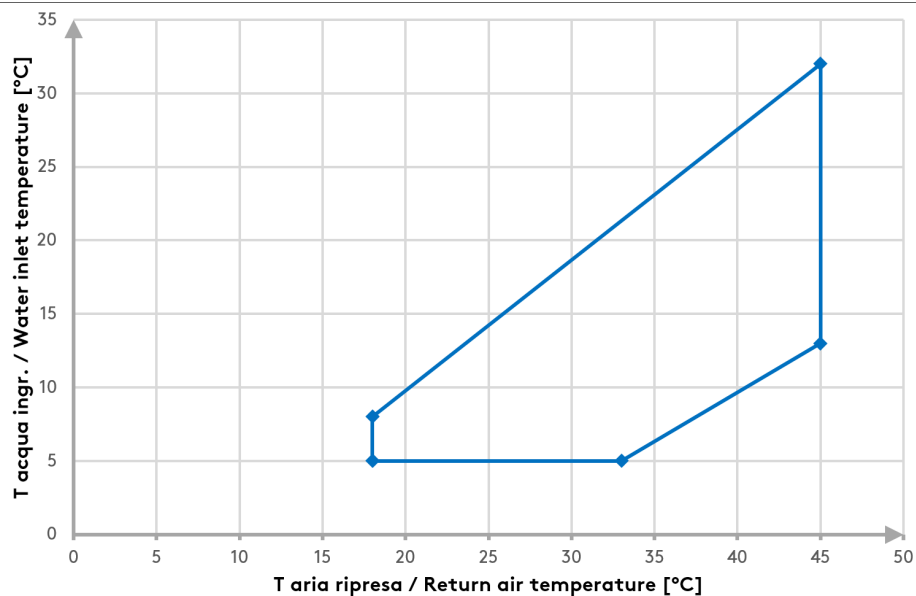
OPERATING LIMITS – COOLBLADE BTD IN RACK CW

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 In Rack CW 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.

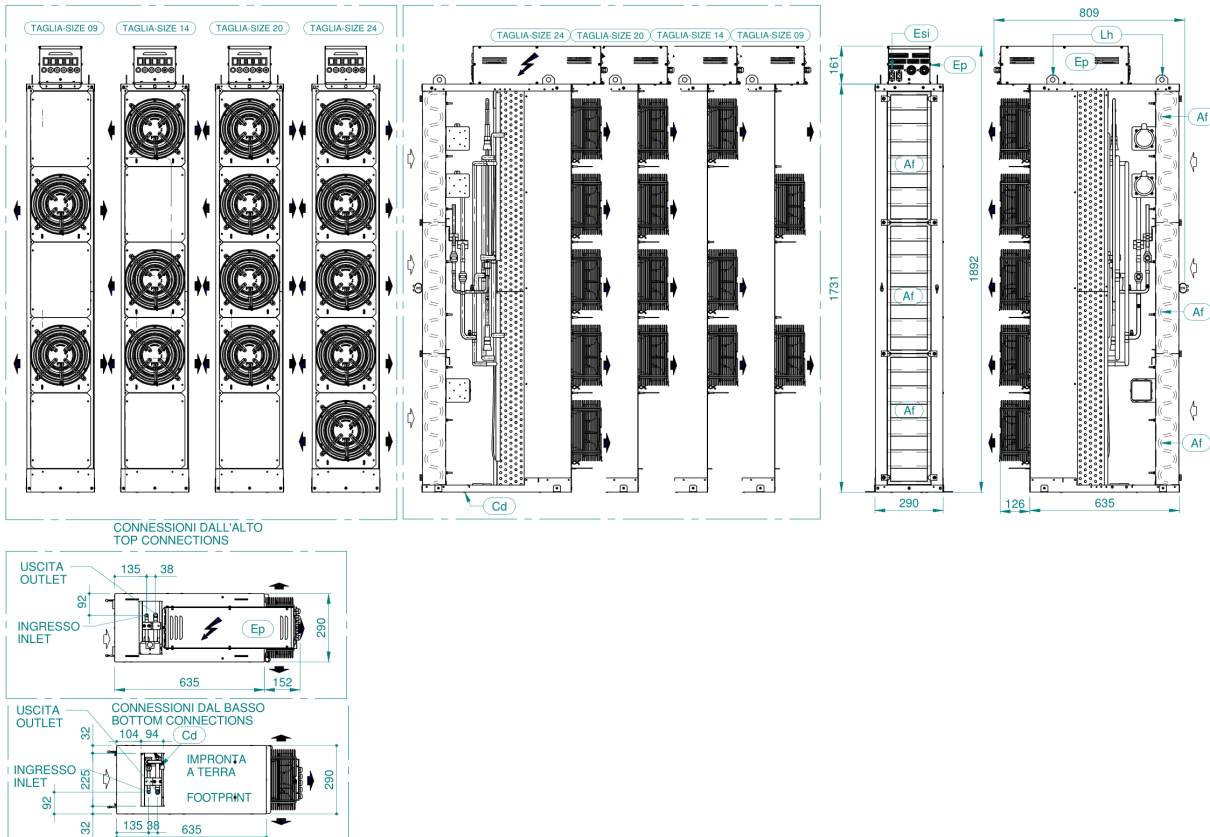


The maximum percentage of glycol is 50%.

DIMENSIONAL DIAGRAMS

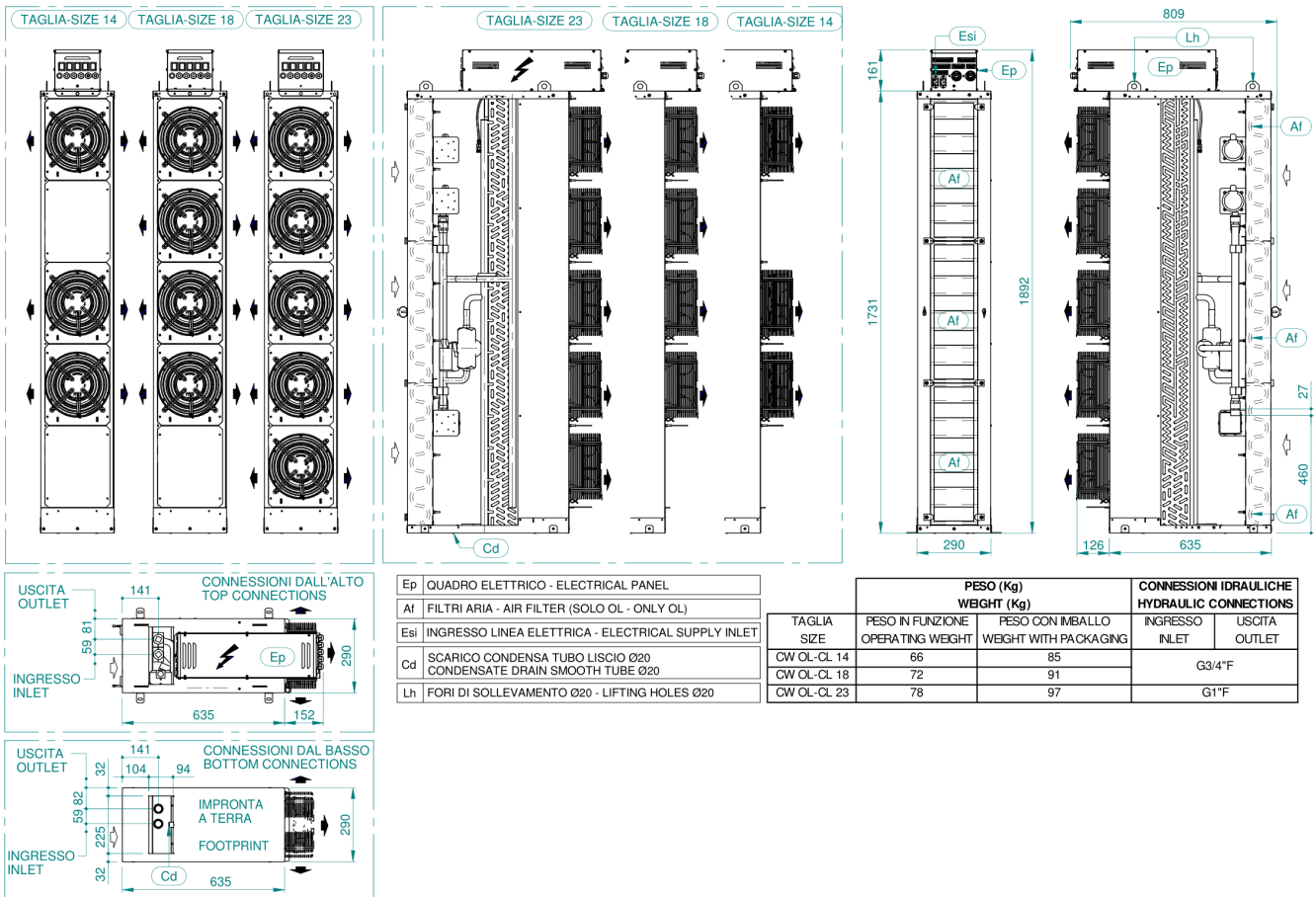
COOLBLADE BTD IN RACK DX

DDIM000719-A



COOLBLADE BTD IN RACK CW

DDIM000717-A



INSTALLATION TIPS

PUTTING IN PLACE

- 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 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.
- 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 braze-welding, 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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