Databook

Code:

Small Chiller

07/2024

Air Cooled Heat Pump in Split version with Inverter scroll compressors

EWYT~CZI + EWYT~CZO

BLUEVOLUTION

- **Nominal capacity range 21 - 64 kW**
- **Split solution**
- **R-32 refrigerant**

Performance according to EN14511.

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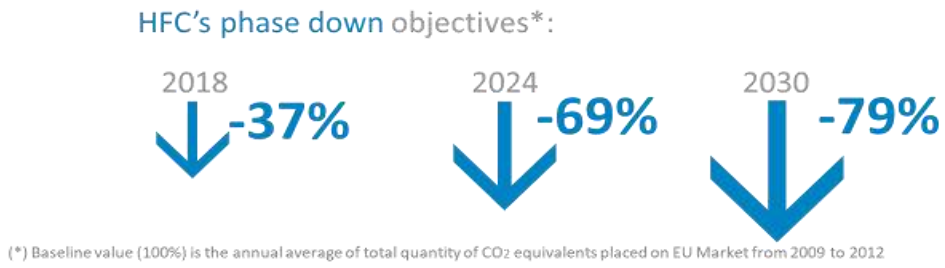
DAIKIN

INDEX

Low operating cost.
The new Daikin *BLUEVOLUTION* heat pump series (EWYT-CZ SPLIT VERSION) is the result of careful design aimed to optimize the energy efficiency and thus the total life cycle cost of the unit, with reduced operating cost thanks to outstanding performances and reliability.
The units feature high efficiency scroll compressor arranged in single or tandem configuration on each refrigerant circuit, optimized condensing section with advanced technology condensing fans and plates evaporator with low refrigerant content and reduced pressure drops.

Low environmental impact.
Latest revision of F-GAS, entered into force in 2015, set up a phase down program for traditional HFC's refrigerants. In 2018 first significant reduction step has been introduced (37%) and in 2030 the reduction (calculated in equivalent CO2 tons) will need to achieve almost 80%.



The new Daikin *BLUEVOLUTION* series uses R-32 refrigerant to reduce drastically the carbon footprint of the unit. The selection of R-32 (chemical name difluoromethane) minimises the global warming impact of scroll compressor units thanks to the lower Global Warming Potential in combination with high-energy efficiency.
The Global Warming Potential of R-32 is 675, which is only one third of the commonly used refrigerant R-410A.

Thanks to the low flammability classification (R-32 refrigerant is classified A2L in ISO817), it can be safely used in many applications including chilled water systems. Being a single component refrigerant, R-32 is also easier to recycle and reuse, that is another environmental plus in its favour.

Daikin has a long history of continuous reduction of the environmental impact of cooling, heating and refrigeration, having a unique expertise that comes from manufacturing both refrigerants and equipment. This position is one of the results of company's corporate philosophy to "Be a Company that Leads in Applying Environmentally Friendly Practices".

Outstanding reliability.
The units have one or two truly independent refrigerant circuits with one or two compressors to assure maximum safety for any maintenance, whether planned or not.

Condensation control.
Units are equipped with fan speed modulation.

Fan silent mode.
Units are standardly supplied with fan silent mode. This feature allows the user to set up detailed time bands to reduce fan rotation speed and therefore sound emission in those areas where night quietness is a mandatory requirement. The average sound power reduction is -2dB(A) and a consequent drop in Capacity of -4%.

Superior control logic.
The control logic is designed to provide maximum efficiency, to continue operation in unusual operating conditions and to provide history of unit operation. Easy interface with, Bacnet, Ethernet TCP/IP or Modbus communications. Master/Slave operation is provided as standard allowing to connect up to 4 units working as single system.

Dynamic Condensing Pressure Management.
Superior software logic has been developed to get the highest efficiency at whatever operating condition: thanks to the Dynamic Condensing Pressure Management the unit controller adjusts the condensing pressure set-point to minimize the overall power input.

Code requirements – Safety and compliance to laws/directives
Units are designed and manufactured in accordance to the following directives and harmonized standards:

Low voltage directive	DIRECTIVE 2014/35/EU
Electromagnetic compatibility (EMC)	DIRECTIVE 2014/30/EU
Machinery directive	DIRECTIVE 2006/42/EC
Pressure equipment Directive	DIRECTIVE 2014/68/EU
Ecodesing	DIRECTIVE 2009/125/EC
Safety of machinery	EN 60335-2-40
EMC - Part 6-2	EN 61000-6-2
EMC - Part 6-4	EN 61000-6-4
Low voltage directive	DIRECTIVE 2014/35/EU
Electromagnetic compatibility (EMC)	DIRECTIVE 2014/30/EU

Certifications.
Units are CE and EAC marked, complying with European directives in force, concerning manufacturing and safety.

The Small inverter Chiller & Heat pump in *Split version is an Heat Pump consisting of an indoor and an outdoor unit connected to each other by the refrigerant circuit to ensure glycol free application. The Split version is always supplied with Low Lift Pump mounted on board and Inverter Driven.*

Compressors
Hermetic orbiting scroll type optimized for R-32 operation and complete with motor over-temperature and over-current protection devices. Each compressor is equipped with an oil heater that keeps the oil from being diluted by the refrigerant when the unit is not running. Each compressor is mounted on rubber antivibration mounts and is standardly equipped with compressor jacket for a quite operation. Unit is delivered with complete oil charge.
The Variable Frequency Drive (VFD) is integrated in the electrical panel of the unit and it allows continuous modulation of compressor's rotational speed.
On site, unit can be set to operate in ***Boosted mode***, please check the technical table values in the _MAX section.
Another feature to be set on site is the ***Constant Heating Capacity***, a standard control feature that has the purpose of keeping the heat capacity supplied by the unit unchanged as the ambient temperature decreases. This is achieved accelerating the compressor frequency to get as close as possible to the Heating Capacity at 40/45 °C, OAT 7°C, while the ambient temperate decreases. Please check the CSS in the Energy Analysis section.

Water Side Heat Exchanger
The Indoor unit is equipped with a direct expansion plate-to-plate type Heat Exchanger optimized for R-32 refrigerant operation. This heat exchanger is made of stainless-steel brazed plates and is covered with 20mm closed cell insulation material. The flow switch is standard and factory mounted while the water filter on the heat exchanger side is shipped with the Unit, but needs to be field installed.

Air Side Heat Exchanger
The Air Side Heat Exchanger of the Outdoor unit is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum Air Side Heat Exchanger fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Air Side Heat Exchanger fans
Air Side Heat Exchanger fans are propeller type with high efficiency design blades to maximize performances. The blades are made of glass-reinforced resin and a guard protects each fan.
Units are standardly equipped with inverter driven fans.

Electronic expansion valve
The unit is equipped with electronic expansion valves to achieve precise control of R-32 refrigerant mass flow. Electronic expansion valves become mandatory to improve the energy efficiency and to accurately control the temperature in a wide range.
Electronic expansion valves have unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistant stainless-steel body.
If compared to traditional thermostatic valves, electronic expansion valves allow the system to work with low condenser pressure (wintertime) without any refrigerant flow problems and to perfectly control the chilled water temperature.

Refrigerant circuit
Each unit has one or two independent refrigerant circuits and each one includes:

- Compressors
- Refrigerant
- Water side Heat Exchanger
- Air Side Heat Exchanger
- Electronic expansion valve
- Filters
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- Suction temperature sensor
- Discharge temperature sensor

Electrical panel
Power and control are in the main panel that is manufactured to ensure protection against weather conditions. The electrical panel of the outdoor is IPX4 and the indoor is IP22.

Safety device / logic for each refrigerant circuit
The following devices / logics are available:
• high pressure switch;
• high pressure transducer;
• low pressure transducer;
• high compressor discharge temperature;
• compressor case temperatute switch
• low pressure ratio;

System security
The following securities are available:
• low ambient temperature lock-out;
• freeze protection.

Supervising systems remote communication
Controller can communicate to BMS (Building Management System) based on the most common protocols as:
• Modbus MSTP TCP-IP Accessory
• BACnet MSTP TCP-IP Accessory

Additional information related to F-GAS Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006

Unit Model	Refrigerant type	Refrigerant GWP	N° of circuits	Refrigerant PRE-Charge Circuit 1 [kg]	Refrigerant PRE-Charge Circuit 2 [kg]
EWYT021CZO-A1	R32	675	1	7.3	-
EWYT032CZO-A1	R32	675	1	9.5	-
EWYT040CZO-A1	R32	675	1	9.8	-
EWYT064CZO-A2	R32	675	2	9.3	7.3

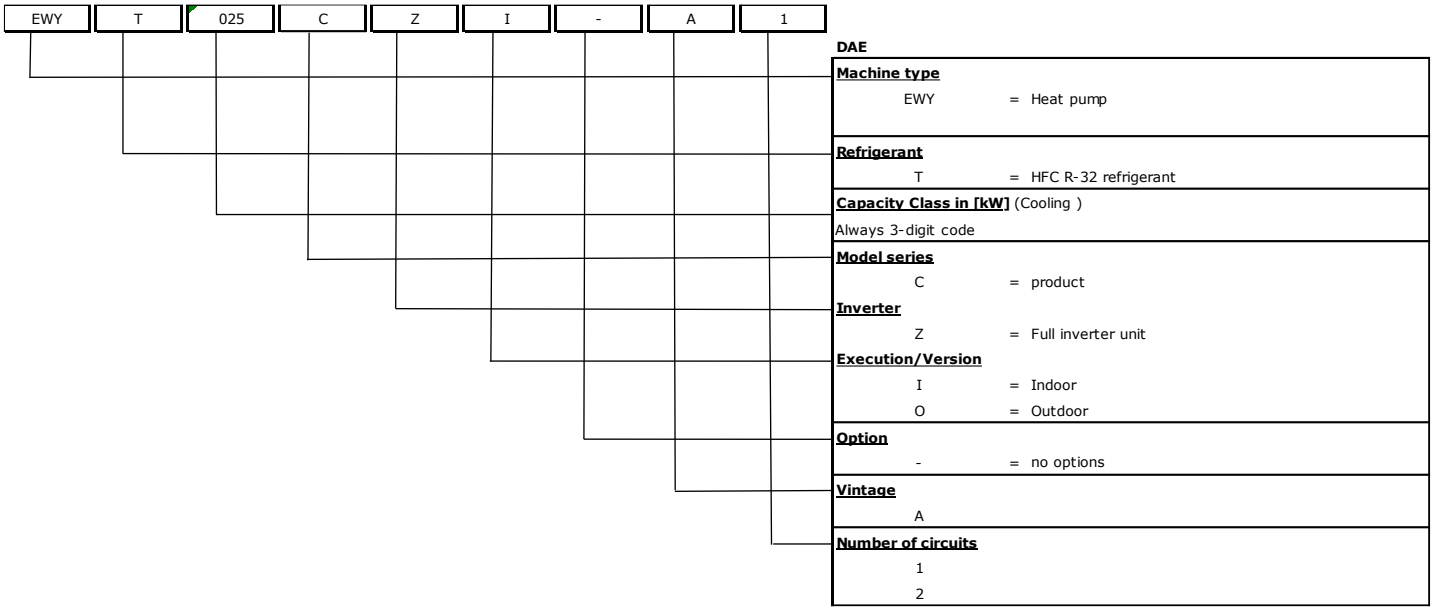
Note: Equipment contains fluorinated greenhouse gases.

Factory Refrigerant PRE-Charges are intended only for the outdoor unit. The indoor unit, on the other hand, is Pre-Charged with nitrogen.

Actual refrigerant charge depends on the final unit construction and according to the final equivalent length which cannot exceed 30m and 10m in height.

For the additional refrigerant quantity, refer to paragraph 6.6 of the IOM.

Nomenclature



Standard Component and Features (supplied on basic units)

Hour run meter (provided as standard)

General fault contactor (provided as standard)

Main switch interlock door (provided as standard)

Master / Slave (provided as standard)
The DAIKIN Master/ Slave (M/S) control. Once set which unit has the role of master, the other(s) will operate as slave(s) based on the inputs provided by the master.
The units must be installed in parallel in the hydronic plant.
With Master/Slave control it is possible to balance the working hours of the compressors enhancing reliability and extending the life of the system.
In order to operate in Master/Slave mode an additional probe (NTC10K type or available as an accessory EKRSCTMS) must be installed on the common line of the plant and connected to the master unit.
The master / slave feature allows to manage the start and stop of field supplied water pumps. The power supply of the field supplied pumps is seperate from the unit.

20mm evaporator insulation (provided as standard)
The heat exchanger is fitted with 20mm closed cell insulation material.

Fans speed regulation
Fans speed regulation: continuous modulation of the fans' speed for optimal condensation control at low ambient temperatures.
Fans silent mode: This feature allows the user to set up customized time bands to reduce fans' speed rotation and therefore sound emission in those areas where quiet is a mandatory requirement during specific time of the day (e.g. night operation). The average sound power reduction is -2 dB(A). For heat pump operation, it must be taken into account that the unit will defrost more often.
Fan Boost: the unit can go in fan Boost operation in case of external canalization or in case of high ambient conditions just enabling the function in the controller. Refer to "Available fan static pressure correction factors" tables in case of additional pressure drop due to ducts or canalizations.

Alarm from external device
The unit controller is able to receive an external alarm signal. The user can decide whether this alarm signal will stop the unit or not.

Water filter (provided as standard)
The water filter removes impurities from the water by means of a fine physical barrier. It must be installed on the water pipe connected to the heat exchanger inlet.
The filter is shipped loose. NOTE: The installation of the water filter is mandatory.

Shut off valve (provided as standard)
Shut off valves are delivered with the unit and to be field installed.

Evaporator flow switch (provided as standard)
It is always factory mounted on the leaving water side and cabled. For additional information please check the Piping Diagram ("Hydraulic schemes" paragraph).

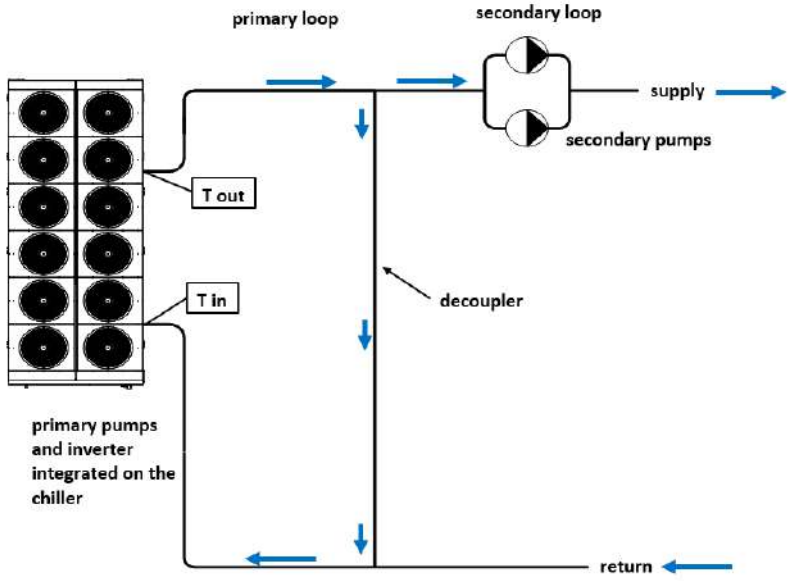
Hydronic kit
Unit mounted hydronic kits are available for low lift solution.
The Low lift pump kit provides an average available head of 100 kPa at chiller standard conditions.
The kit is completed with mechanical elements specified in the P&I.

Inverter for pump (provided as standard)
The Inverter kit is standardly associated with the hydronic kit. The inverter for the pump has been designed for operation at an ambient temperature in line with the declared envelope; continuous operation at full load at an high ambient temperature will reduce the useful life of the inverter itself.
The inverter pump can be used for the following purposes:

- **Adjusting the water flow rate during unit commissioning.**

- **Set a "thermostat off" pump speed**. With the inverter kit, it is possible to manage two different water flow settings: a setting for water flow during the "Thermostat ON" mode (when the chiller is actually providing cooling to the plant), and a set for the "thermostat off" mode (when the plant load is satisfied and the compressors are waiting to start). This feature allows to achieve energy saving on plant operating cost by reducing the speed of the pumps when the chiller has reached the set point.

- **Control variable flow on primary loop based on chiller delta-T (available for single chiller installation only)**
  Having the unit with the inverter kit for the on-board pump it is possible to manage a variable water flow rate for the primary loop. This function is available as standard when the hydronic kit plus inverter are selected.
  The standard feature is applicable for single unit installation only. In case of multiple chillers installation an additional control is needed.
  The variable flow control is suitable for primary/secondary plant but can not be used in Variable Primary Flow chilled water system configurations.

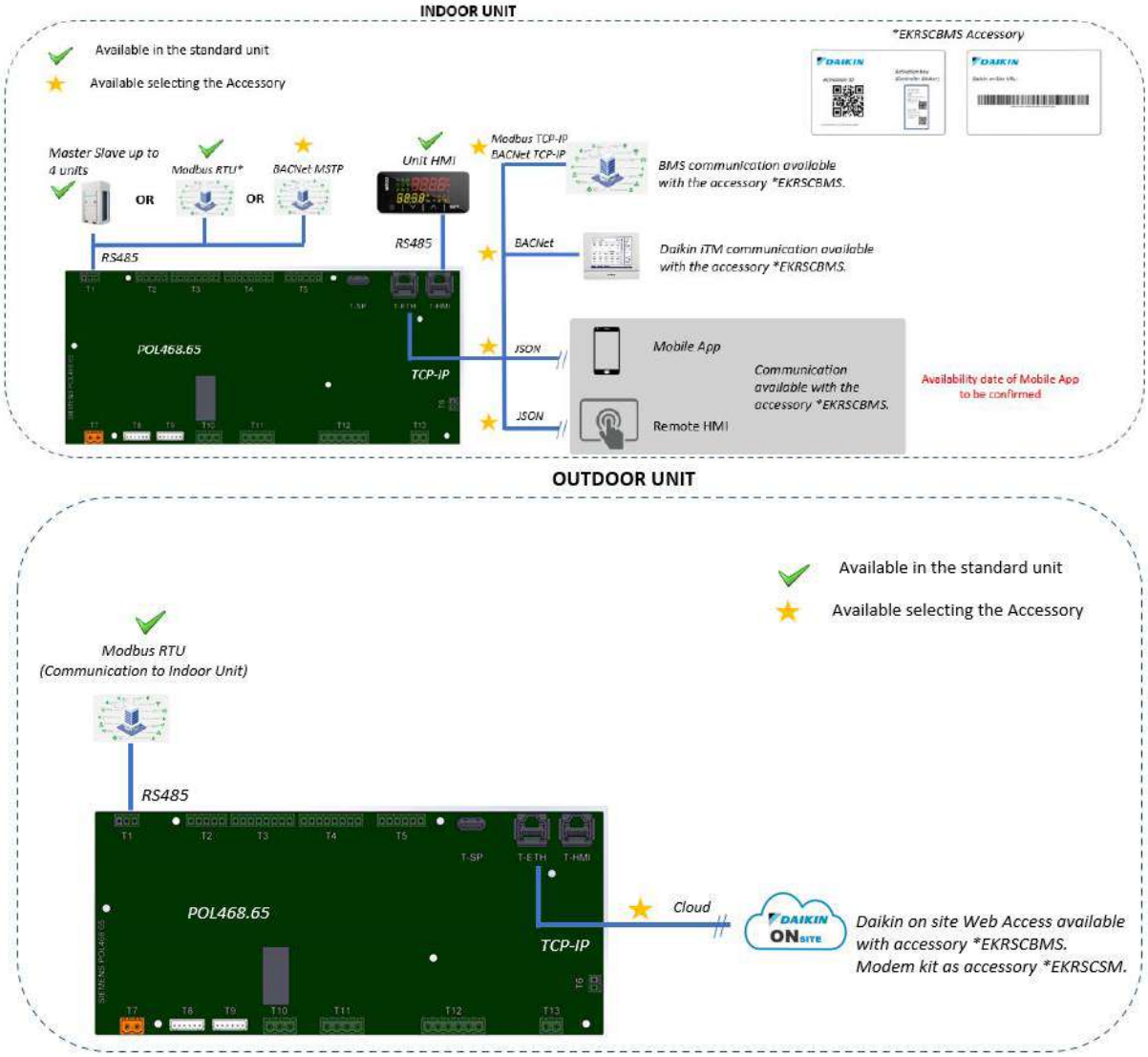


In a Primary-Secondary plant configuration a key component is the decoupler. The decoupler is always open (no valve must be installed). The aim of the decoupler is to allows the primary and secondary pumps to operate at different flow rates. This is necessary because the primary pumps and secondary pumps are managed differently and so the primary and secondary flow rate are practically never the same. Specifically, the primary flow rate is managed based on the chiller delta-T (T_{out} - T_{in}), the secondary flow rate is regulated to maintain the necessary pressure differential in the secondary loop. The direction of the water flow through the decoupler must be always from supply to return. To ensure this the primary flow rate must be higher than the secondary flow rate.

If this condition is not respected the warmer return water will flow backwards through the decoupler and raise the supply water temperature. Due to the higher temperature of the supply water the terminal (users) unit control will open the valves asking for higher water flow rate. The secondary pumps will speed up increasing even more the water flow rate on secondary plant making the situation even worst (secondary flow rate >> primary flow rate). As result there will be no control on the supply water temperature losing effectiveness of the cooling plant.
On the other side any excess in the primary flow, vs. secondary flow, flows through the decoupler from the supply to the return mixing with the warmer return water. To reach this target is very important to have minimum pressure drop in the decoupler that needs to be sized to reach a pressure drop that should not exceed 4÷5 kPa for the flow rate of the primary pump.
Activating the variable flow control the chiller will modulate the water flow rate based on the chiller delta-T.
When the secondary loop will reduce the water flow rate (because the plant load decrease), the water flow rate in the decoupler (always from supply to return) increases. The return water temperature mixes with the supply water from the decoupler reducing the inlet water temperature and so the delta-T on the chiller. As consequence the chiller control reduce the speed of the pump, reducing the primary flow rate.
On the opposite, when the flow rate on secondary flow increases also the water temperature at the chiller inlet increase (increasing the delta-T); therefore, the chiller control will increase the water flow rate.

Accessories

EKRSCTMS	Temperature sensor for master/slave configuration	To be selected
EKRSCIO	IO extension for VPF, domestic hot water, demand limit, setpoint reset, low noise	NA - Standard functions included
EKRSCBMS	Connectivity for external BMS communication (Modbus TCP, Bacnet MSTP/IP)	To be selected
EKRSCSM	Kit DoS router with antenna	To be selected



The Split version is able to manage as standard function the VPF-Variable Primary Flow, DHW-Domestic hot water management, Demand limit, Setpoint reset, Low noise, Double set point, Defrost out, Cooling heating output.

EKRSCTMS – Temperature sensor for master/slave configuration

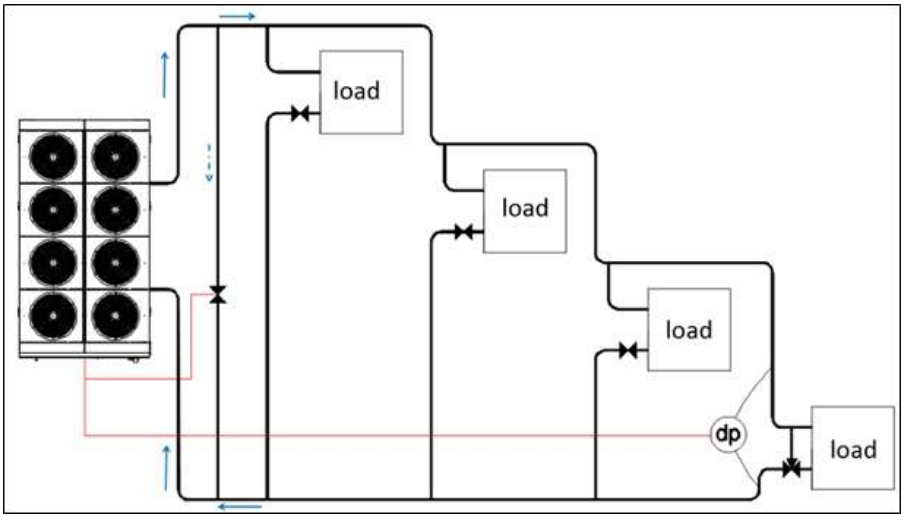
	M/S	DHW	VPF	Demand Limit	Current Limit
M/S		Compatible	Not compatible	Compatible	Compatible
DHW			Not compatible	Compatible	Compatible
VPF				Compatible	Compatible
Demand Limit					Compatible
Current Limit					

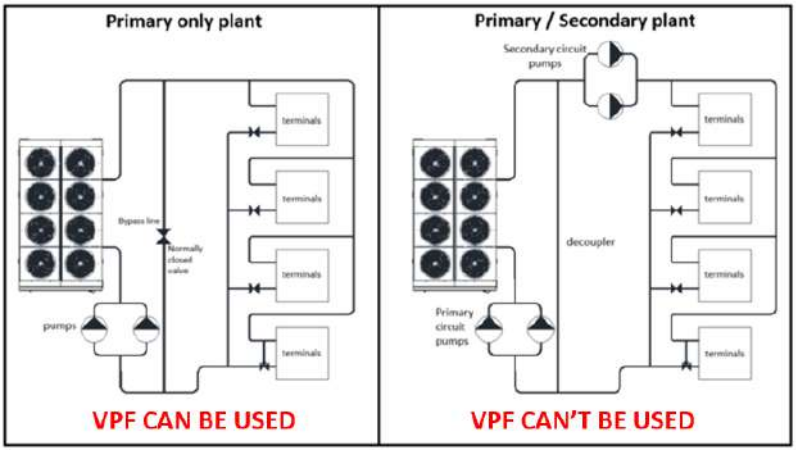
Double set point
Possibility to set two different chilled water temperature set points.

Ambient outside temperature sensor and setpoint reset (provided as standard)
The leaving water temperature set-point can be overwritten through an external 0-10V signal, through the ambient temperature, or through the water side heat exchanger ΔT.

Variable Primary Flow
By selecting EKRSCIO the chiller can manage the Variable Primary water flow according to the differential pressure measured in a specific point of the plant, selected by the plant designer. The differential pressure transducer is available as an accessory EKRSCDP (one to be mounted on the unit and one on the plant). However, the factory is not providing the connection capillaries between the evaporator and the accessory itself. Once installed, the differential pressure transducer must be connected to the unit. As an alternative the unit controller can receive directly the differential pressure value from an external BMS communicating with the standards communication protocols (eg. MODBUS).
The Variable Primary Flow (VPF) configuration is an alternative to the more "traditional" Primary/Secondary (P/S) plant configuration.

Daikin Applied Europe is not responsible for the plant configuration and cannot confirm the optimal position of the differential pressure transducer.





A bypass line (field supply) needs to be installed which always guarantees that the minimum water flow of the chiller is supplied (refer to the "Operating limit" chapter for indication on minimum water flow). The bypass valve will be an ON/OFF normally closed valve controlled by the chiller. In case the minimum water flow allowed is not reached, the chiller will open the bypass line restoring the water flow above the minimum value.

In case of multiple units' installations in a primary only plant, to control the pump speed an external control is required. Master/Slave function does not support primary only chilled water systems with variable flow operation. For unit installed in Primary/Secondary plants the option Variable Primary Flow is not applicable. In this case an external control is required.

***Note**: VPF can be used only for units installed in a primary only plant to be controlled according to VPF strategy. Master/Slave function does not support primary only chilled water systems with variable flow operation.*

EKRSCDP - Differential Pressure Transducers

Domestic Hot Water Control

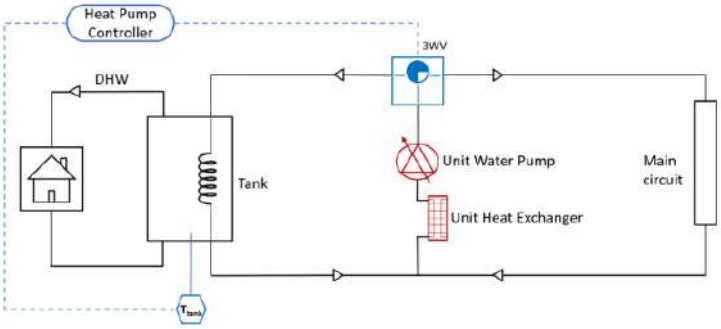
By selecting EKRSCIO the chiller can manage the Domestic Hot Water Loop with different configurations.
The unit can receive an external input coming from an external temp. sensor in order to switch to the DHW setpoint and giving an output to a 3-way valve the hot water can be diverted to the DHW Loop.

In case the Domestic Hot Water DHW function is selected the control system is improved to manage a secondary circuit to generate domestic hot water.

The control software can manage the production of domestic hot water controlling two additional components, not supplied by Daikin Applied Europe: the Tank Temperature Sensor and the 3-Way Valve.
To enable the DHW the user must install:

- Water pump;
- A three-way valve;
- A water tank designed for DHW use;
- A tank temperature sensor;
- Two water circuits (and the equipment): one for the technical water and one for the domestic hot water.

The tank temperature sensor is necessary to maintain the DHW at the costumer's set point (Tset) and the 3-Way Valve switch the pump delivery to the domestic hot water circuit instead of main one (if Ttank < Tset).
Domestic hot water is always provided by the tank and the two water circuits (technical water and domestic hot water) are distinguished and separated. For this reason, the heat pump cannot be defined as a "combination heater" because it's not directly connected to an external supply of drinking or sanitary water.



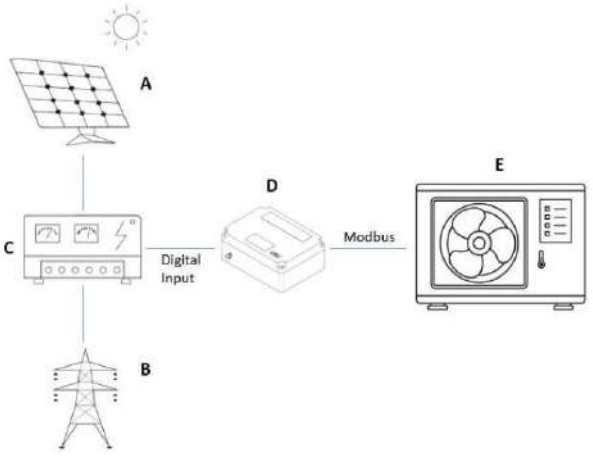
Low Noise
Thanks to EKRSCIO the unit can manage the Low Noise Operation.

EKRSCBMS – Connectivity Card
In case the BMS communication is needed, with Modbus or BACnet protocol, the connectivity card is delivered with the unit. Through a dedicated App, available for iOS and Android, it is possible to scan the QRCode and the activation key and generate the controller license file for activating the corresponding communication protocol.

	M/S - Master (T1)	M/S - Slave (T1)	Modbsu RTU (T1)	Modbus TCP-IP	Bacnet MSTP (T1)	Bacnet TCP-IP	Modem
M/S - Master (T1)		Not compatible	Not compatible	Compatible	Not compatible	Compatible	Compatible
M/S - Slave (T1)			Not compatible	Not compatible	Not compatible	Compatible	Compatible
Modbsu RTU (T1)				Compatible	Not compatible	Compatible	Compatible
Modbus TCP-IP					Compatible	Compatible	Not compatible
Bacnet MSTP (T1)						To be confirmed	Compatible
Bacnet TCP-IP							Not compatible
Modem							

EKRSCSM - Daikin on site modem with antenna
Connecting the unit to Daikin on Site will be possible through a dedicated modem that can be ordered as an accessory. Factory doesn't supply the SIM card.

EKSCSGW - Smart Grid Ready box
The Smart Grid Box is an accessory that allows the integration of the Heat Pump control for a Smart Grid application.



A: Solar panels
B: Grid
C: Interface-compatible system components (Solar inverter / energy management system)
D: Smart Grid Box
E: Heat Pump

To integrate the Smart Grid Box into the EWYT-CZ I/O, the system layout should be designed to be compatible with these new control functionalities. The interface-compatible system components (not supplied by Daikin Applied Europe) can transmit digital signals to the Smart Grid ready box of the heat pump, in order to control it with regard to energy consumption or other different target variables.

EWYT~CZ(I/O)

MODEL		EWYT021CZI-A1 + EWYT021CZO-A1	EWYT032CZI-A1 + EWYT032CZO-A1	EWYT040CZI-A1 + EWYT040CZO-A1	EWYT064CZI-A2 + EWYT064CZO-A2
COOLING PERFORMANCE					
Capacity - Cooling	kW	21.13	32.70	39.93	64.41
Capacity control - Type		Inverter Controlled	Inverter Controlled	Inverter Controlled	Inverter Controlled
Capacity control - Minimum capacity	%	14	19	15	15
Unit power input - Cooling	kW	6.56	10.28	13.33	21.86
EER		3.221	3.181	2.995	2.946
SEER		5.41	5.7	5.36	5.34
IPLV		6.29	6.25	5.87	5.88
HEATING PERFORMANCE					
Capacity - Heating	kW	19.93	32.08	39.00	61.82
Unit power input - Heating	kW	5.8	9.3	11.7	19.2
COP		3.433	3.442	3.325	3.218
SCOP Low temperature		4.19	4.18	4.18	4.01
WATER HEAT EXCHANGER HEATING					
Water temperature in	°C	40	40	40	40
Water temperature out	°C	45	45	45	45
Water flow rate	l/s	1.0	1.5	1.9	3.0
Water pressure drop	kPa	10.6	25.8	36.5	20.6
Air Temperature		7	7	7	7
WATER HEAT EXCHANGER COOLING					
Type *		Brazed plate	Brazed plate	Brazed plate	Brazed plate
Fluid		Water	Water	Water	Water
Fouling Factor	m2°C/W	0	0	0	0
Water Volume	l	2	2	2	5
Water temperature in	°C	12	12	12	12
Water temperature out	°C	7	7	7	7
Water flow rate	l/s	1.0	1.5	1.9	3.1
Water pressure drop	kPa	11.3	28.6	37.6	21.7
Insulation material *		Black closed-cell flexible elastomeric foam	Black closed-cell flexible elastomeric foam	Black closed-cell flexible elastomeric foam	Black closed-cell flexible elastomeric foam
AIR HEAT EXCHANGER					
Type *		Al Fins&Cu Tubes	Al Fins&Cu Tubes	Al Fins&Cu Tubes	Al Fins&Cu Tubes
FAN					
Type *		Axial	Axial	Axial	Axial
Drive *		VFD	VFD	VFD	VFD
Nominal air flow	l/s	3122	5080	6701	8967
Air Temperature	°C	35	35	35	35
Quantity	No.	1	2	2	3
Speed	rpm	800	700	900	800
Motor input	kW	0.4	0.5	1.1	1.2
CASING					
Colour *		IW	IW	IW	IW
Material *		GPSS	GPSS	GPSS	GPSS
DIMENSIONS					
Height IN/OUTDOOR	mm	700/1878	700/1878	700/1878	700/1878
Width IN/OUTDOOR	mm	830/802	830/802	830/802	830/814
Length IN/OUTDOOR	mm	1120/1152	1120/1752	1120/1752	1120/2906
WEIGHT					
Unit Weight IN/OUTDOOR	kg	133/265	144/357	144/357	172/620
Operating Weight IN/OUTDOOR	kg	135/265	146/357	146/357	177/620
COMPRESSOR					
Type		Scroll	Scroll	Scroll	Scroll
Oil charge	l	2.2	3.2	3.2	5.4
Quantity	No.	1	1	1	2

MODEL		EWYT021CZI-A1 + EWYT021CZO-A1	EWYT032CZI-A1 + EWYT032CZO-A1	EWYT040CZI-A1 + EWYT040CZO-A1	EWYT064CZI-A2 + EWYT064CZO-A2
SOUND LEVEL**					
Sound Power – Cooling IN + OUTDOOR	dB(A)	76	79	80	83
Sound Pressure level @1m distance – Cooling IN + OUTDOOR	dB(A)	59.7	62.2	63.2	65.4
REFRIGERANT CIRCUIT					
Refrigerant type		R32	R32	R32	R32
N. of circuits	No.	1	1	1	2
PIPING CONNECTIONS					
Evaporator water inlet/outlet	mm	1''1/4 (female)	1''1/4 (female)	1''1/4 (female)	2'' (female)

All the cooling performances (Cooling capacity, unit power input in cooling and EER) are based on the following conditions: 12,0/7,0°C; ambient 35,0°C, unit at full load operation; operating fluid: Water; fouling factor = 0. EN14511

All the heating performances (Heating capacity, unit power input in heating and COP) are based on the following conditions: 40,0/45,0°C; ambient 7,0°C, unit at full load operation; operating fluid: Water; fouling factor = 0. EN14511

The values of SCOP and ηs are calculated in accordance with the Ecodesign regulation No. 813/2013 and the standard EN 14825-2018, these units are classified as "Low Temperature Heat Pumps".
SCOP calculation for Low Temperature is based on the following conditions: Tbivalent -7 °C, Tdesign -10 °C, Average Climate.

SEER is calculated in accordance with the regulation No. 2281/2016 and standard EN14825 for information only.

*** Sound power level is measured in cooling mode at full load (referred to 12/7°C, ambient 35°C) in accordance with ISO 9614 and Eurovent requirements The sound pressure is calculated from the sound power level and are for information only and not considered binding.*

The minimum capacity indicated is referred to unit operating at standard Eurovent conditions.

Dimensions and weights are for indication only and not considered binding. Before designing the installation, consult the official drawings available from the factory at request.

All the data are referred to standard unit without options. All data are subject to change without notice

Performances Derating varying the equivalent length

The following tables show the derating to be applied to the performance of the Split version according to the length of the connection pipes between the Indoor Unit and the Outdoor Unit.
Starting from 5m the derating have a linear trend until reaching the derating for the 30 meters of piping.

DERATING - COOLING MODE			
Length [m]	**CC**	**PI**	**EER**
0	100%	100%	100%
5	100%	100%	100%
30	89%	99%	90%

DERATING - HEATING MODE			
Length [m]	**HC**	**PI**	**COP**
0	100%	100%	100%
5	100%	100%	100%
30	100%	104%	96%

EWYT~CZ(I/O)

MODEL		EWYT021CZI-A1 + EWYT021CZO-A1	EWYT032CZI-A1 + EWYT032CZO-A1	EWYT040CZI-A1 + EWYT040CZO-A1	EWYT064CZI-A2 + EWYT064CZO-A2
POWER SUPPLY					
Phases	No.	3 N	3 N	3 N	3 N
Frequency	Hz	50	50	50	50
Voltage	V	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	10%	10%	10%	10%
UNIT					
Maximum inrush current	A	0	0	0	0
Maximum running current IN/OUT	A	2.8/20.6	3.8/33.6	3.8/37.6	6.9/60.3
Maximum current for wires sizing IN/OUT	A	3.1/22.8	4.2/37.3	4.2/41.7	7.7/66.9
COMPRESSORS					
Phases	No.	3	3	3	3
Voltage	V	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	10%	10%	10%	10%
Maximum running current	A	0	0	0	0
Starting method		VFD	VFD	VFD	VFD

The data are referred to the standard unit.
All data are subject to change without notice.
Please refer to unit nameplate data

Fluid: Water
Allowed voltage tolerance ± 10%, Voltage unbalance between phases must be within ± 3%.
Maximum starting current: In case of inverter driven units, no inrush current at start up is experienced.
Nominal current in cooling mode is referred to the following conditions: evaporator 12/7°C; ambient 35°C; compressors + fans current
Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
Maximum unit current for wires sizing is based on minimum allowed voltage.

Defrost derating

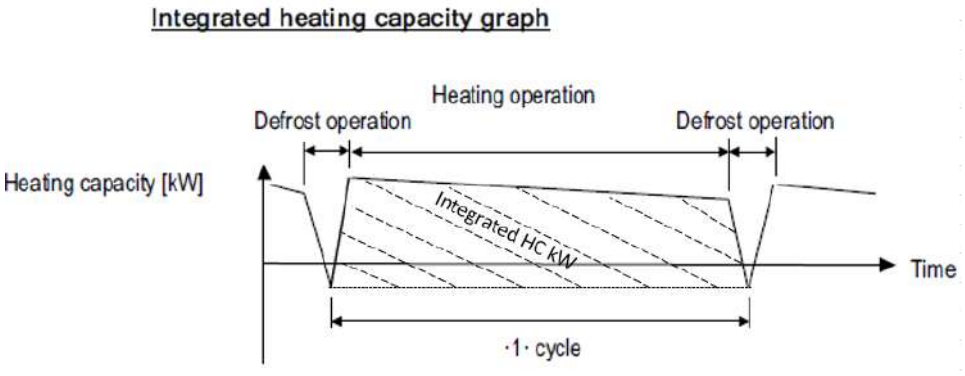
The Heating values declared in the Performance tables are intended to be "Instantaneos" so not taking into consideration the defrost consequences. The "Integrated" heating capacity, on the other hand, takes into account the capacity drop that occurs during a frosting period and defrost operation.

Integrated heating Capacity =(Heating Capacity)* (Integrated correction factor during frosting period)

Integrated correction Factor:

OAT [°C]	-15.0	-10.0	-7.0	-2.0	2.0	7.0
Defrost Derating	87%	86%	85%	83%	81%	100%

The integrated heating capacity is the heating capacity for a single cycle (from one defrost operation to the next one) integrated during time so graphically speaking is the area below the heating capacity curve:



The heating capacity varies according to the outdoor temperature (°C DB), relative humidity (RH) and the frosting volume of the coil, because in the other hand if the surface of the heat exchanger is covered with snow and ice, the heating capacity drops drastically.

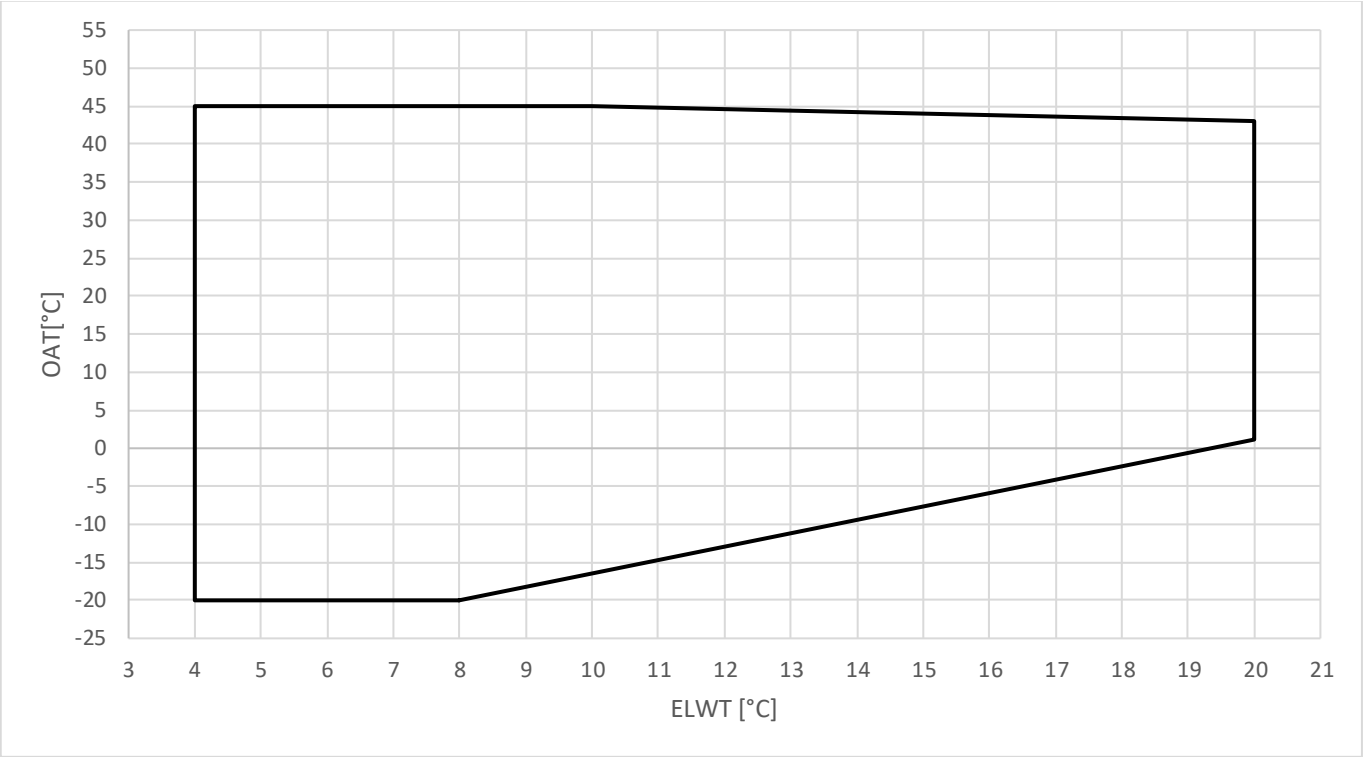
EWYT~CZ(I/O)

	Sound pressure level at 1 m from the unit									Sound Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**db(A)**	**db (A)**
EWYT021CZI-A1 + EWYT021CZO-A1	71.2	65.5	58.7	55.4	53.7	51.5	49.0	42.9	**59.6**	**76.0**
EWYT032CZI-A1 + EWYT032CZO-A1	68.5	62.6	59.5	58.2	57.9	55.0	49.1	33.8	**62.2**	**79.0**
EWYT040CZI-A1 + EWYT040CZO-A1	68.6	62.7	59.7	58.8	59.5	55.9	49.2	33.8	**63.2**	**80.0**
EWYT064CZI-A2 + EWYT064CZO-A2	75.0	70.8	64.9	61.3	58.9	58.6	52.4	46.2	**65.4**	**83.0**

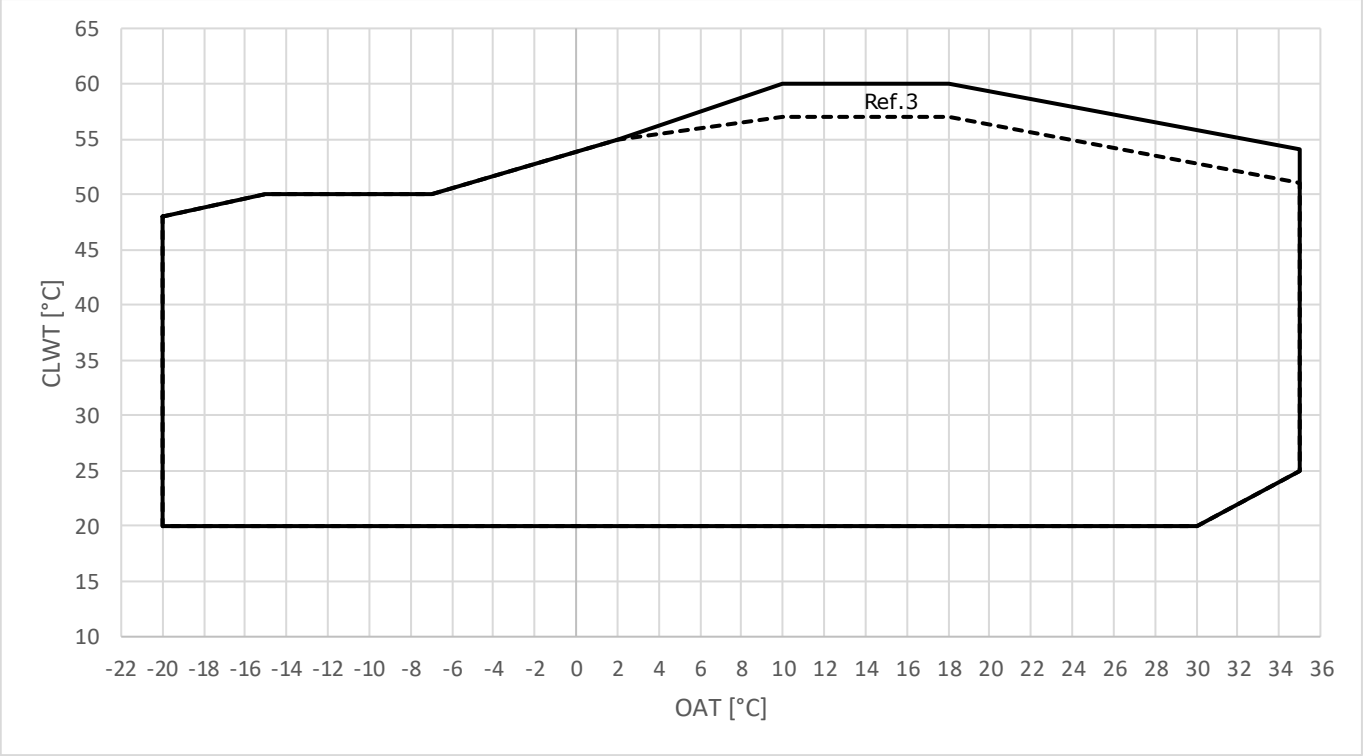
Sound power level (referred to evaporator 12/7°C, ambient 35°C full load operation) are measured in accordance with ISO 9614 and Eurovent 8/1.
The certification refers only to the overall sound power level.
The sound data in the Octave band spectrum is intended for reference only and not considered binding.
The sound pressure is calculated from the sound power level and are for information only and not considered binding.

Indoor Sound Power level	kW	21	32	40	64
	dB(A)	63.0	64.5	64.5	66.0

ENVELOPE COOLING



ENVELOPE HEATING



OAT = Outdoor ambient temp; ELWT = Evaporator leaving water temp; CLWT = condenser leaving water temp

Ref. 3 Certain unit sizes might work in part load in this area.

Water heat exchanger - minimum/maximum water Δt

The minimum and maximum allowed Δt at full load conditioins are respectively 3°C and 8°C. Contact factory in case lower or higher Δt are required. Minimum and maximum evaporator flows are to be respected withing the Δt range above.

Water flow

The following tables indicate the minimum and maximum water flow allowed for each model. For application with Variable Primary Flow refer to the following value for the dimensioning of the bypass line.
The minimum flow indicated correspond to the minimum flow allowed at minimum load for the unit. It is not intended as minimum flow allowed for unit full load operation.
For minimum flow allowed (maximum deltaT) in full load operation refer to Selection Software.
Note: the performances are certified at standard conditions and with the unit operating with the nominal water flow (corresponding to OAT 35°C; water in/out 12/7°C).

MODEL	Min Flow [l/s]	Max flow [l/s]
EWYT021CZI-A1 + EWYT021CZO-A1	0.84	1.90
EWYT032CZI-A1 + EWYT032CZO-A1	1.01	2.66
EWYT040CZI-A1 + EWYT040CZO-A1	1.01	2.66
EWYT064CZI-A2 + EWYT064CZO-A2	1.41	5.50

Air heat exchanger - Altitude correction factors

ELEVATION ABOVE SEA LEVEL [m]	0	300	600	900	1200	1500	1800
BAROMETRIC PRESSURE [mbar]	1013	997	942	908	875	843	812
CAPACITY CORRECTION FACTOR	1	0,993	0,986	0,979	0,973	0,967	0,96
POWER INPUT CORRECTION FACTOR	1	1,005	1,009	1,015	1,021	1,026	1,031

Maximum operating altitude is 1800 m above sea level.

Available fan static pressure correction factors

COOLING			
EXTERNAL STATIC PRESSURE [Pa]	**0**	**50**	**100**
COOLING CAPACITY CORRECTION FACTOR	1	0.99	0.98
UNIT PI CORRECTION FACTOR	1	1.03	1.07
REDUCTION OF MAX OPERATING AMBIENT TEMPERATURE [°C]	0	-1.5	-2.5

HEATING			
EXTERNAL STATIC PRESSURE [Pa]	**0**	**50**	**100**
HEATING CAPACITY CORRECTION FACTOR	1	0.99	0.97
UNIT PI CORRECTION FACTOR	1	1.008	1.011
INCREASE OF MIN OPERATING AMBIENT TEMPERATURE [°C]	0	+0.5	+1.0

COOLING Boosted Fan			
EXTERNAL STATIC PRESSURE [Pa]	**0**	**50**	**100**
COOLING CAPACITY CORRECTION FACTOR	1	1	1
UNIT PI CORRECTION FACTOR	1	1.04	1.09
REDUCTION OF MAX OPERATING AMBIENT TEMPERATURE [°C]	0	0	0

HEATING Boosted Fan			
EXTERNAL STATIC PRESSURE [Pa]	**0**	**50**	**100**
HEATING CAPACITY CORRECTION FACTOR	1	1	1
UNIT PI CORRECTION FACTOR	1	1.05	1.10
INCREASE OF MIN OPERATING AMBIENT TEMPERATURE [°C]	0	0	0

Applications with more than 100 Pa of external static pressure are not recommended.
Heating correction factors are intented not considering the de frost.
In case of canalization is not possible to reduce Sound powe level with Fan Silent Mode.

Maximum cable dimension

Maximum cable dimension that can be physically connected to the main switch of the unit.

Model	Max cable size [mm^2]	
	INDOOR	OUTDOOR
EWYT021CZI-A1 + EWYT021CZO-A1	6 (rigid) / 4 (flexible)	16
EWYT032CZI-A1 + EWYT032CZO-A1	6 (rigid) / 4 (flexible)	16
EWYT040CZI-A1 + EWYT040CZO-A1	6 (rigid) / 4 (flexible)	16
EWYT064CZI-A2 + EWYT064CZO-A2	6 (rigid) / 4 (flexible)	50

Plant water content

Cooling Mode

The chilled water content of the systems should have a minimum water amount to avoid excessive stress (start and stops) on the compressors.
Design considerations for water volume are the minimum cooling load, the water temperature setpoint differential and the cycle time for the compressors.
As a general indication, the system water content should not be less than the values deriving from the following fomula:

$$\textit{Single circuit Unit} \rightarrow 5\ \frac{\text{lt}}{\text{kW}_{\text{nominal}}}$$

$$\textit{Dual circuit Unit} \rightarrow 3{,}5\ \frac{\text{lt}}{\text{kW}_{\text{nominal}}}$$

kW$_{nominal}$ = Cooling capacity at 12/7°C OAT=35°C

The above rule of thumb derives from the following formula, as the relative volume of water capable of maintaining the water temperature setpoint differential during the minimum load transient avoiding an excessive starts and stops of the compressor itself (which depends on the compressor technology):

$$Water\ Volume = \frac{CC\ [W]\ x\ Min\ load\ \%\ x\ DNCS[s]}{FD\ \left[\frac{g}{L}\right] * SH\left[\frac{J}{g°C}\right] * (DT)\ [°C]}$$

CC = Cooling Capacity
DNCS = Delay to next Compressor Start
FD = Fluid Density
SH = Specific Heat
DT = Water Temperature Setpoint Differential

A properly designed storage tank should be added if the system components do not provide sufficient water volume.
By default, the unit is set to have a water temperature setpoint differential in line with Comfort Cooling application which allows to operate with the minimum volume mentioned in the previous formula.
However, if a smaller temperature differential is set, as in the case of Process Cooling applications where temperature fluctuations must be avoided, a larger minimum water volume will be required.
To ensure proper operation of the unit when changing the value of setting, the minimum water volume must be corrected.

In case of more than one installed unit, the overall capacity of the installation must be considered in the calculation so summing the water content of each unit.

Heating Mode

The heating water content of the systems should have a minimum water amount to avoid excessive decrease of the water setpoint during the defrost cycle to guarantee the proper environmental comfort.
As a general indication the system water content should not be less than the values deriving from the following fomula:

$$\textit{Single circuit Unit} \rightarrow 16\ \frac{\text{lt}}{\text{kW}_{\text{nominal}}}$$

$$\textit{Dual circuit Unit} \rightarrow 8\ \frac{\text{lt}}{\text{kW}_{\text{nominal}}}$$

kW$_{nominal}$ = Heating capacity at 40/45°C OAT=7°C

The above rule of thumb derives from the following formula, as the relative volume of water capable of maintaining the system temperature within an acceptable ΔT (which depends on the heating application) during the defrost transient:

$$Water\ Volume = \frac{CC\ [W]\ x\ \mathrm{MDD}[s]}{FD\left[\frac{g}{L}\right] * SH\ \left[\frac{J}{g°C}\right] *\ DT[°C]}$$

CC = Cooling Capacity during defrost operation
MDD = Max Defrost Duration
FD = Fluid Density
SH = Specific Heat
DT = Acceptable Water Temperature Differential

The water temperature difference is considered acceptable for the Comfort Heating application which allows to operate with the minimum volume mentioned in the previous formula.
However, if a smaller water temperature difference is considered acceptable, a larger minimum water volume will be required.
A properly designed storage tank should be added if the system components do not provide sufficient water volume.

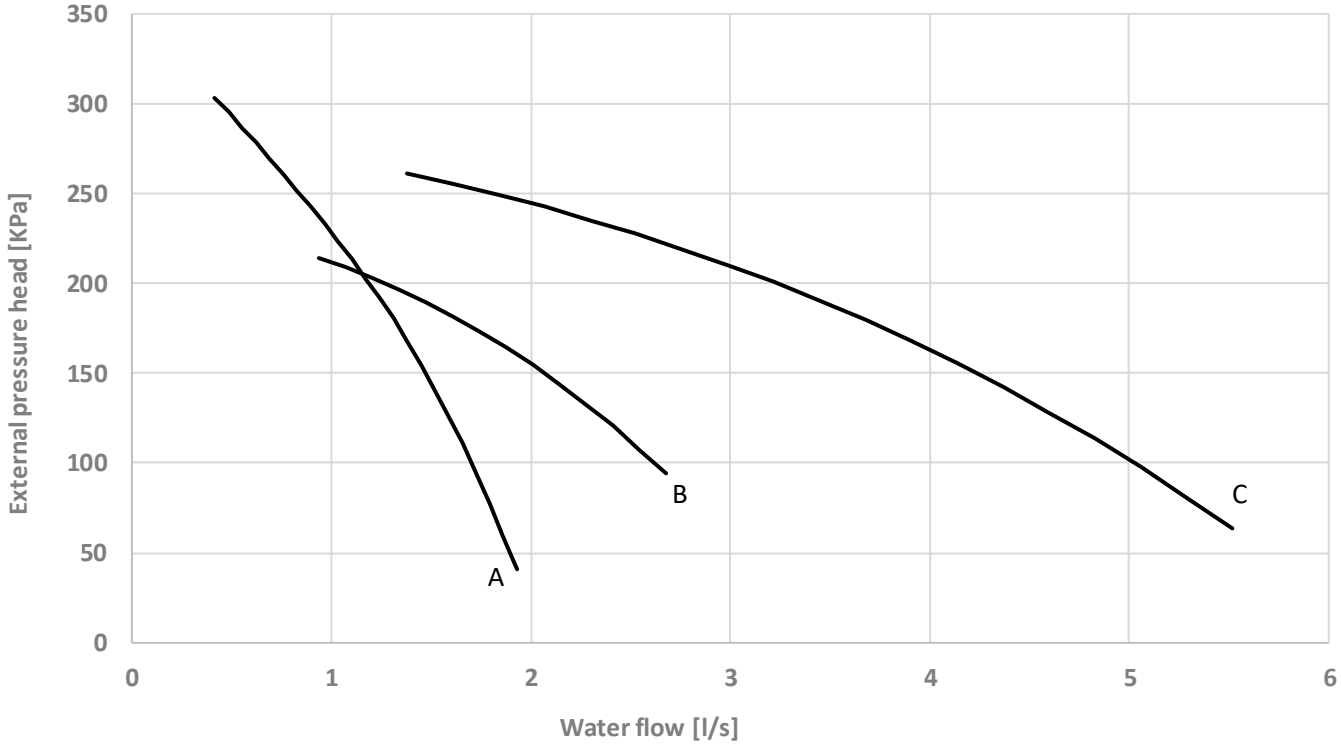
In case of more than one installed unit, the overall capacity of the installation must be considered in the calculation so summing the water content of each unit.

Note: The indication is intended as a general guideline and not intended to substitute the evaluation made by qualified technical personnel or by HVAC engineers. For more detailed analysis is better to consider the use of other more detailed approach.
These considerations refer to the water volume always flowing through the unit. If there are bypasses, branch of the system that can be excluded, that parts should not be accounted in the water content calculation.

Water quality Before putting the unit into operation, clean the water circuit. Dirt, scales, corrosion debrits and other material can accumulate inside the heat exchanger and reduce its heat exchanging capacity. Pressure drop can increase as well, thus reducing water flow. Proper water treatment therefore reduces the risk of corrosion, erosion, scaling, etc. The most appropriate water treatment must be determined locally, according to the type of system and water characteristics. The manufacturer is not responsible for damage to or malfunctioning of equipment caused by failure to treat water or by improperly treated water. Plant water quality must respect the following table;

DAE Water quality requirements	BPHE
Ph (25 °C)	7.5 – 9.0
Electrical conductivity [µS/cm] (25°C)	< 500
Chloride ion [mgCl^-/l]	< 70
Sulphate ion [mgSO_4^{2-}/l]	< 100
Alkalinity [mg $CaCO_3$/l]	< 200
Total Hardness [mg$CaCO_3$/l]	75 ÷ 150
Iron [mgFe/l]	< 0.2
Ammonium ion [mg NH^{4+}/l]	< 0.5
Silica [mgSiO_2/l]	-
Chlorine molecular (mgCl_2/l)	< 0.5

EWYT~CZI – Pump Low lift



External pressure head refers to unit equipped with hydronic kit, defined as difference between pump external static pressure and evaporator and water filter pressure drops.

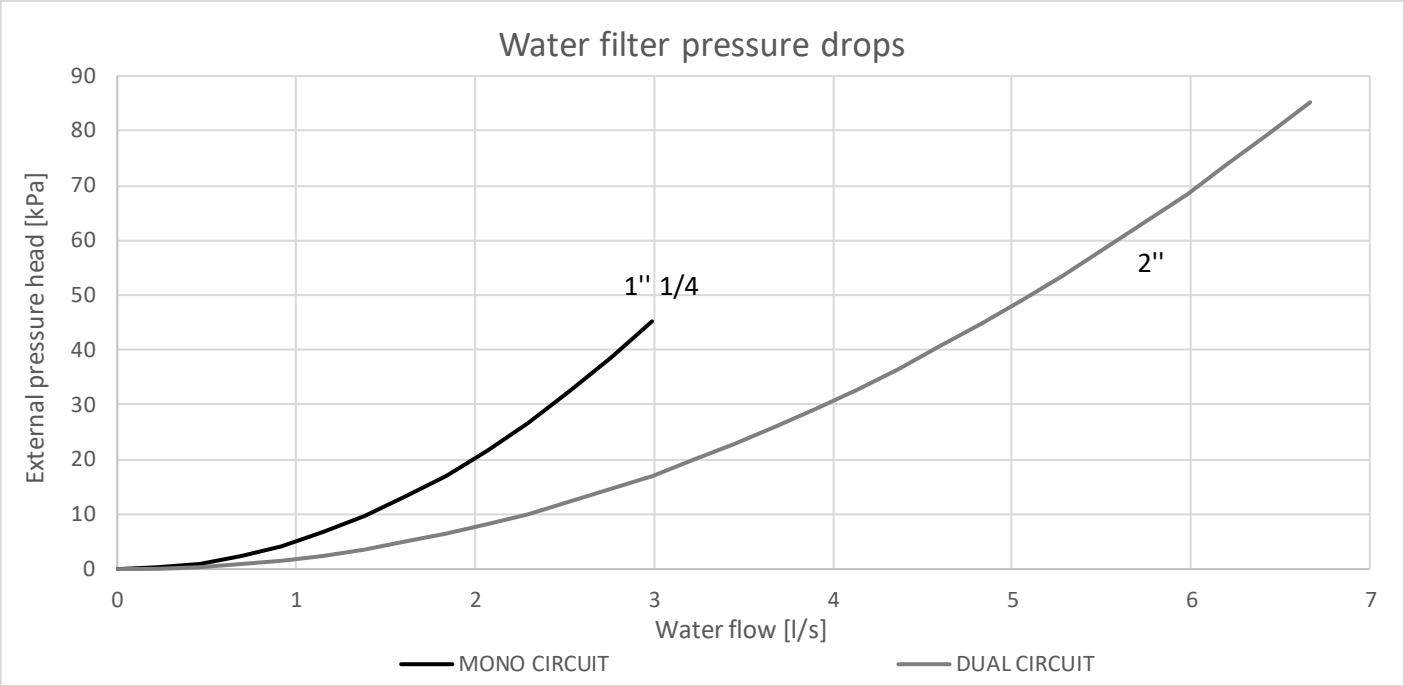
For water flow limits of the unit refer to water flow section.

Pump - Low lift	
Model	**Pump's curve**
EWYT021CZI-A1	A
EWYT032CZI-A1	B
EWYT040CZI-A1	B
EWYT064CZI-A2	C

Pump data

Model	Power [kW]	Current [A]
EWYT021CZI-A1	1,1	2,4
EWYT032CZI-A1	1,1	2,4
EWYT040CZI-A1	1,1	2,4
EWYT064CZI-A2	2,2	4,6

Water filter pressure drops

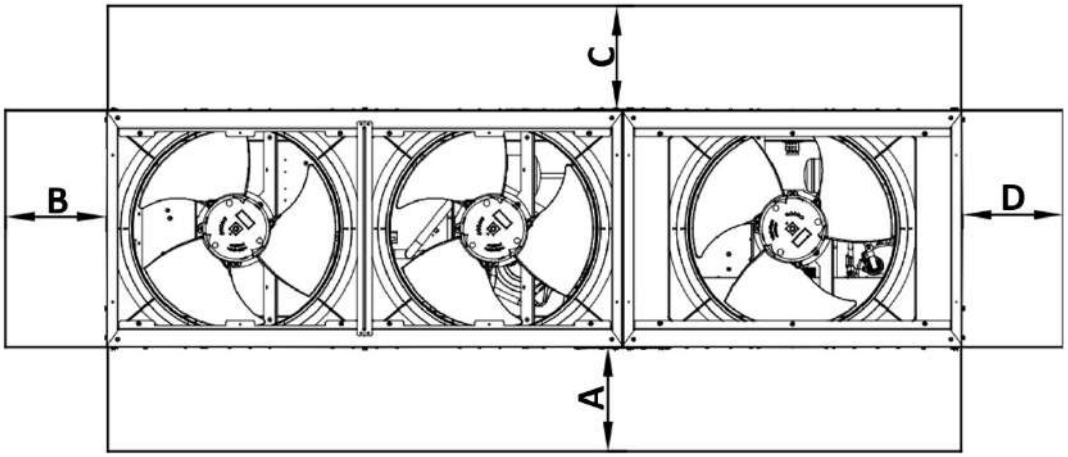


Space requirements

It is fundamental to respect minimum distances on all units to ensure optimum ventilation to the condenser coils. When deciding where to position the unit and to ensure a proper air flow, the following factors must be taken into consideration:

- avoid any warm air recirculation;
- avoid insufficient air supply to the air-cooled condenser.

Both these conditions can cause an increase of condensing pressure, which leads to a reduction in energy efficiency and refrigerating capacity.
Any side of the unit must be accessible for post-installation maintenance operations and vertical air discharge must not be obstructed. Figure below shows the minimum space required.



DUAL Unit

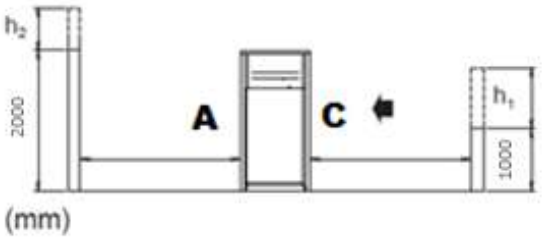
Where:

- **A** : Electrical panel side
- **B/D** : Side view of battery
- **C** : Front view of battery

If the unit is installed in a free field, the distances indicated are:

A/B/C/D≥500 mm

In the presence of obstacles or walls, the following minimum distances are recommended:

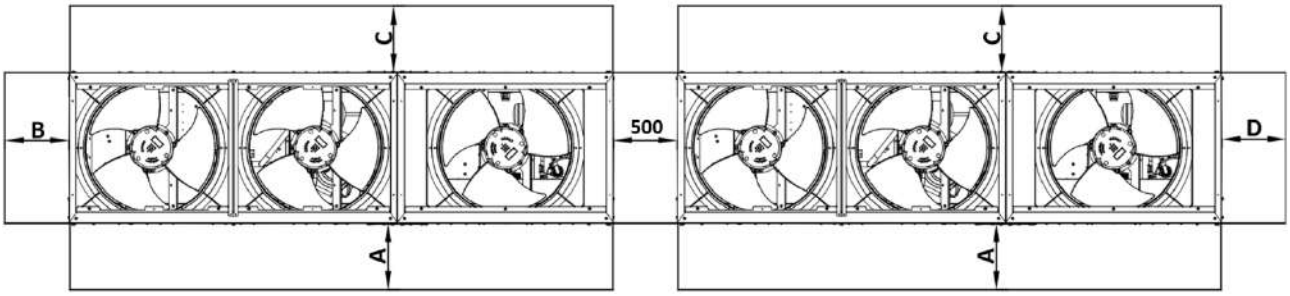


$$h_2 > 0 \rightarrow A_1 \geq A + \frac{h_2}{2}$$

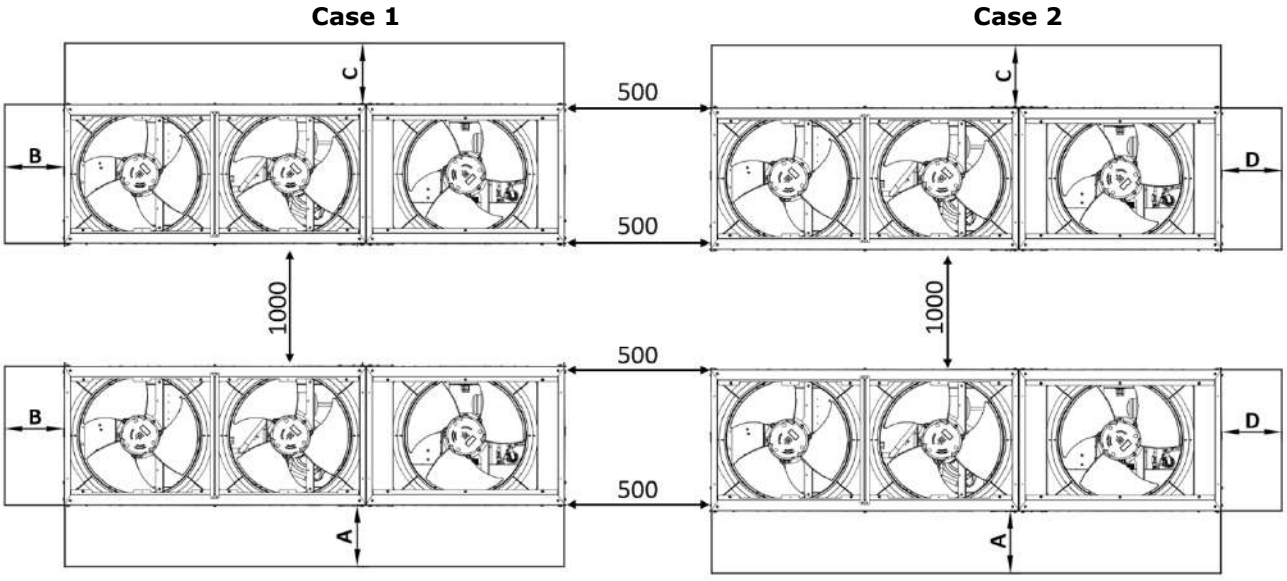
$$h_1 > 0 \rightarrow C_1 \geq C + \frac{h_1}{2}$$

With A_1 and C_1 the new minimum distances.
NOTE: In case the calculated value of A_1 and/or C_1 is higher than 2000mm, consider 2000mm as minimum distance.

If two units are installed in a free field side by side along their longer sides, A and C, the minimum recommended distance between them is 1000 mm; if two units are installed side by side along their shorter sides, sides B and D, the minimum distance between them should be 500 mm. Should the unit be installed without observing the recommended minimum distances from walls and/or vertical obstacles, there could be a combination of warm air recirculation and/or insufficient supply to the air-cooled condenser which could cause a reduction of capacity and efficiency.
In any case, the microprocessor will allow the unit to adapt itself to new operating conditions and deliver the maximum available capacity under any given circumstances, even if the lateral distance is lower than recommended, unless the operating conditions should affect personnel safety or unit reliability.



Units installed side by side along their shorter sides, B or D



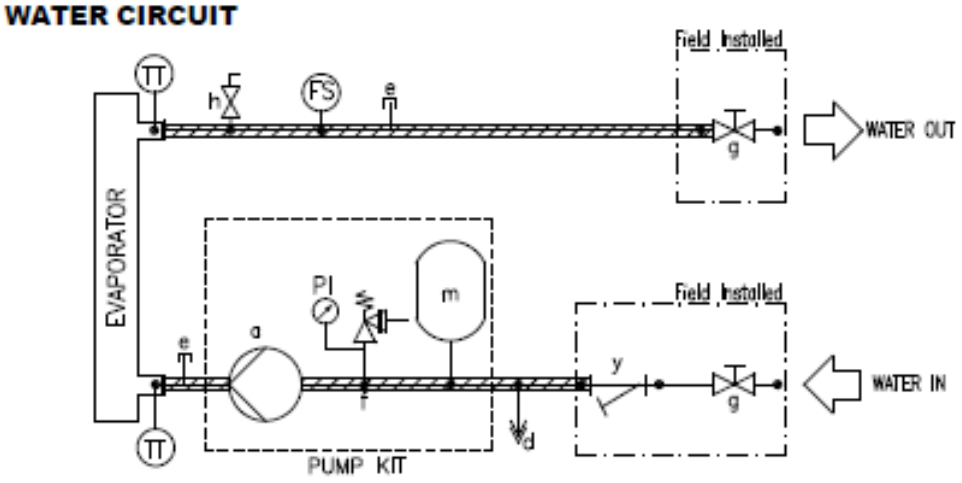
Units installed side by side along their longer sides (Case 1 and Case 2)

The minimum distances, reported above, ensure functionality of the unit in most applications.

Water filter The installation of the filter is mandatory. The water filter has to be installed as close as possible to the chiller. If the chiller is installed in a different part of the hydraulic system, the installer must ensure the cleaning of the water pipes between water filter and evaporator.

Hydraulic schemes

- **Hydraulic scheme**



WATER CIRCUIT EQUIPMENT

a	PUMP
d	DRAIN
e	PLUGGED FITTING
f	SAFETY VALVE 3 BAR 1/2"
g	SHUT OFF VALVE
h	AIR VENT
m	EXPANSION VESSEL
y	WATER FILTER
TT	TEMPERATURE SENSOR
PI	PRESSURE GAUGE
FS	FLOWSWITCH

Water pressure

Check whether the water pressure is above 1 bar. If it is lower, add water.
The maximum operating pressure is 3 bar.

General

The unit will be designed and manufactured in accordance with the following European directives and harmonized standards:
- Low voltage directive -DIRECTIVE 2014/35/EU
- Electromagnetic compatibility (EMC)DIRECTIVE 2014/30/EU
- Machinery directive - DIRECTIVE 2006/42/EC
- Pressure equipment Directive - DIRECTIVE 2014/68/EU
- Ecodesing - DIRECTIVE 2009/125/EC
- Safety of machinery EN 60335-2-40
- EMC - Part 6-2 EN 61000-6-2
- EMC - Part 6-4 EN 61000-6-4

The unit will be tested at full load in the factory (at the nominal working conditions and water temperatures).
The unit will be delivered to the job site completely assembled and charged with refrigerant and oil.
The installation of the unit must comply with the manufacturer's instructions for rigging and handling equipment.

The unit will be able to start up and operate (as standard) at full load with:
- Outside air temperature from..... °C to..... °C
- Evaporator leaving fluid temperature between..... °C and..... °C

Refrigerant HFC R-32

Performance Chiller shall supply the following performances:
- Number of chiller(s):..... unit(s)
- Cooling capacity for single chiller:..... kW
- Power input for single chiller in cooling mode:..... kW
- Heat exchanger entering water temperature in cooling mode:..... °C
- Heat exchanger leaving water temperature in cooling mode:..... °C
- Heat exchanger water flow:..... l/s
- Nominal outside working ambient temperature in cooling mode:..... °C
- Minimum full load efficiency (EER): ..... (kW/kW)
- Minimum part load efficiency (SEER): ..... (kW/kW)

Operating voltage range should be 400V ±10%, 3ph, 50Hz voltage unbalance maximum 3%, with neutral conductor and shall only have one power connection point.

Unit description Chiller shall include one or two independent refrigerant circuits, hermetic orbiting scroll type optimized for R-32 operation, electronic expansion device (EEXV), direct expansion, PHE evaporator, air-cooled condenser section made with copper-aluminum technology, R-32 refrigerant, lubrication system, motor starting components, control system and all components necessary for a safe and stable unit operation.
The chiller will be factory assembled on a robust base frame made of galvanized steel, protected by an epoxy paint.

Sound level and vibrations Sound power level shall not exceed .....dB(A). The sound power levels must be rated in accordance to ISO 9614 (other types of rating cannot be used). Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length..... mm
- Unit width..... mm
- Unit height..... mm

Compressors
Hermetic orbiting scroll type optimized for R-32 operation and complete with motor over-temperature and over-current protection devices. Each compressor equipped with oil heater that keeps the oil from being diluted by the refrigerant when the chiller is not running. Each compressor is mounted on rubber antivibration mounts for a quite operation. Unit is delivered with complete oil charge.

Evaporator
The units shall be equipped with a direct expansion plate to plate type evaporator
- The evaporator will be made of stainless steel brazed plates and shall be linked with an electrical heater controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material
- The evaporator will be manufactured in accordance to PED approval
- Flow switch on evaporator is factory mounted as standard
- Water flter on evaporator is shipped loose as standard

Air Side Heat Exchanger
The Air Side Heat Exchanger is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum Air Side Heat Exchanger fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Air Side Heat Exchanger fans
Air Side Heat Exchanger fans are propeller type with high efficiency design blades to maximize performances. The blades are made of glass-reinforced resin and a guard protects each fan.
Units are standardly equipped with inverter driven fans.

Refrigerant circuit The unit shall have one or two independent refrigerant.
• The circuit shall include as standard: electronic expansion device driven by unit's microprocessor control. The units will be provided with an automatic control for condensing pressure which ensures the working at low external temperatures down to - …… °C, to maintain condensing pressure.

• The unit automatically unloads when abnormal high condensing pressure is detected. This to prevent the shutdown of the refrigerant circuit (shutdown of the unit) due to a high-pressure fault.
The compressor shall be connected to unit's metal base frame by rubber anti vibration supports to prevent the transmission of vibrations to all metal unit structure, in order to limit the unit noise emissions.

Master/Slave
The unit shell be able to operate in Master / Slave mode in order to be connected with another similar unit (up to 4). The master unit shall manage the slave units connected in parallel on the hydraulic plant with the aim of optimize the running hours of each compressor and to balance running hours and the load between the units.

Electrical control panel
Power and control shall be located in the main panel that will be manufactured to ensure protection against all weather conditions.
• The electrical panel shall be IPX4 and (when opening the doors) internally protected against possible accidental contact with live parts
• The main panel shall be fitted with a main switch interlocked door that shuts off power supply when opening
• The power section will include compressors and fans starter devices

Controller
The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.
• A sophisticated software with predictive logic, will select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximize unit energy efficiency and reliability
• The controller will be able to protect critical components based on external signals received from the unit itself

Controller features
Controller shall be guarantee following minimum functions:

• Management of the compressors,
• Chiller enabled to work in partial failure condition
• Full routine operation at condition of:
- high ambient temperature value
- high thermal load
- high evaporator entering water temperature (start-up)
• Leaving water evaporator temperature regulation
• Display of Status Safety Devices
• Number of starts and compressor working hours
• Optimized management of unit load
• Fan management according to condensing pressure
• Start at high evaporator water temperature
• Master / Slave (provided as standard)
• Variable primary Flow (available as accessory)

In all of us, a green heart

Daikin's unique position as a manufacturer of air conditioning equipment, compressors and refrigerants has led to its close involvement in environmental issues. For several years Daikin has had the intention to become a leader in the provision of products that have limited impact on the environment. This challenge demands the eco design and development of a wide range of products and an energy management system, resulting in energy conservation and a reduction of waste.

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