

NA 14.54 B

10 - 2015

MAGISTER

Instruction manual



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1 - INTRODUCTION

Introduction to the range:

Magister is a range of precision close control units (temperature and humidity) that is specifically adapted to meet the needs of premises with high heat loads or of sensitive locations (data centers, computer rooms, metrology laboratories, etc.).

The MAGISTER range is available with two types of operation:

- Chilled water (CW)
- Direct expansion (DXA) linked to two air-cooled condensers

The description of the unit is indicated using the following format:

MAGISTER X X X

Example of description: **MAGISTER CW40 UNDER1** ① ② ③ ④

- ① **Range**
- ② **Unit type**
 - CW: chilled water
 - DXA: direct expansion
- ③ **Cooling capacity**
- ④ **Assembly type (direction of air flow)**
 - UNDER: downwards
 - OVER: upwards

2 - RECEIPT OF GOODS

2.1 Checking the equipment

In accordance with Article 133-3 of the French Code of Commerce, the recipient is entirely responsible for checking the condition of the goods received.

In the event of missing items, the customer must provide the exact number of parcels delivered.

Any damaged or missing items must be specified on the delivery note in the presence of the driver before signing the delivery note.



These comments must be confirmed to the carrier by registered letter within three business days.

The comments "conditional" and "pending unwrapping" shall have no value.

The client must unwrap the goods in the presence of the driver.

Claims must be made at the time of delivery and be described in detail.

2.2 Identifying the equipment

Each unit has a name plate located at the bottom of the electrics box that bears an identification number. This number must be quoted in all correspondence.

- ① Product reference
- ② Product description
- ③ Year manufactured
- ④ **Serial no. (to be quoted in all correspondence)**
- ⑤ Type of fluid used in the exchanger and operating pressure.
- ⑥ Cooling capacity + water temperature used
- ⑦ - Heating capacity + water temperature used (if heating coil option)
+ usage type (2 stages or TRIAC, if electric heater option)
- ⑧ Cabinet information
 - Supply voltage
 - Max. current
 - Weight of the device

Ref. produit/Item Nbr 7323226.333.62		Designation/Description MAGISTER CW030 3OVER	
An(Year) 2014	N. Serie/Serial Nbr Q2182458/0000	Repere/Part	
Fluide - Charge/Fluid - Load	Froid/Cold	Tension/Voltage	
BP/LP Mini	Regime	Intensité/Current	
HP Maxi	Chau/Heat	Poids/Weight	
Temp. Maxi (°C)	Regime - Type	N° Declaration CE 7033238.12	
		30, av. Jean Falconnier 01300 CULOZ (FRANCE) Tél.: 33-(0)4-79-42-42-42 www.ciat.com	

2.3 Documents

The following documents should be inside the cabinet:

- Instruction manual
- Control manual
- Electrical diagram of the cabinet
- Key to the electrical diagram
- Dimensional drawing with connection diagram
- Additional diagrams depending on options

3 - SAFETY INSTRUCTIONS

Appropriate PPE (Personal Protective Equipment) must be worn when servicing the units

Warning



The unit must be installed and maintained by a qualified, experienced technician. Follow the operating precautions to the letter when carrying out work on the unit. Labels have been placed on the unit to remind you of the safety instructions. As a general rule, follow all applicable safety regulations and standards.

4 - WARRANTY

See general terms and conditions of sale.

5 - STORAGE OF EQUIPMENT

The cabinet must be stored in a dry, sealed area, away from moisture and frost. The temperature in this area must not exceed 50°C.

6 - HANDLING

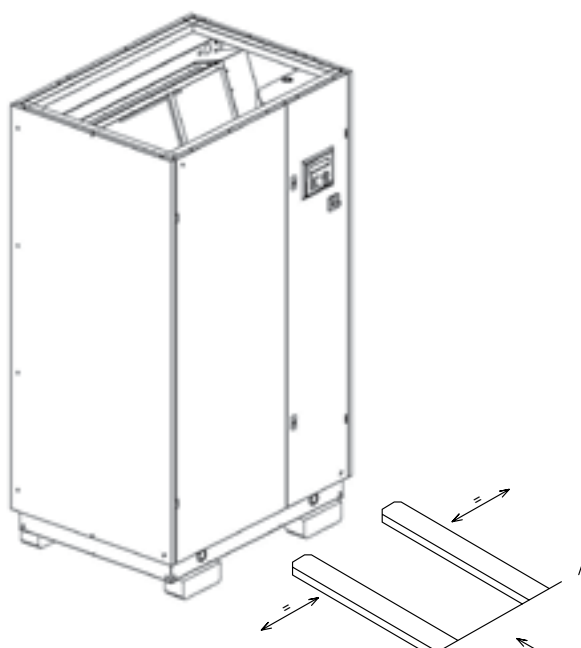
The unit must be handled either with a pallet truck or using a spreader beam and slings. This operation must be carried out by qualified personnel: refer to the information on the label affixed to the equipment.



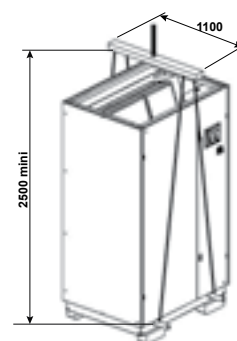
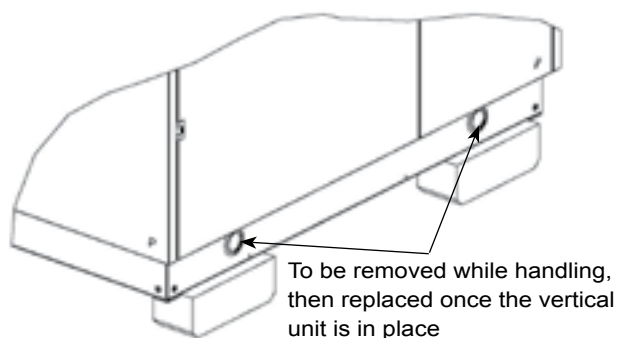
Warning: The unit must be handled with care and kept vertical.

In all cases, the vertical unit must be raised by its base.

Handling with a pallet truck



Handling with a spreader beam and slings



If the unit is lifted using a spreader beam and slings:

- Protect the panels.
- First remove all the caps covering the holes for the tubing on the lower section of the equipment. (Fig. 1).
- Use tubing (\varnothing max. = 40mm) with a sufficient lifting capacity (see weight table).
- Use fabric slings.

6.1 Weights and dimensions:

SIZE	Dimensions H x W x D	Weight (kg)
CW 40	1990 x 1190 x 890	350
CW 53	1990 x 1520 x 890	385
CW 78	1990 x 2070 x 890	545
CW 100	1990 x 2620 x 890	635
CW 115	1990 x 3000 x 890	730

Indoor unit			Outdoor unit			
Size	Dimensions H x W x D	Weight (kg)	Size	Quantity	Dimensions H x W x D	Empty unit weight (kg)
DXA 59	1990 x 2070 x 890	510	CD 100	2	1393 x 1543 x 1053	290
DXA 65	1990 x 2070 x 890	510	CD 120	2	1393 x 1543 x 1053	290
DXA 70	1990 x 2620 x 890	620	CD 120	2	1393 x 1543 x 1053	290
DXA 85	1990 x 2620 x 890	620	CD 150	2	1393 x 1543 x 1053	350

Outdoor unit: please refer to the Condenciat CD N06.130 manual

7 - SUPPLY AIR TYPE

3 supply air types:

Fitting UNDER

Return air above
supply air underneath



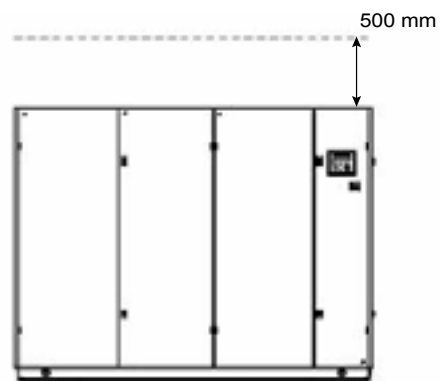
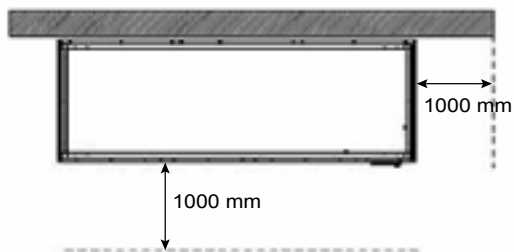
Fitting OVER

Return air on front, supply air above **except CW115** Return air underneath, supply air above **except CW115 and DXA**



You must leave space for access to the front and to the right of the unit for maintenance and installation operations. For free air intake, there must be at least 500 mm above the unit.

8 - LOCATION & INSTALLATION



Under no circumstances should these vertical units be installed in an atmosphere that is:

- **Explosive**
- **Flammable**
- **Corrosive**
or **dusty**.

Once at the place of installation, remove the wooden blocks.

• Different configuration options are possible:

❖ The unit can be placed directly on the floor. In this case:

The unit must be placed on a flat, smooth surface which is as level as possible (ratio of approx. one to one thousand).

The cabinet frame must rest fully on its contact surface.

The unit need not be anchored to the floor if it is operated under normal conditions.

❖ Or on one of the following bases:

Support base, cased base with grids, cased base with damper.

(See the technical characteristics for these options in paragraph 12.2).

It should be placed on a floor that is as level as possible.

Each base comes with feet, which allow the height to be adjusted (in the event of a raised floor) and the base to be levelled before placing the unit on top.

Before placing the vertical unit on top, an adhesive seal (supplied with the option) is to be placed on the aluminium casing frame to ensure its tightness.

The cabinet can also come with a plenum with grids or a free-cooling plenum.

(See the technical specifications for these options in paragraph 12.2)

Before placing the plenum on the vertical unit, apply the adhesive seal (supplied with the option) to its tightness.

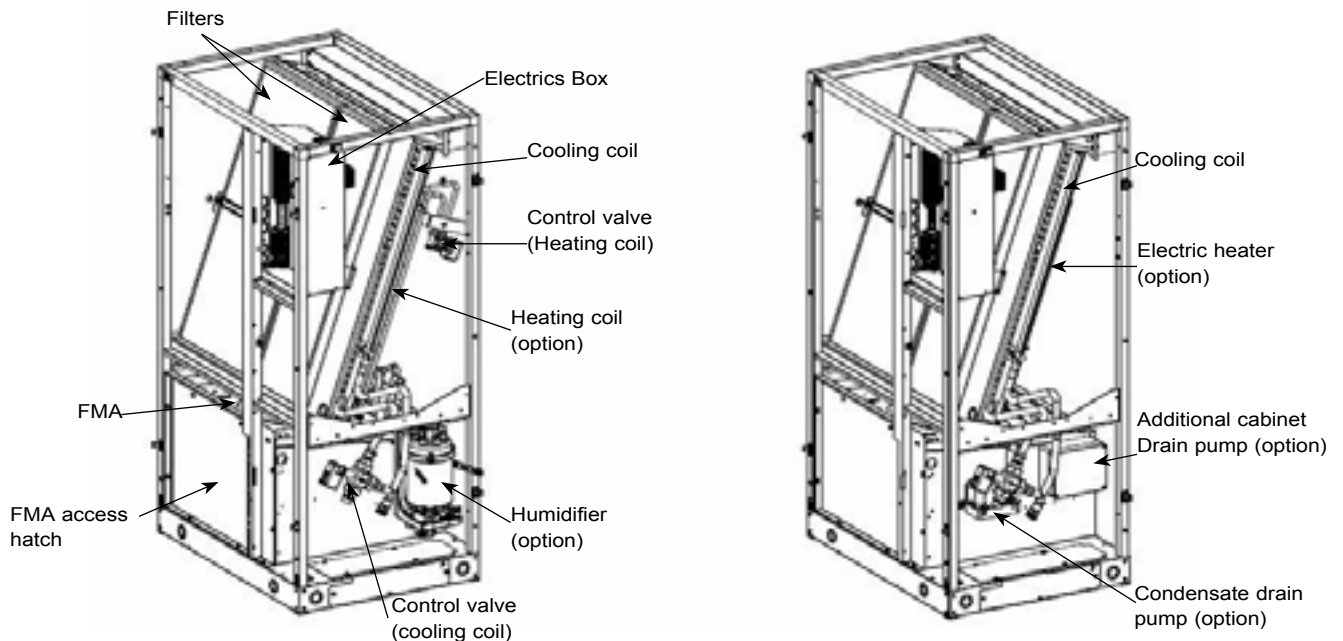
For some models (CW115 and DXA) and for practical reasons, when the unit is in its final position, the horizontal gussets (with oblong stamped holes), located at the bottom of the unit, can be removed (see photo).

Horizontal gussets

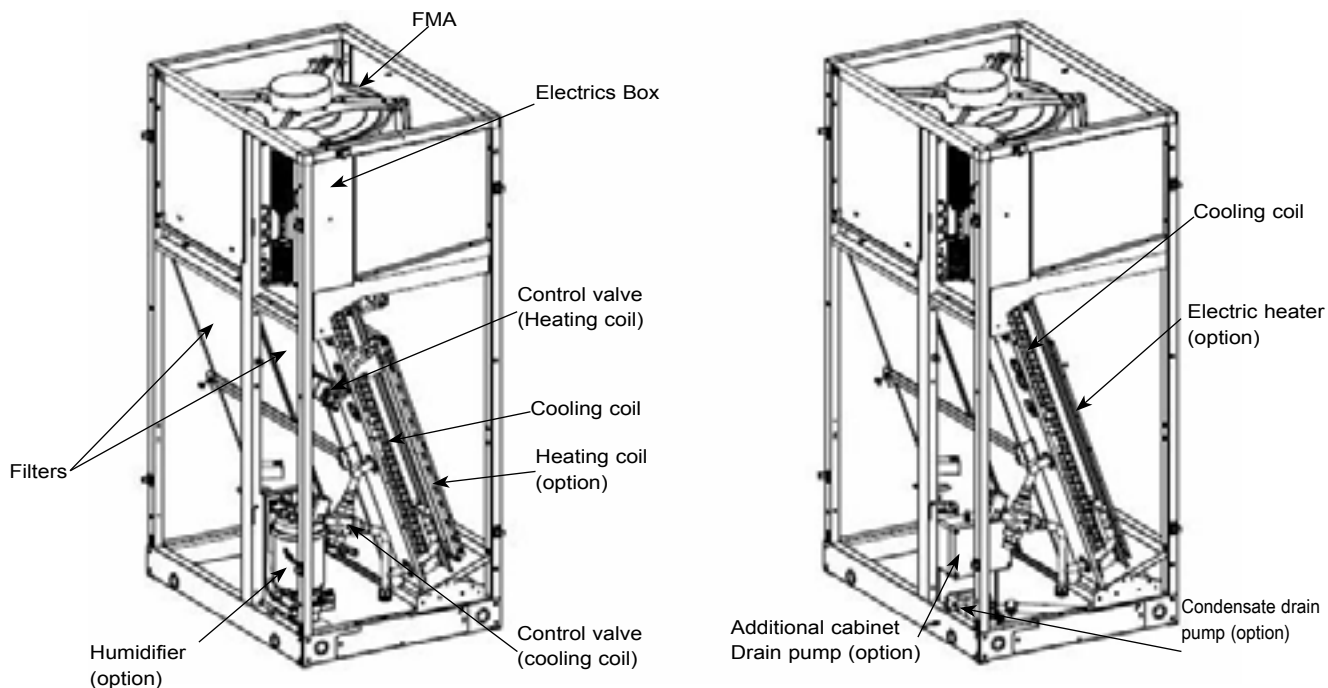


9 - LOCATION AND MARKING OF COMPONENTS

CW40 to CW100, Under Assembly

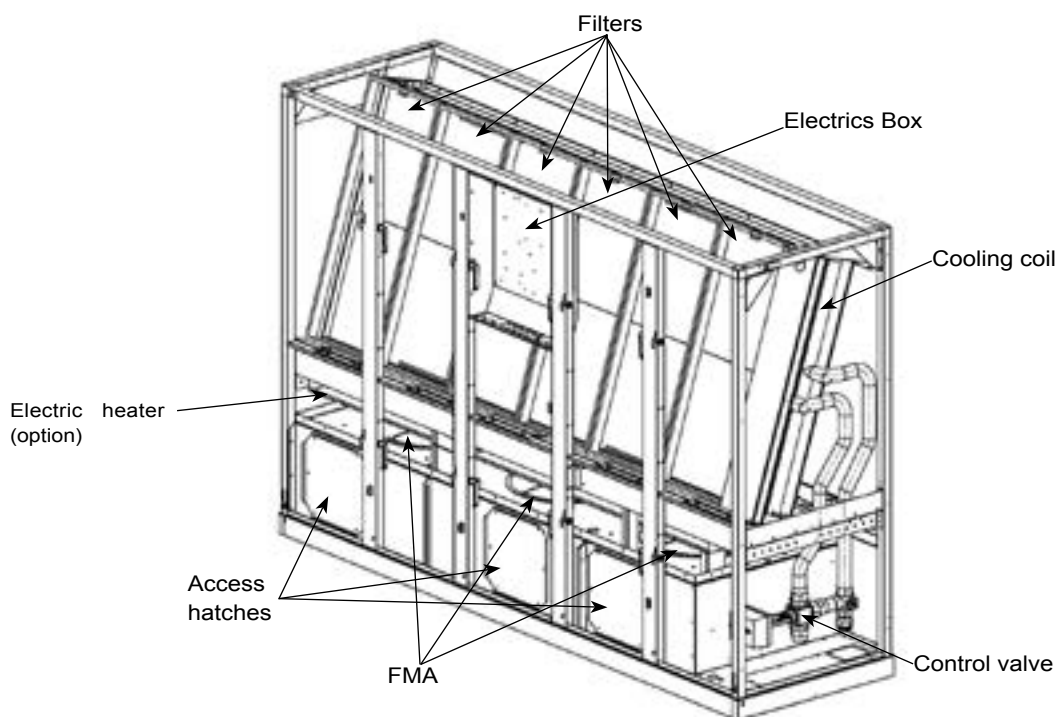


CW40 to CW100, Over Assembly

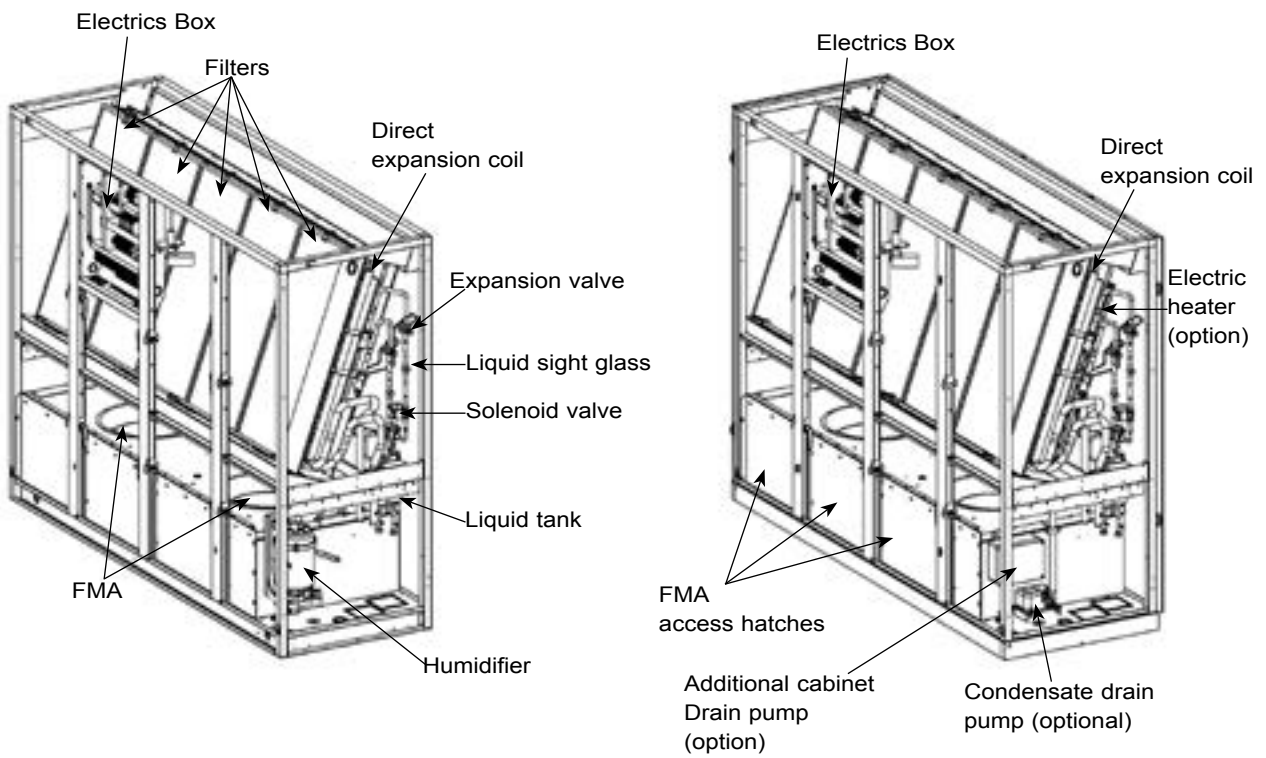


EN

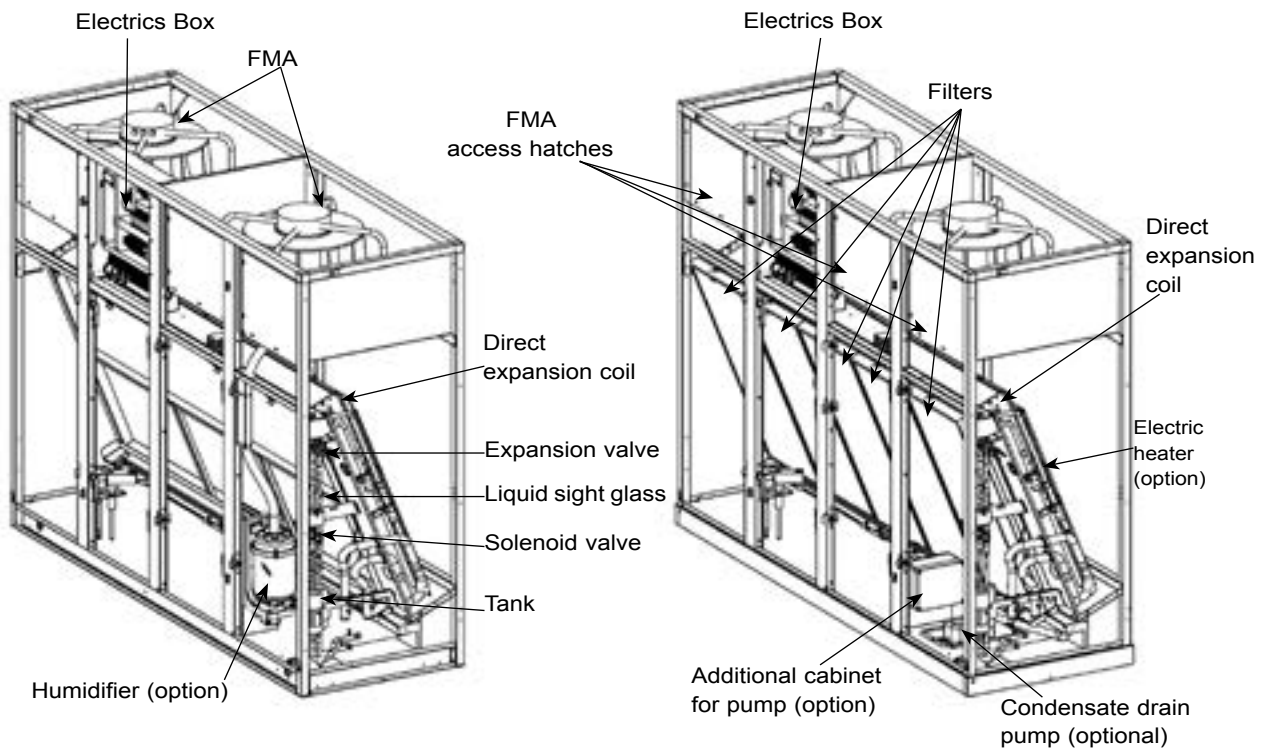
CW115, Under Assembly



DXA 59 to 85, Under Assembly



DXA 59 to 85, Over Assembly

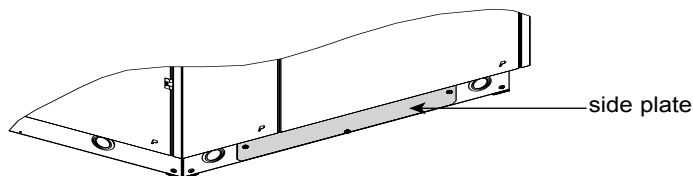


10 - CONNECTIONS

When following these steps, please consult the dimensional drawing and connection diagram as well as the wiring diagram found inside the vertical unit.

10.1 Hydraulic connections (CW)

The hydraulic pipes must be routed through the plates provided for this purpose in the vertical unit frame. This is either done to the right of the unit or directly underneath.



These plates must be drilled (water circuit + condensate draining) then refitted in place before the hydraulic pipes are routed through them.

For the CW115 and DXA models, the pipes on the right are routed through a fixed insulated panel.



Foam panel

please see the dimensional drawing and connection diagram to locate the routing areas and connection positions.

CW connection diameters:

		CW 40	CW 53	CW 78	CW 100	CW 115
Cooling coil	Inlet	G 1"1/4 (M)	G 1"1/4 (M)	G 1"1/2 (M)	G 1"1/2 (M)	G 2" (M)
	Outlet	G 1"1/4 (F)	G 1"1/4 (F)	G 1"1/2 (F)	G 1"1/2 (M)	G 2" (F)

		CW 40	CW 53	CW 78	CW 100
Heating coil	Inlet	G 3/4" (M)	G 3/4" (M)	G 3/4" (M)	G 3/4" (M)
	Outlet	G 3/4" (M)	G 3/4" (M)	G 3/4" (M)	G 3/4" (M)

Always use two spanners when connecting or tightening the hydraulic couplings to avoid twisting the pipes and applying stress on the welds.

To avoid the risk of condensation, the hydraulic pipes and elements must be carefully insulated.

Before insulating, check the tightness of the couplings.

Warning: The operating pressure on the chilled or hot water network must not exceed 8 bar.

Once all the connections have been made, the access holes must be sealed.

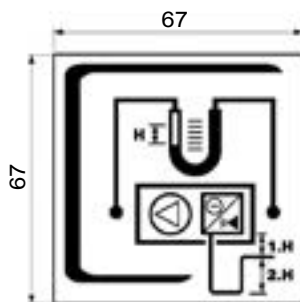
Insulated flexible connections are available on request for carrying out hydraulic connections. Ensure these are not bent too acutely to avoid pinching the inner tube and restricting the flow of water.

Condensate drain

The condensate drain pan should include a siphon to avoid any risk of overflowing. (See position and connection diameter on the dimensional drawing).

In these vertical units, the pan is depressed due to its position in relation to the fan motor assembly.

To enable correct drainage, the height must be equal to at least twice the unit's depression.



A condensate drain pump option is available (see technical specifications in paragraph 12), provided that the humidifier option has not been requested.

If the humidifier option is selected, the discharge must not drain into the unit's drain pan. To have a single discharge for both, connect the humidifier drain downstream of the unit's drain pan.

Warning: the condensates from the humidifier can reach 100°C.

10.2 Refrigerant connections (DXA model)

Installation precautions:

The refrigerant connections between the indoor unit and the condenser (outdoor unit) must be made by qualified personnel. Only insulated copper refrigeration pipes must be used.

This network must be designed and constructed correctly in order to ensure the entire system operates correctly.

The pipes must be sufficiently flexible to withstand fluctuations in length, expansion and contraction. The fluid line must be angled in order to always carry the fluid to the unit.

It is important to avoid:

- Excessive refrigerant fluid loss,
- Accumulation of oil,
- Liquid ingress into the compressor, either when operating or idle,

The pipe route must:

- Not hinder, nor be hindered by, the existing installation,
- Be protected against accidental shocks,
- Be visible in its entirety, and not be encased in plaster or concrete.
- The height differences and equivalent lengths between the indoor and outdoor unit must be in accordance with the recommendations (see Table at the end of this paragraph)
- The pipe dimensions must ensure a minimum pressure drop, and the minimum and maximum speeds must be complied with to ensure correct circulation of the gas and movement of the oil.
- Fit oil traps every 4 metres on the vertical columns to ensure the oil is returned to the compressor.
- Check that no contamination has fallen into the tube.
- Carry out all brazing operations using a nitrogen purge.

Refrigerant connection diameters

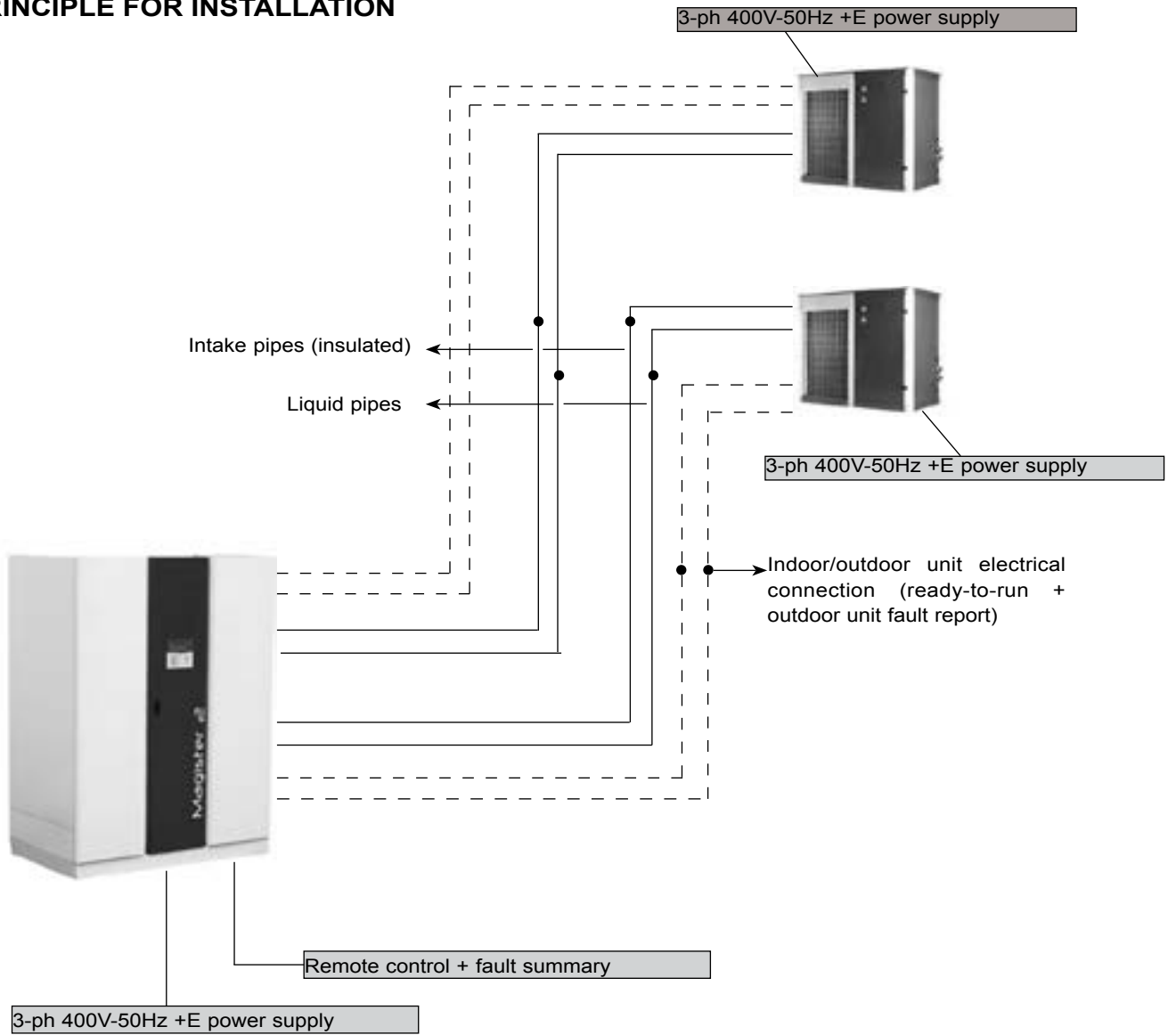
Size		DXA 59 2 x CD100	DXA 65 2 x CD120	DXA 70 2 x CD120	DXA 85 2 x CD150
Indoor unit	∅ liquid	7/8" F		7/8" F	
	∅ gas	1"1/8 F		1"3/8 F	
Outdoor unit	∅ liquid	7/8" M	7/8" M	7/8" M	7/8" M
	∅ gas	1"3/8 M	1"3/8 M	1"5/8 M	1"5/8 M
Connection tube	∅ liquid	7/8"		7/8"	
Connection tube	∅ gas	1"1/8		1"3/8	

Please see the dimensional drawing and connection diagram to locate the routing areas and connection positions.

Outdoor unit refrigerant connection

Refer to the instructions contained in the outdoor unit

PRINCIPLE FOR INSTALLATION



Note: Electrical and refrigerant connections not supplied by CIAT.

Table of the maximum lengths for refrigerant connections

The tables below show the permitted lengths for the pipers and the corresponding maximum height difference. The values in the tables show the reduction in cooling capacity as compared to the nominal capacity as a percentage.

DXA 59 + 2 CD 100/7/8" liquid line, 1"1/8 gas line

Total length (m) \ Height difference (m)	6	20	30	40	50
0	0	-4	-5	-6	-7
10	-	-4	-5	-6	-7
20	-	-4	-5	-6	-7
25	-	-	-5	-6	-7

DXA 65 + 2 CD 120/7/8" liquid line, 1"1/8 gas line

Total length (m) \ Height difference (m)	6	20	30	40	50
0	0	-5	-6	-7	-8
10	-	-5	-6	-7	-8
20	-	-5	-6	-7	-8
25	-	-	-6	-7	-8

DXA 70 + 2 CD 120/7/8" liquid line, 1"3/8 gas line

Total length (m) \ Height difference (m)	6	20	30	40	50
0	0	-4	-5	-6	-7
10	-	-4	-5	-6	-7
20	-	-4	-5	-6	-7
25	-	-	-5	-6	-7

DXA 85 + 2 CD 150/7/8" liquid line, 1"3/8 gas line

Total length (m) \ Height difference (m)	6	20	30	40	50
0	0	-5	-6	-7	-8
10	-	-5	-6	-7	-8
20	-	-5	-6	-7	-8
25	-	-	-6	-7	-8



Additional information concerning the refrigerating circuit characteristics is provided in paragraph 12 on refrigerant fluid used and loads.

10.3 Electrical connections

The electrical connections and wiring must be set up as shown on the wiring diagram included with the unit and in accordance with applicable standards and regulations.

The unit's power supply cable must be determined according to the power of the unit, the length of the cable, the protection, and the operating mode.

Check that the characteristics of the electrical power supply conform with the indications on the name plate.

Please ensure the unit is connected to earth, and that the power supply is always able to supply the necessary power.

- **INDOOR UNIT electrical specifications:**

TRI 400V power supply + Earth - 50Hz

Table of currents (CW)

		CW 40	CW 53	CW 78	CW 100	CW 115	
Fan motor assembly	Voltage (V)	400					
	Power (kW)	3,4		6,8		9,3	
	Current (A)	5,4		10,8		14,7	
Control circuit (transformer)	Voltage (V)	24					
	Current (A)	1					
Humidifier (option)	Voltage (V)	400					
	Power (kW)	6					
	Current (A)	8,7					
Electric heater (option)	Voltage (V)	400					
	Power (kW)	12	18	24	33,6	32,4	43,2
	Current (A)	17,4	26	34,6	48,4	46,8	62,3
Total current without option	Current (A)	6,4		11,8		15,7	
	Rating of main switch (A)	16				32	
Total current with humidifier	Current (A)	15,1		20,5		24,4	
	Rating of main switch (A)	25		40		32	
Total current with electric heater	Current (A)	23,8	32,4	46,4	60,2	62,5	78
	Rating of main switch (A)	40		63	80		
Total current all options	Current (A)	32,5	41,1	55,1	68,9*	71,2	86,7
	Rating of main switch (A)	40	63		80		125

Table of currents (DXA)

		DXA 59	DXA 65	DXA 70	DXA 85
Fan motor assembly	Voltage (V)	400			
	Power (kW)	6,2			
	Current (A)	9,8			
Control circuit (transformer)	Voltage (V)	24			
	Current (A)	1			
Humidifier (option)	Voltage (V)	400			
	Power (kW)	6			
	Current (A)	8,7			
Electric heater (option)	Voltage (V)	400			
	Power (kW)	18		24	
	Current (A)	26	26	34,6	34,6
Total current without option	Current (A)	10,8			
	Rating of main switch (A)	16			
Total current with humidifier	Current (A)	19,5			
	Rating of main switch (A)	25			
Total current with electric heater	Current (A)	36,8		45,4	
	Rating of main switch (A)	40		63	
Total current all options	Current (A)	45,5		54,1	
	Rating of main switch (A)	63			

- OUTDOOR UNIT electrical specifications:

TRI 400V power supply + Earth - 50Hz

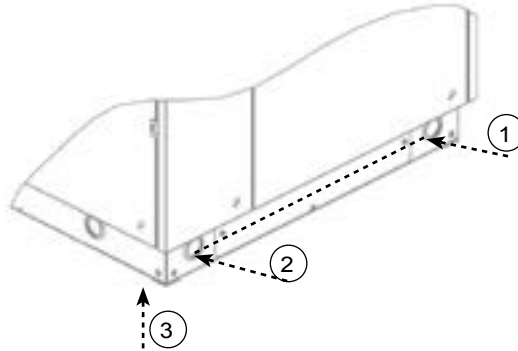
Refer to the instructions contained in the outdoor unit

For the indoor unit/outdoor unit electrical connections please see the wiring diagram.

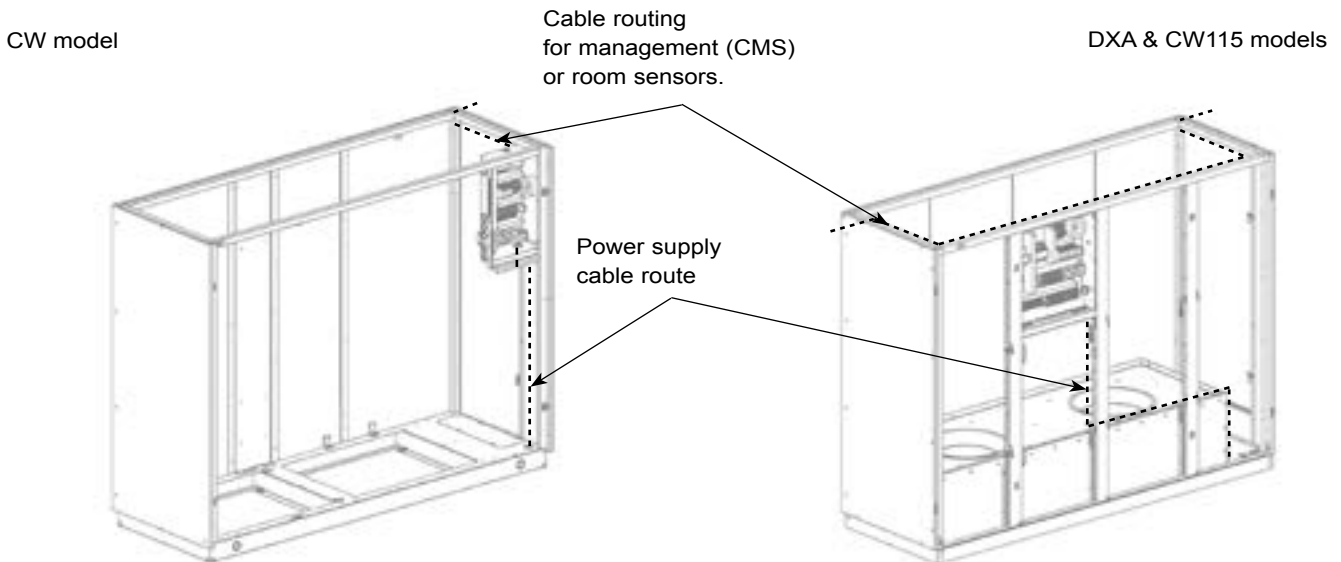
Recommendations concerning electrical connections of the indoor unit.

Connect the indoor unit so that the main power supply comes from underneath the unit.

Either on the right side of the unit (1 or 2) or from underneath (3). If using a cased base, pass it through one of the grommets on the right side intended for this purpose (See technical characteristics in paragraph 12.2.5).



Then follow the routing shown in the figures below.



When wiring via management systems (CMS) or master/slave control, as well as room sensors, go through the top of the cabinet and the top section of the box, through the grommets shown in the box views.

In all cases, avoid following the power supply cables, to avoid interference to the signals sent.

• Recommendations concerning the cables and routing in the box.

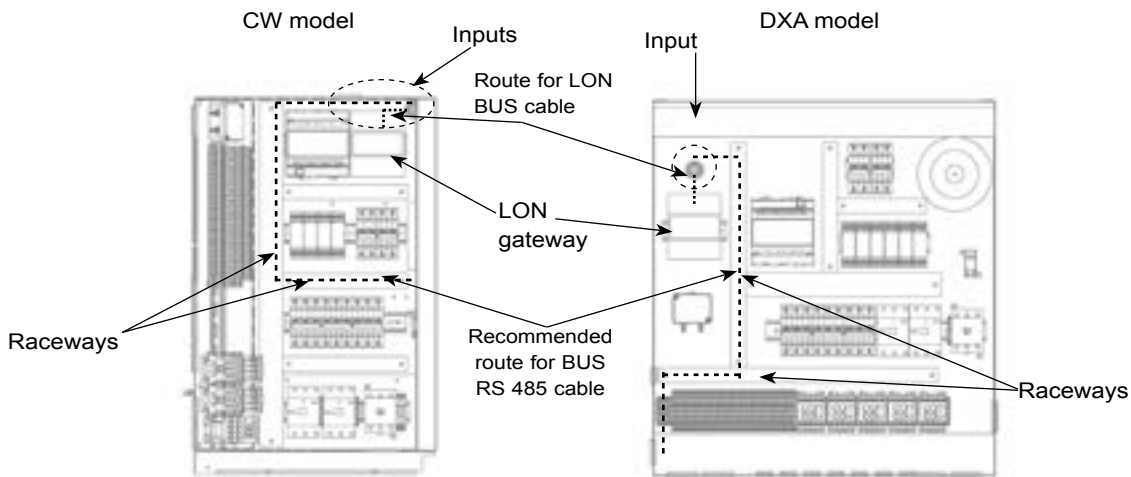
❖ For communication cables:

- BUS RS485 cable: Multiconductor cable, shielded, jacketed (shielding with braiding)
 - BUS RS485 cable for MODBUS or master/slave communication.
 - LON BUS cable for LON communication (see LON specification)

❖ For room sensor cables:

- Multipolar shielded cables of 3 to 5 wires with a maximum cross section of 1.5 mm².

Please refer to the control manual and electrical diagram for more details concerning connection.



All the cable routings in the unit must be sealed tight.
 On the CW115 and DXA models, the vertical units are supplied with caps that must be put back on the side and front sections of the casing.

11 - TECHNICAL SPECIFICATIONS

11.1 Basic component

11.1.1 Control

The vertical units are equipped with an automatic CIAT control: μ AIR CONNECT2.



CIAT μ Air Connect 2

The heart of the vertical unit, this manages the unit and ensures it functions correctly. It is incorporated into the display and is mandatory for DXA models.

It can be connected to control systems so that the vertical unit can be controlled remotely, or to allow for master/slave control with several vertical units.

For adjustment and configuration, refer to the corresponding manual (N09.41).

11.1.2 Fan motor assembly (FMA)

EC motor (electronic communication) with "plug fan" type direct drive.

Thanks to their technology, these fans have low energy consumption.

❖ Type of FMA control:

- **With μ RC2.1 controls**

- On CW40 to 100 cabinets: MODBUS control as the FMAs are equipped with a MODBUS card which allows the following information to be communicated to the controls: rotation speed, current used and power input.



- On CW115 and DXA 59 to 85 vertical units: progressive 0-10V control.



- Without control (CW only)

- Progressive 0-10V control via a manual voltage potentiometer located inside the electrics box (graduated from 0 to 100%)

	CHILLED WATER				
	CW 40	CW 53	CW 78	CW 100	CW 115
Number	1	1	2	2	3
Max. power (KW)	3.4	3.4	6.8	6.8	9.3
Max. current (A)	5.4	5.4	10.8	10.8	14.7

	DIRECT EXPANSION			
	DXA 59	DXA 65	DXA 70	DXA 85
Number	2			
Max. power (kW)	6.2			
Maximum current (A)	9.8			

Nominal flow rates of cabinets:

	CHILLED WATER				
	CW 40	CW 53	CW 78	CW 100	CW 115
Nominal flow rate (m³/h)	10000	13300	18800	24500	27000
Max. flow rate (m³/h)	13300	13300	20500	27000	27500

	DIRECT EXPANSION			
	DXA 59	DXA 65	DXA 70	DXA 85
Nominal flow rate (m³/h)	15000	15700	18500	21000
Min flow rate (m³/h)	9000	10000	9000	12000

Table of operating pressures downstream of the filters

CW	CW 40		CW 53		CW 78		CW 100		CW 115	
	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
Air flow (m3/h)	10 000	13 300	13 300	13 300	18 800	20 500	24 500	27 000	27 000	27 500
Max. operating pressure with G4 filter (Pa)	400	171	229	229	400	400	343	157	400	400
Max. operating pressure with F7 filter (Pa)	400	60	140	140	400	400	261	68	400	385

DXA	DXA59	DXA65	DXA70	DXA85
Air flow (m3/h)	15 000	15 700	18 500	21 000
Max. operating pressure with G4 filter (Pa)	400	400	400	355
Max. operating pressure with F7 filter (Pa)	400	400	400	345

i If the unit does not function immediately after installation, it is recommended that you run the equipment at full speed for a minimum of one hour every three months so that condensates that have potentially entered inside can evaporate and so that the bearings are put into motion.

11.1.3 Cooling Coil: CW model



**Make sure that the chilled water supply pipes are insulated.
Moderately tighten the coil supply connections to avoid damaging the manifolds**

The coil is regulated by a two-way or three-way valve equipped with a 0-10V servomotor (mounted and connected)

• **Coil specifications:**

		CHILLED WATER				
		CW 40	CW 53	CW 78	CW 100	CW 115
Coil (4-row coil)	Number of coils	1	1	1	1	1
	Capacity (l)	11.8	15.8	21	27.4	50.8
Coil (6-row coil)	Number of coils					1
	Capacity (l)					73.8

• **Cooling capacity:**

COOLING COIL										
CW	CW 40		CW 53		CW 78		CW 100		CW 115	
Air flow (m³/h)	Nominal *	Maximum **	Nominal *	Maximum **	Nominal *	Maximum **	Nominal *	Maximum **	Nominal *	Maximum **
		10 000	13 300	13 300	13 300	18 800	20 500	24 500	27 000	27 000
Sensible cooling capacity (kW)	40	45	55	53	78	78	100	100	127	130

* Conditions: return air 24°C 45%, water temperature 7/12°C

** Conditions: return air 26°C 40%, water temperature 10/15°C

• **Flow rate and pressure drop for valve + coil:**

		CHILLED WATER					
		No. of rows	CW 40	CW 53	CW 78	CW 100	CW 115
Nominal water flow rate (m³/h)	4 rows		7.02	9.65	13.6	17.6	20.2
	6 rows						24.7
KV valve			16	16	25	40	40
ΔP (Pa) Valve only (mWC)	4 rows		2	3.7	3	2	2.6
	6 rows						3.9
ΔP (Pa) Valve + coil (mWC)	4 rows		6.5	9.2	9	6.9	4.9
	6 rows						7.2

Maximum permitted differential pressure on cold water valve

	CW40	CW53	CW78	CW100	CW115
KV	16	16	25	40	40
ΔP max. Three-way valve	300	300	300	260	260
ΔP max. Two-way valve	1200	1200	1000	260	260

11.1.4 Direct Expansion Coil and Refrigerant Circuit :

DXA model

The indoor and outdoor units are delivered with a nitrogen safety load. Evacuation and freon charging must be carried out by the installer.

The refrigerant fluid used is R410A.

The sealing test must be carried out in compliance with EC regulation no. 842/2006 relating to certain greenhouse gases.

R410A type refrigerant fluid is a gas which has the following impact on the environment:

1/ No impact on the ozone layer.

2/ Impact on the greenhouse effect: GWP (Global Warming Potential) relating to each gas.

- R410A -----GWP = 2088

- Users must have systems containing refrigerant periodically checked for leaks by qualified personnel. The frequency of checks depends on the refrigerant charge:

- Every 12 months for units containing 3 to 30 kg of refrigerant.

(2 kg in France, according to the decree and order of 7 May 2007)

- Every 6 months for units containing 30 to 300 kg of refrigerant.
 - Every 3 months for units containing more than 300 kg of refrigerant.
- (Implementation of leak detection system)
- For all systems which contain over 3 kg of refrigerant (2 kg in France), users are required to keep a log of the quantities and types of fluids used in, added to and recovered from the system, as well as the dates and results of the sealing tests. The name of the technician and his company must also be recorded.
 - A leak test must be carried out one month after any leak repairs.
 - System users are responsible for collecting used refrigerant and having it recycled, regenerated or destroyed.

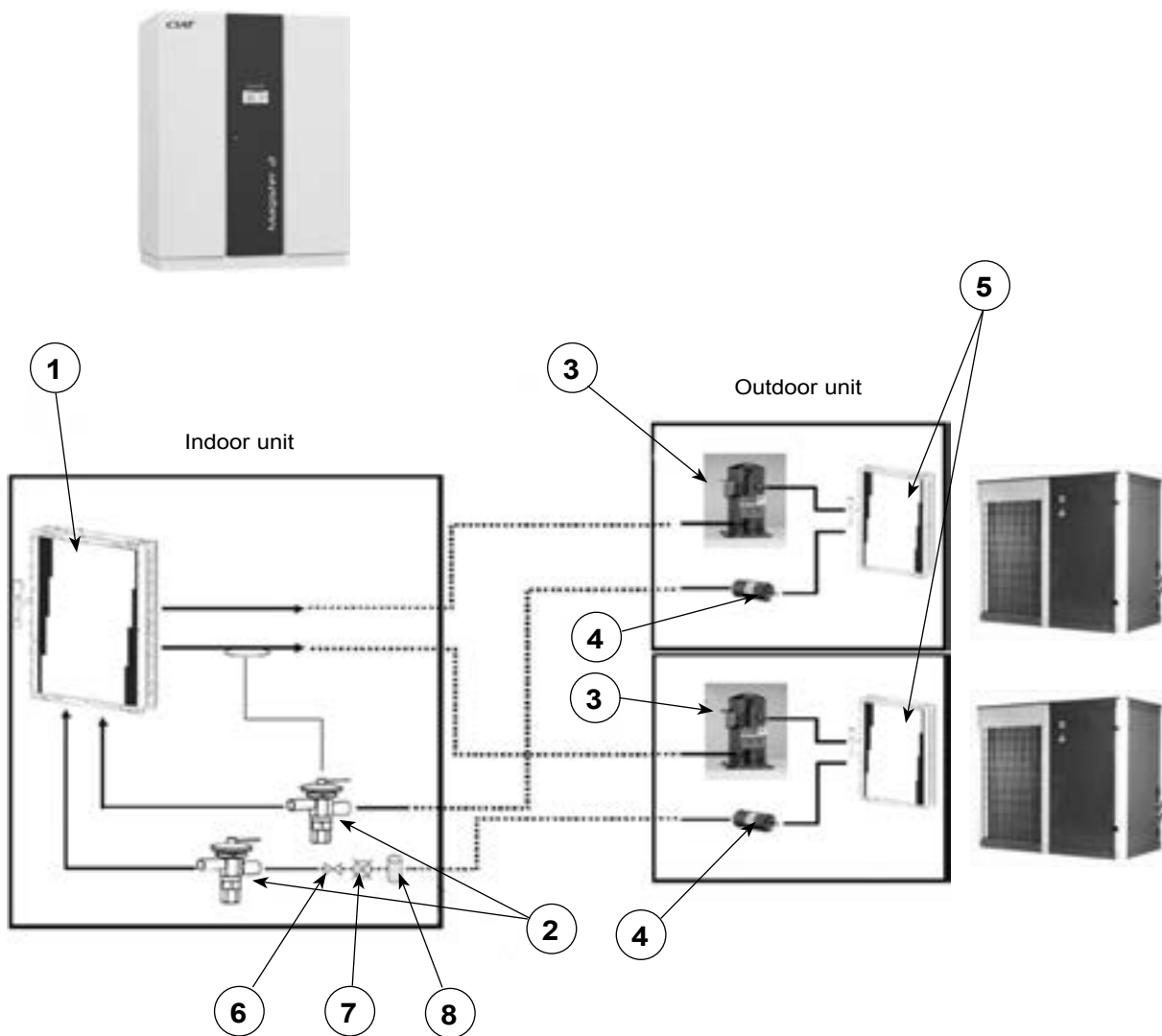
The table below shows the loads to be used for each circuit

Unit/CD distance = 0 metres

	DXA 59 2xCD100	DXA 65 2 x CD120	DXA 70 2 x CD120	DXA 85 2 x CD150
Load in kg per circuit (connection = 6 metres)	12.35	10.47	10.89	12.68
Additional load per metre	0.35 Kg/m additional tube			

DXA 2 circuit schematic diagram

- 1-Evaporator coil
- 2-Thermostatic expansion valve
- 3-Compressor
- 4-Dryer filter
- 5-Condenser coil
- 6-Solenoid valve
- 7-Liquid sight glass
- 8-Liquid tank



11.1.5 Filter

G4 filters:
 Thickness: 48 mm
 Efficiency: 90% gravimetric
 Filtering surface: 2 x the face area
 Fire rating: M1

F7 filters:
 Thickness: 48 mm
 Efficiency: 85% opacimetric
 Filtering surface: 17 x the face area
 Fire rating: M1

CHILLED WATER					
	CW 40	CW 53	CW 78	CW 100	CW 115
Dimensions	1192x600	1192x600	1192x600	1192x600	1140x450
	1192x360	1192x360			
Number	1	1	3	4	6
	1	2			
Thickness G4 (mm)	48	48	48	48	48
Thickness F7 (mm)	48	48	48	48	48

DIRECT EXPANSION				
	DXA 59	DXA 65	DXA 70	DXA 85
Dimensions	1076x472			
Quantity	4	4	5	5
Thickness G4 (mm)	48	48	48	48
Thickness F7 (mm)	48	48	48	48

Pressure drops - clean filters:

CHILLED WATER					
	CW 40	CW 53	CW 78	CW 100	CW 115
Flow rate (m³/h)	10 000	13 300	18 800	24 500	27 500
ΔP (Pa) G4	52	57	52	50	69
ΔP (Pa) F7	140	150	140	130	120

DIRECT EXPANSION				
	DXA 59	DXA 65	DXA 70	DXA 85
Flow rate (m³/h)	15 000	15 700	18 500	21 000
ΔP (Pa) G4	50	54	49	60
ΔP (Pa) F7	55	59	53	65
ΔP (Pa) G4+F7	110	110	100	130

Filter fouling is measured by a pressure sensor located in the electrics box.
 It is set to 1.5 times the value for the filter when clean (pressure ports upstream and downstream of the filter).

11.1.6 Standard control elements:

(factory-wired)

- Intake temperature sensor.
 - Differential pressure sensor: when attached to the electrics box, this allows the difference in pressure upstream and downstream of the filter to be measured, so as to determine whether the filter is fouled.
 - Water leak sensor: this is found at the end of a wound cable located at the bottom of the cabinet so that it is long enough to extend downwards into a raised floor, if required, and to be positioned in the area to be monitored.
- It can be added on request.

11.2 Optional components

11.2.1 Heating Coil



Moderately tighten the "coil supply" connections to avoid damaging the manifolds.

The coil is adjusted by a two-way or four-way valve equipped with a 0-10V servomotor (mounted and connected).

Coil specifications:

		HOT WATER			
		CW 40	CW 53	CW 78	CW 100
Coil (1 row)	Number of coils	1	1	1	1
	Capacity (l)	3.82	4.92	6.29	6.29

	HEATING COIL									
	CW 40		CW 53		CW 78		CW 100		CW 115	
	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
Air flow (m³/h)	10 000	13 300	13 300	13 300	18 800	20 500	24 500	27 000	27 000	27 500
Heating capacity (kW)*	36	40	44	44	63	66	71	73		
Heating capacity (kW)**	18	21	23	23	33	34	37	38		

* Conditions: return air 17°C - 50%, water temperature 80/60°C

** Conditions: return air 17°C - 50%, water temperature 45/40°C

Heating coil pressure drop*:

HOT WATER				
CW	CW 40	CW 53	CW 78	CW 100
Nominal water flow rate (m³/h)	0.9	1.1	1.68	1.9
KV valve	4	4	4	4
ΔP Valve only (mWC)	0.6	0.8	1.8	2.3
ΔP (Pa) Valve + Coil (mWC)	1.5	1.8	3	3.8

Nominal flow rate: ΔT water: 20° C

	CW40	CW53	CW78	CW100
KV	4	4	4	4
ΔP max. ¹ Four-way valve	240	240	240	240
ΔP max. ² Two-way valve	400	400	400	400

11.2.2 Electric heater

Functions in two on/off stages or with TRIAC (modulating).

The latter allows the power of the electric heater to be varied to ensure it is as close as possible to the required heating capacity. The connection is carried out in the factory. The electric heater is equipped with two safety thermostats, one with automatic reset and the other with manual reset.

		CHILLED WATER					
		CW 40	CW 53	CW 78	CW 100	CW 115	
Power (kW)	Power (kW)	12	18	24	33.6	32.4	43.2
	stage 1	6	12	12	16.8	21.6	28.8
	stage 2	6	6	12	16.8	10.8	14.4
Number of heaters	stage 1	3 x 2KW	3 x 4KW	3 x 4KW	3 x 5.6KW	18 x 1.2KW	24 x 1.2KW
	stage 2	3 x 2KW	3 x 2KW	3 x 4KW	3 x 5.6KW	9 x 1.2KW	12 x 1.2KW
Total current (A)		17.3	26	34.7	48.6	46.8	62.3

		DIRECT EXPANSION			
		DXA 59	DXA 65	DXA 70	DXA 85
Power (kW)		18	18	24	24
Power:	• Stage 1	6	6	12	12
	• Stage 2	12	12	12	12
Number of resistors:	• Stage 1	3	3	6	6
	• Stage 2	6	6	6	6
Total current (A)		26	26	34.6	34.6

11.2.3 Humidifier

Functions only with municipal water, and not with demineralised or softened water.

The humidifier with immersed electrodes has a card known as CPY (mounted inside the box) to relay all information relating to the humidifier directly to the μ Air Connect 2 controller. It adapts, within the allowable operating limits, to the physical and chemical properties of the water used. Voltage is applied to the immersed electrodes, and an electrical current passes between them, heating the water to boiling point. The water acts as an electrical resistor, ensuring continuity between the electrodes with a minimum of dissolved salts.

(The water must have a conductivity of between 350 μ S/cm and 125 μ S/cm.)

	CW 40 to CW 115 DXA 59 to DXA 85		CW 61/70/80/90
Make/model	KUET-2D		KUET-3D
Control voltage	24 V		On request
Power input in control circuit	Without 9 V A valve; with 35 V A valve		
High power circuit voltage	3-PH/400 V		
Power circuit current (A)	8.7 A		
Protection rating	16 A		
Max. power	6 kW		
Factory power setting	CW 40 to CW 100: 6 kW	DXA 59 to 85: max. 6 kW	
Factory steam flow rate setting	CW 40 to CW 100 8 kg/h: (100%) CW 115: 8 kg/h: (100%)	DXA 59 to 85: max. 8 kg/h (100%)	
Steam flow rate	5 to 8 kg/h		
Water supply pressure	1 to 8 bar		
Max. water supply flow rate	0.6 L/min		
Conductivity of supply water	350 to 1250 μ S/cm		
Hydrogen ion activity (PH)	7 to 8 ph		
Drain water flow rate	4 L/min		
Water supply \varnothing	G 3/4" male		
Drain \varnothing	32 mm		
Hardness of TH supply water	100 to 400 mg/l Ca CO ₃		

EN

Connection:

The humidifier is supplied with a flexible water supply tube at the back of the cabinet. To drain it, carry out siphoning.



Warning: the water temperature can reach 100°C.

- If the option without the μ RC2.1 (CIAT) control has been chosen, a display can be found the cabinet, and which can be used to control the humidifier.



Please follow the instructions on the CPY card configuration sheet provided with the unit.

11.2.4 Condensate drain pump

This option is only available if the humidifier option has not been requested.

Specifications:

- Electrical power supply: 230V-50Hz-90W
- Max flow rate: 500 l/h
- Max. discharge height: 5.4 m
- Integrated check valve

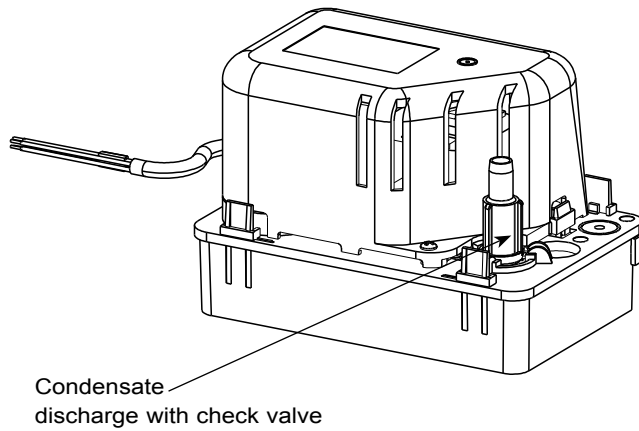
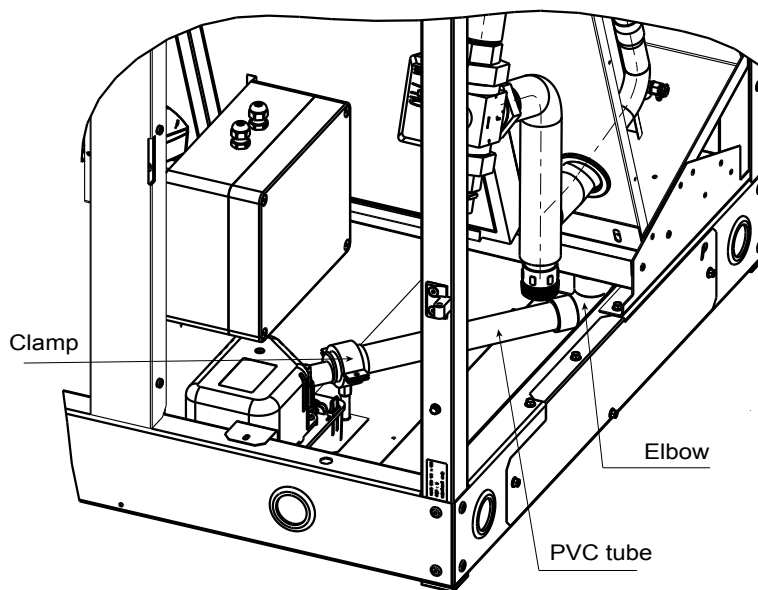


Table of actual flow rates for pump SI 1805

The pressure drops defined in this table are calculated using 10 mm diameter flexible piping	Discharge height	Total pipe length			
		5 m (in l/h)	10 m (in l/h)	20 m (in l/h)	30 m (in l/h)
	1 m	460	380	280	200
	2 m	390	320	240	180
	3 m	300	250	190	150
	4 m	200	180	130	100
	5 m	90	80	60	50

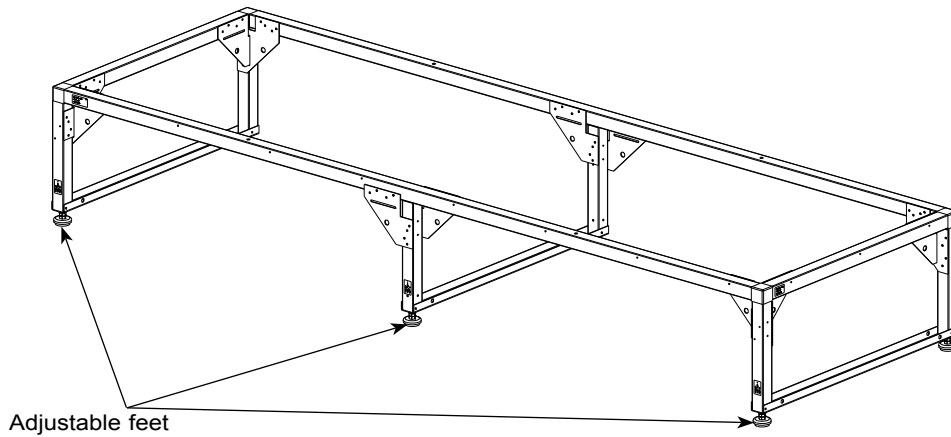
Connect a Ø 10 int (3/8") flexible tube (not supplied by CIAT) to the pump discharge.

For OVER models (3 and 5), if using a spreader beam and slings, the PVC tube will not be directly connected to the pump, for handling reasons. It must therefore be angled in the right direction and fixed to the clamp, as shown below.



11.2.5 Bases:

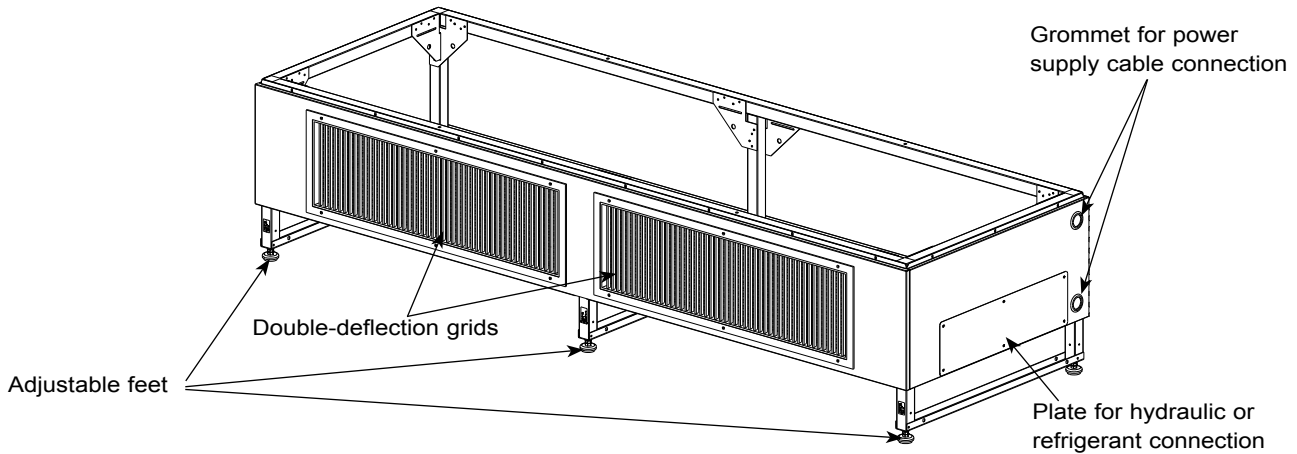
• Support base:



For supply air through a raised floor.

The height can be adjusted from 250 mm to a maximum of 610 mm. Adjustment screws are provided with the base for adjustment on site. Do not forget to stick the adhesive seal provided to the aluminium frame of the base to ensure tightness.

• Cased base with grid:



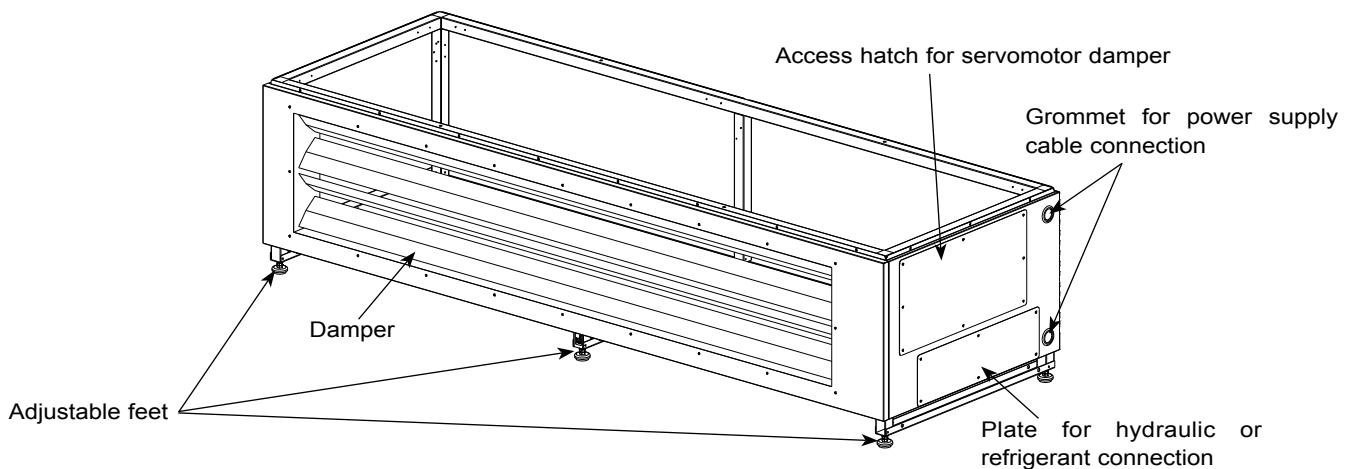
Can be used for both intake and supply air.

The height can be adjusted from 450 mm to a maximum of 860 mm. Adjustment screws are provided for adjustment on site. Do not forget to stick the adhesive seal provided to the aluminium frame of the base to ensure its tightness.

Made up of double-deflection grids to direct the air flow.

Side hatch for pipe connection (hydraulic or refrigerant connection) + grommet for power supply cable.

• Cased base with damper:



This is mainly used to insulate the cabinet when it is connected to a duct system.

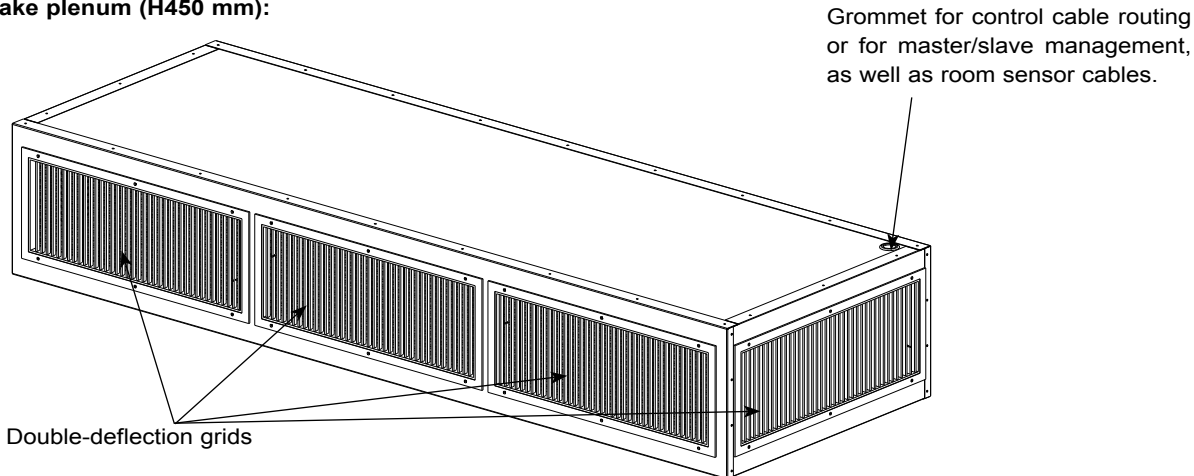
The damper prevents air returning to the unit when it is not operating and when other units are operating nearby.

The height can be adjusted from 630 mm to a maximum of 860 mm. Adjustment screws are provided for adjustment on site. Do not forget to stick the adhesive seal provided to the aluminium frame of the base to ensure its tightness.

Side hatches for pipe connection (hydraulic or refrigerant connection) and damper servomotor access, as well as a grommet for the power supply cable.

11.2.6 Plenums:

- Supply air/intake plenum (H450 mm):

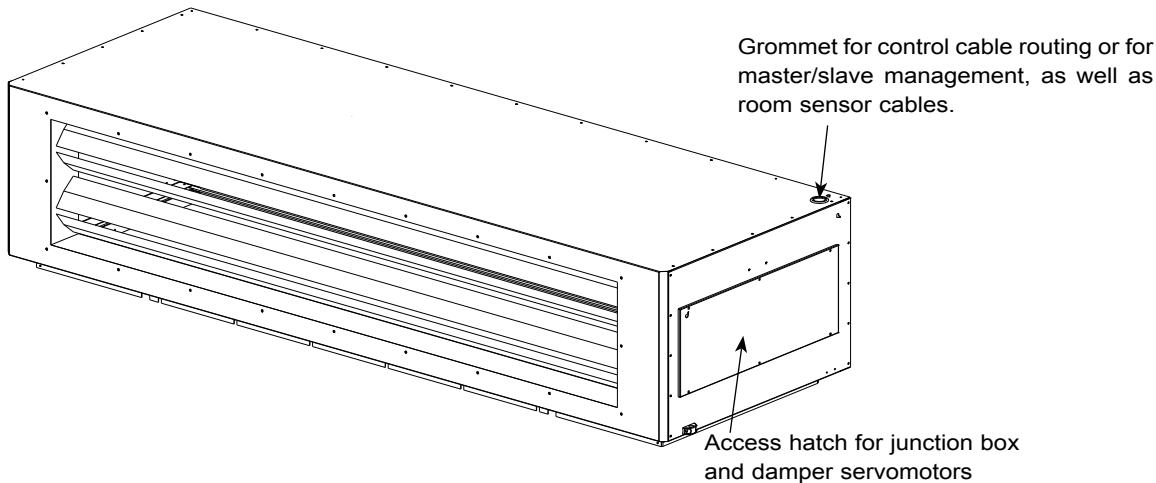


Proposed when air is to be distributed directly into a space. It is mounted on top of the cabinet and features double-deflection grids (one on each side and on the front) to allow the direction of the air stream to be adjusted manually. The plenum may also be used mounted at the bottom (UNDER) to carry air directly from a space back to the air handling system.

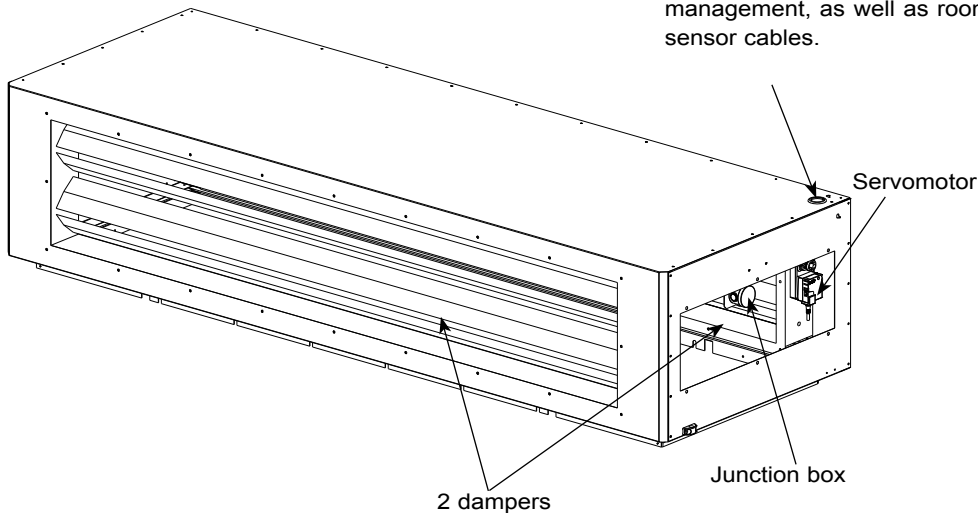
To mount the plenum, please refer to the diagram provided with the cabinet diagram.

Do not forget to stick the adhesive seal provided to the edge of the frame of the plenum that will be in contact with the cabinet to ensure its tightness.

- Free-cooling plenum (Height 550 mm):



Grommet for control cable routing or for master/slave management, as well as room sensor cables.



This accessory should not be installed in corrosive environments (saline environments) or explosive environments (ATEX area).

Components: This is a mixing box made up of two dampers. (One fresh air side and the other on the room's return air side). Two combined temperature and humidity sensors are also provided at the back of the vertical unit. (One outdoor sensor and one internal room sensor).



Internal room sensor



Outdoor room sensor

The outdoor sensor should be installed in a well ventilated area that is not exposed to direct sunlight.

Connection: The plenum is positioned above the vertical unit. A diagram provided with the plenum explains the mounting system. Do not forget to stick the adhesive seal provided to the edge of the frame of the plenum that will be in contact with the cabinet to ensure its tightness.

Electrical connection: When this option is chosen, a wound bundle can be found at the top of the cabinet.

Connect this bundle to the junction box as shown on the diagram. For sensors, the cross section of cables must be a maximum of 1.5 mm². If possible, pass the cables through the top section of the plenum using the grommet provided for this purpose and refer to the routing recommendations in paragraph 11.3.

See electrical diagram for connection.

Operation:



A filter must be installed upstream on the fresh air side (type F7, not provided by CIAT and at customer's expense) so that the indoor air is not adversely affected.

The option allows cooling to be carried out using outdoor air (fresh air), in accordance with the temperature and humidity conditions, to decrease the room temperature. The opening and closing of dampers is managed by the controller according to the information relayed by the various sensors required for correct functioning.

Thanks to these control elements, the controller manages the unit's operating mode.

The cooling contribution to reach the temperature setpoint is then carried out:

- For vertical units using Chilled Water (CW)
 - Using fresh air only (outdoor air)
 - Fresh air + heat exchange coil.
 - Heat exchange coil
- For cabinets using Freon (DXA)
 - Using fresh air only (outdoor air)
 - Heat exchange coil

11.2.7 Intake damper on the vertical unit:

This is mainly used to insulate the cabinet when it is connected to a duct system.

The damper prevents air returning to the unit when it is not operating and when other units are operating nearby.

This option is mounted and connected in the factory. Please see the dimensional drawing and connection diagram for the dimensions and mounting holes for any potential ducts.

The damper is controlled by the controller, which is fitted with a servomotor with a reset function.

11.2.8 Optional control elements

- Raised floor management

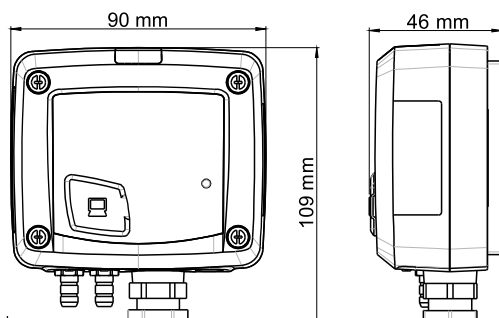
This option is only available with CW

• Characteristics of the CP112 AN pressure sensor

Features: This option comprises a sensor

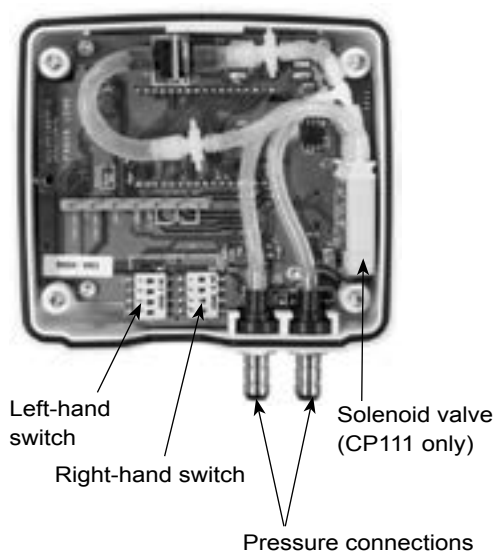


Dimensions of the housing (with mounting support)

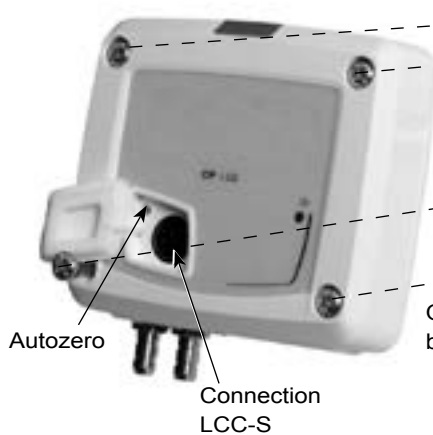


Connectors

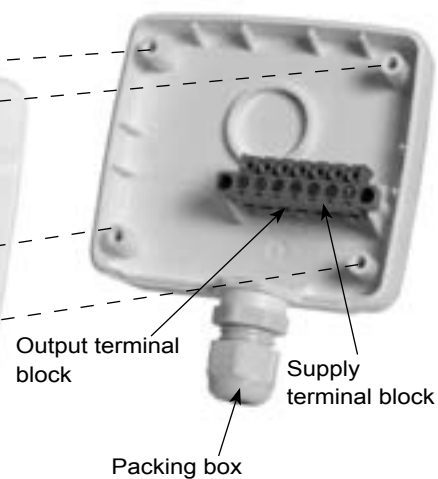
Inside the front cover



Mobile front panel



Rear fixed housing



Electrical connections (as per NFC15-100 standards)

See wiring diagram for connection

Autozero

To perform an Autozero, disconnect the tubes from the 2 pressure connections and press the "Autozero" button. When an Autozero is performed, the green "On" indicator light goes out then comes on again.

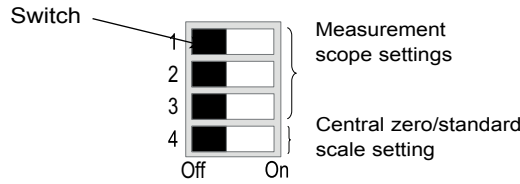
Configuration



To configure the sensor, switch it off and enter the desired settings by moving the switches as described below. Once the settings have been configured, switch the sensor back on.

To configure the sensor, undo the 4 screws on the housing and open it. The switches allowing for various settings are then accessible.

Measurement scope settings - left-hand switch



To set a measurement scope, position switches 1, 2 and 3 of the measurement scopes as shown in the table below.

	Combination 2
Sensor type	CP112
Pa	250

Measurement scopes of the **CP112** on the **scale ± 250 Pa** depending on the measurement unit.

Standard scale and central zero setting - left-hand switch

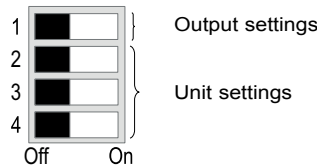
To set the type of measurement scope, position switch 4 as shown opposite:

E.g. 0-250 Pa: Full scale/0



Configurations	Full scale
Combinations	

Setting the output - right-hand switch



To set this type of analogue output, position switch 1 of the output as shown opposite.

Configurations	0-10 V
Combinations	1
	2
	3
	4

Setting the units - right-hand switch

To set a unit of measurement, position switches 2, 3 and 4 of the units as shown in the table below.

Configurations	Pa
Combinations	1
	2
	3
	4



Once the sensor is in position, switch it on and carry out the autozero procedure to ensure the sensor operates correctly in any position.

MAINTENANCE

Avoid the use of aggressive solvents. When cleaning with formalin-based products (parts or ducts), protect the device

- Temperature or temperature and humidity room sensors:

The room sensors are mounted on a wall in the room to be regulated. The sensors are provided at the back of the vertical unit. For connections, please see the wiring diagram and the recommendations in paragraph 11.3.



- Changeover control:

Surface-mounted onto the hydraulic circuit. This option allows the temperature of the water network to be monitored and the exchanger (coil) to be operated in either cooling or heating mode (summer or winter mode).

- Supply air low limit

- Fire thermostat

11.2.9 Lon gateway

This is incorporated in the electrics box.

The gateway is used to translate the main information available in MODBUS into LON.

It is possible to connect 1 to 5 units to the LON gateway.

Please see the recommendations for routing cables in paragraph 11.3 and in the control manual (N09.41).

12 - COMMISSIONING

After making the necessary electrical and hydraulic connections, turn on the unit and check the following steps:

- Check the tightness of the electrical connections,
- Check the hydraulic connections (direction of inlet/outlet connections),
- Make sure the inside of the cabinet is clean and free of foreign bodies,
- Make sure the inside of the cabinet is clean and free of foreign bodies,
- Check the power supply voltage and heat protection calibration in accordance with the current ratings of the various components.
- Check the height of the siphon,
- Vent the air out of the coils via the bleed screws,
- Check the circuits for any leaks; retighten the valve if necessary,
- To configure the setpoints, please refer to the control manual. "µAir Connect 2"
- Depending on the solution chosen, the air flow may be:
 - adjusted based on the difference with the setpoint,
 - constant

(refer to the control manuals for the corresponding configurations)

- If a master/slave control system is used, make sure each cabinet is interconnected by the connection cable,
- Evacuate the system until -0.1 M Pa (-760 mm Hg) is obtained,
- Fill with the required quantity of refrigerant fluid (for charges see the "Refrigerant circuit" section),
- Simulate activation of the various electric components, controlled components and alarms.
- Check the currents.

- Standard components:
- Temperature alarm,
 - Air flow alarm,
 - Water leak alarm,
 - Condensation unit (DX model),
 - Fan motor assembly

- Optional components:
- Low temperature limit alarm,
 - External contact control,
 - Electric heater
 - Humidifier,
 - Hot water valve

- Check the cleanliness of the humidifier supply water (option),
- After allowing the unit to run for a few hours, check the clogging level of the filter, especially in the case of an F7 filter.

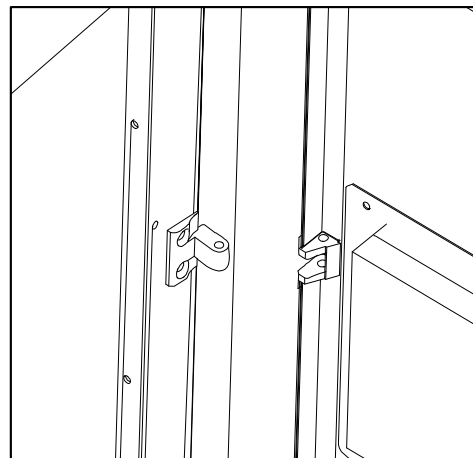
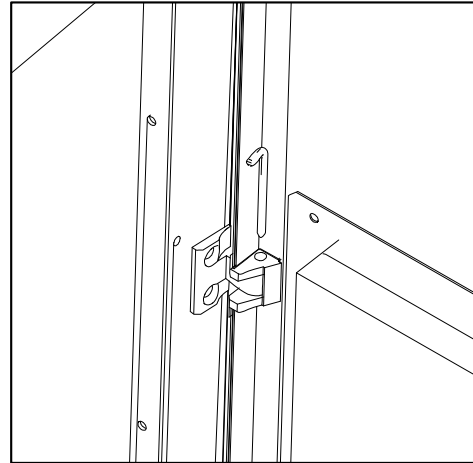
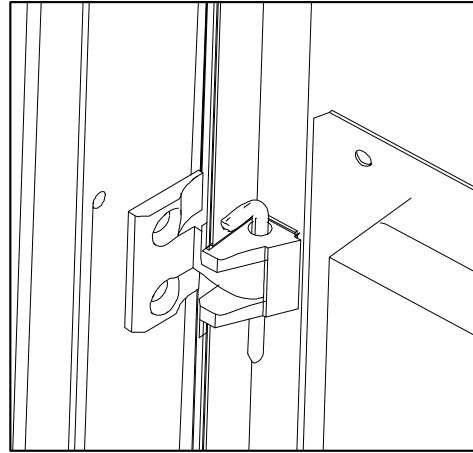
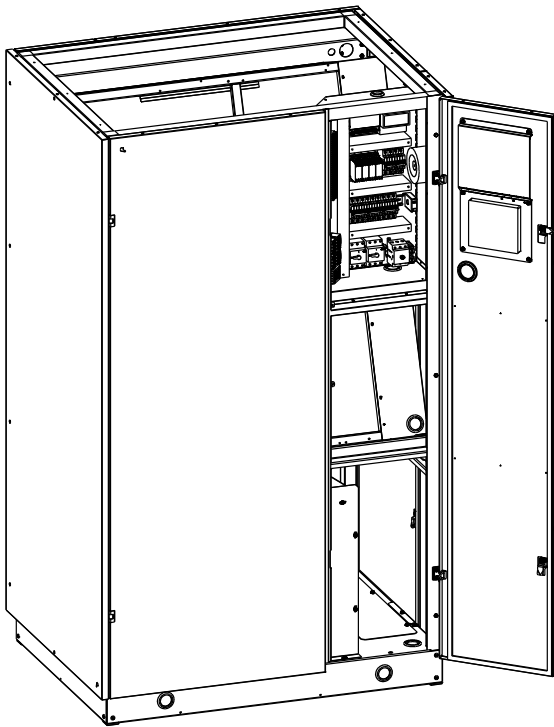
13 - MAINTENANCE

The doors may be removed to facilitate access to all components (see removal diagram below)

Open the doors.

Pull out the pin and remove the hinge (Detail B).

Lift off the door (Detail C).



13-1 Filters

Check the filters frequently when commissioning the unit. The rate at which they will clog will depend on how well the air circuits were cleaned.

Frequency of servicing

The filter life depends essentially on the amount of dust in the air and the efficiency of the filtration system. The filtration quality cannot be maintained if the filter medium has been damaged during maintenance. We recommend that the filters be replaced once every two years in case of low to moderate use.

Replacing the filter elements

When performing maintenance, it is important to avoid releasing and spreading the dust that has accumulated in the filter.

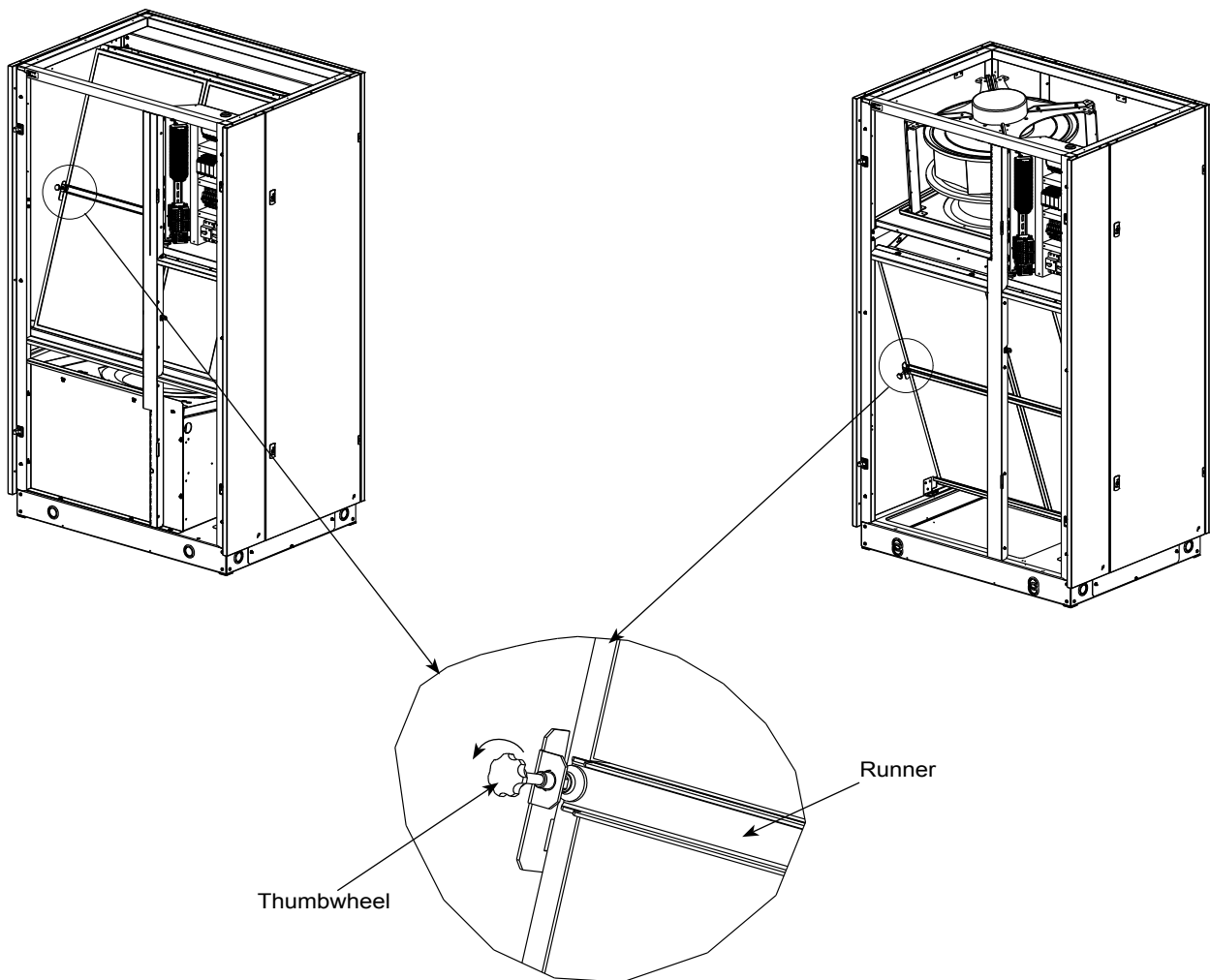
Turn off the unit.

Access the filters on the front of the unit.

For filter sizes **CW 40 to 100**

Replace the used filters by new filters. Take care to note the direction of air flow indicated on the new filters.

Always make sure that the filter elements are properly positioned before compressing them or turning the unit back on.

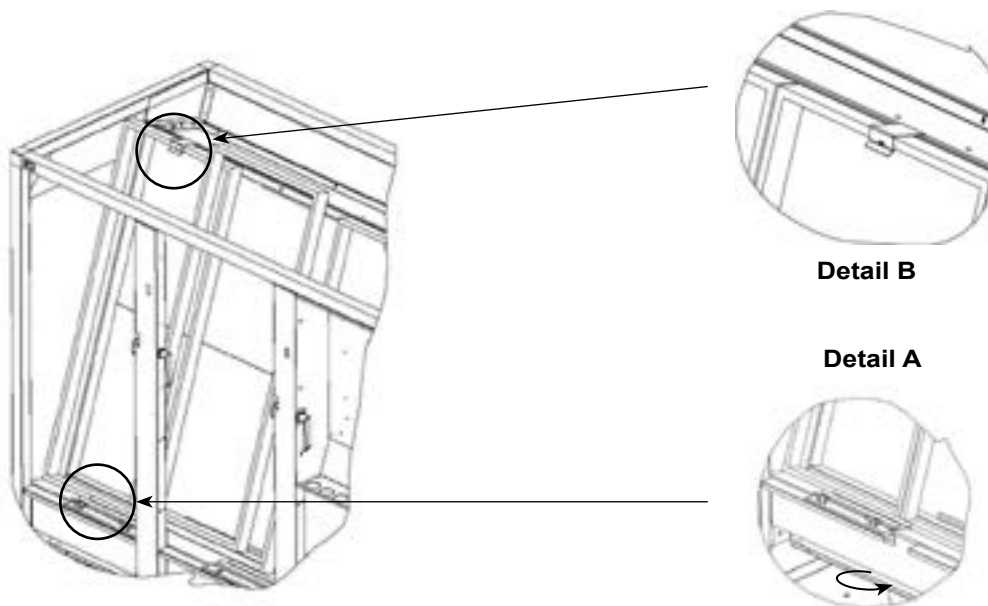


- Unscrew the thumbwheel to free the runner.
- Remove the runner to take the filters out.

▪ For filter sizes CW 115 and DXA 59 to 85

- Unscrew the clamps on the bottom of the filter (detail A)
- Remove the filter by pulling up the tab on the top of the filter (detail B)

Replace the used filters by new filters. Take care to note the direction of air flow indicated on the new filters. Always make sure that the filter elements are properly positioned before compressing them or switching the unit back on



13-2 Cooling coil

Frequency of servicing

As the cooling coil is protected by a filter, its air circuits require very little maintenance



Always cut the power supply to the vertical unit before any cleaning procedures..

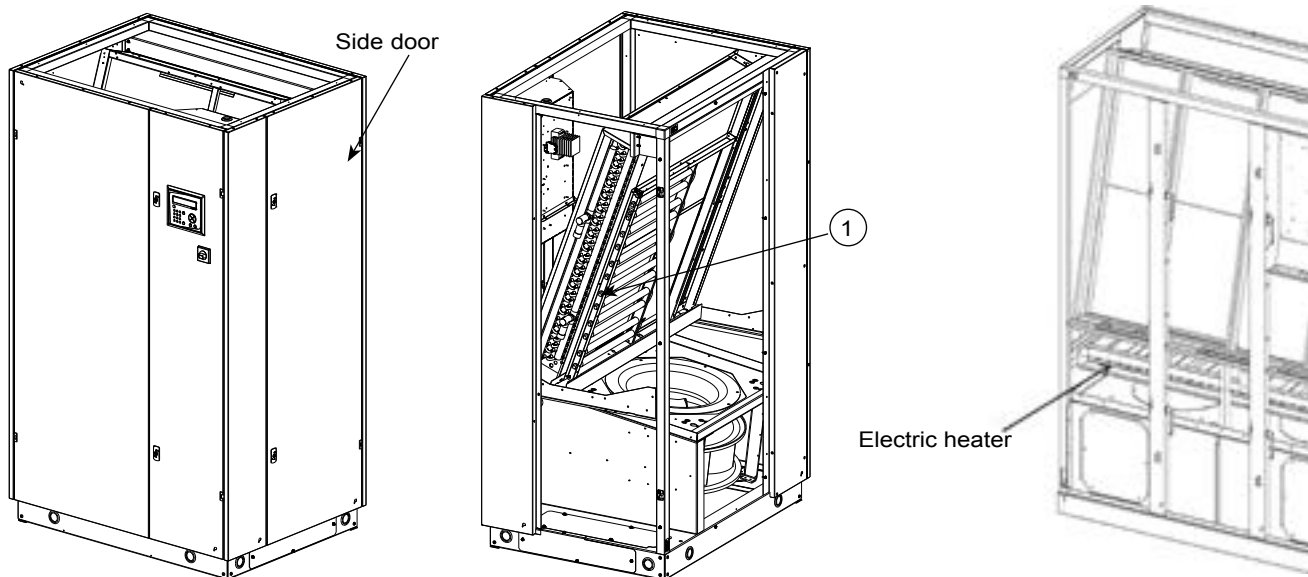
13-3 Electric heater

Frequency of servicing

The electric heater requires very little maintenance. However, the following checks are necessary:
Visually inspect the heating elements, wires and connection cables after every 1500 hours of operation.
Check and retighten the connections once or twice a year.

Sizes CW 40 to 100

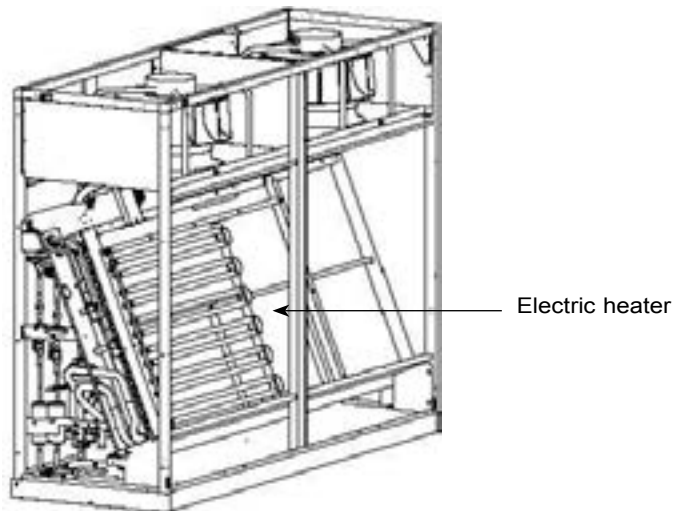
Size CW 115



① **To remove the heaters**

- Unscrew the bolt and remove the washer, and push the pin backwards to release it from its housing. Carry out this procedure in reverse when refitting.

The electric heater is located behind the exchanger (chilled water coil or direct expansion coil). Open the side door to access it. Clean using an air nozzle.

**Cleaning procedure:**

Remove the filters as instructed above,

To avoid damaging the blower nozzle, make sure that it is not too close to the finned surface.

13-4 Humidifier**Maintenance**

Clean the humidifier once a year and replace its tank.

Cleaning or replacing the steam tank

This operation is necessary when the deposits that form on the active surface of the electrodes prevent the correct flow of current (alarms E08, E06).

To remove the tank:

Drain the tank completely via the manual drain programme actuated by the control (See extract from the control manual N09.41 paragraph 6.2, parameter no.911)

Cut the power to the unit by turning it off at the switch or removing the fuses on the line,

Remove the tank steam hose,

Disconnect the main electrodes and remove the pins from the level electrodes,

Remove the retention spring from the cylinder and lift the tank up and out.

In general, the steam tank can be reused after being descaled (scale on the electrodes prevents the free flow of water and current).

If the electrodes are too badly affected the tank must be replaced: Only the tank body and seal need to be changed.

Check the gasket and replace it if need be. Put the tank back in place by following the above steps in reverse order.

Cleaning the unit and seasonal servicing

The unit must be checked and cleaned once a year or after it is shut off for an extended period. Remember to always first drain the water from the tank and to cut the power supply.

Procedure

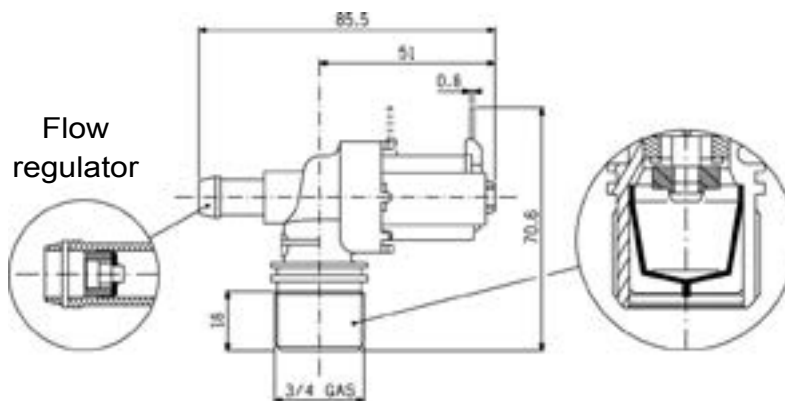
Remove or wash the water supply valve. Check the inlet filter for clogging,

If the pump malfunctions or becomes worn, it must be replaced.

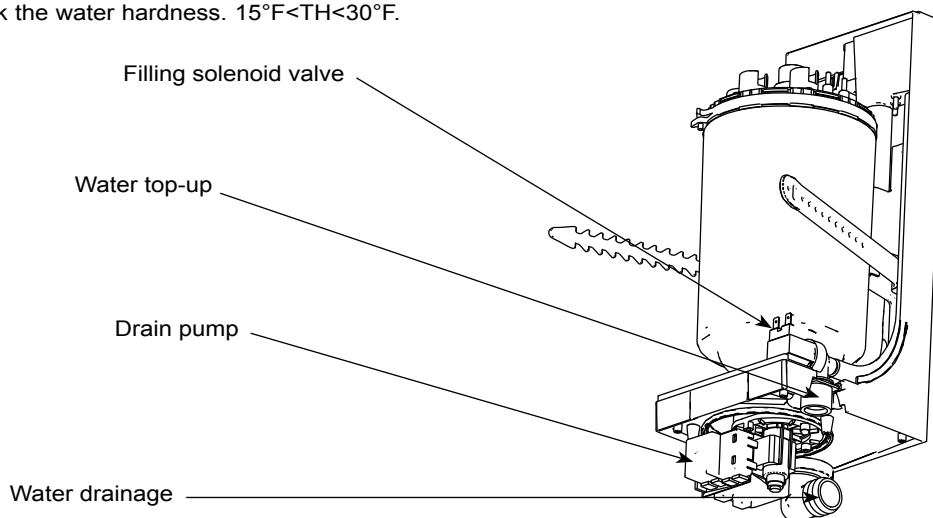
Inspect the water supply, steam supply and condensate drain pipes and replace them if necessary.

Supply valve

CHARGING UNIT



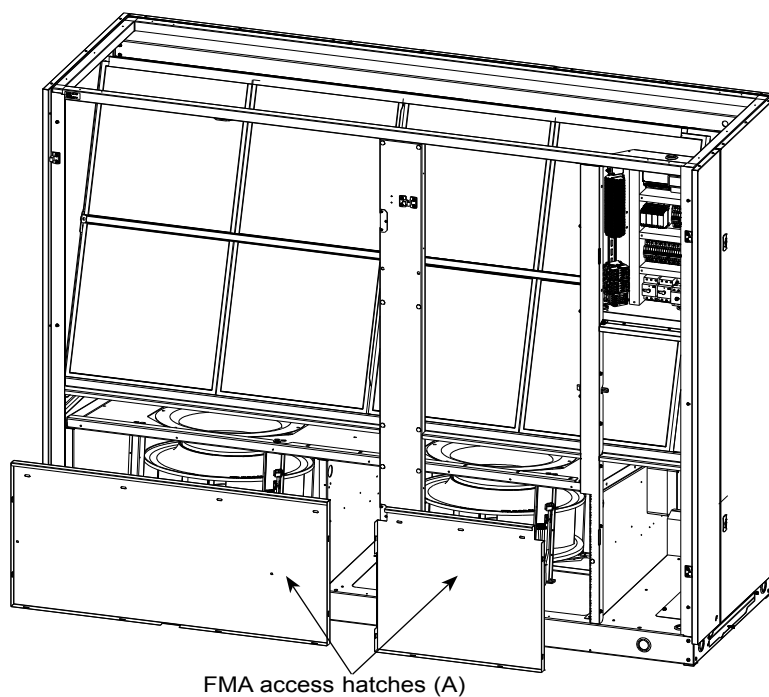
If the humidifier malfunctions (no steam produced),
Check the conductivity of the water: it must be between 350 and 1250 $\mu\text{S}/\text{cm}$.
In case of repeated scaling, check the water hardness. $15^\circ\text{F} < \text{TH} < 30^\circ\text{F}$.



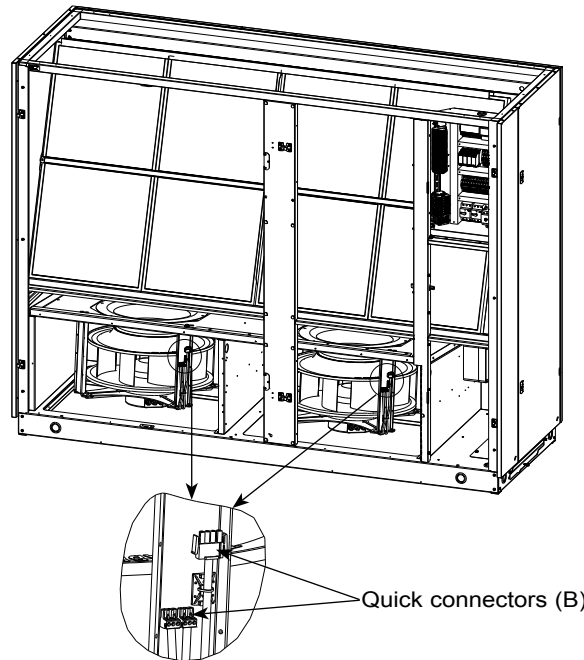
13-5 Fans

Sizes CW 40 to 100

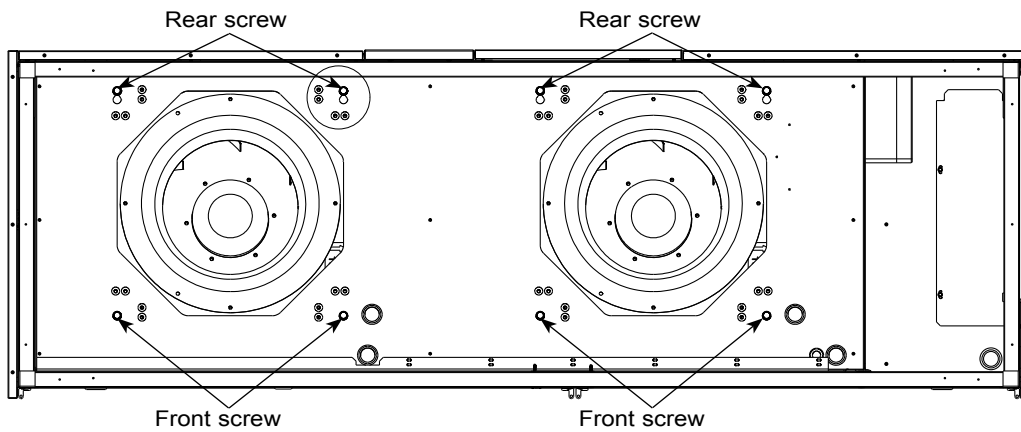
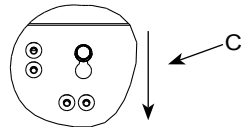
Fitting UNDER



- Remove the screws on the fan access hatches and remove the hatches. (Figure A)

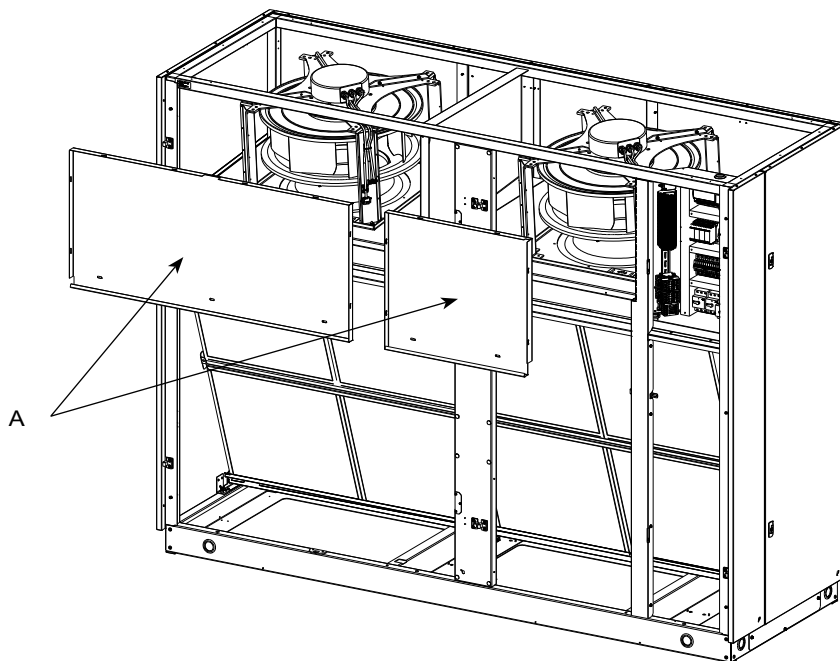


- Disconnect the quick connectors (figure B) for each fan motor assembly
- Slide shims/supports under the FMAs to support them.

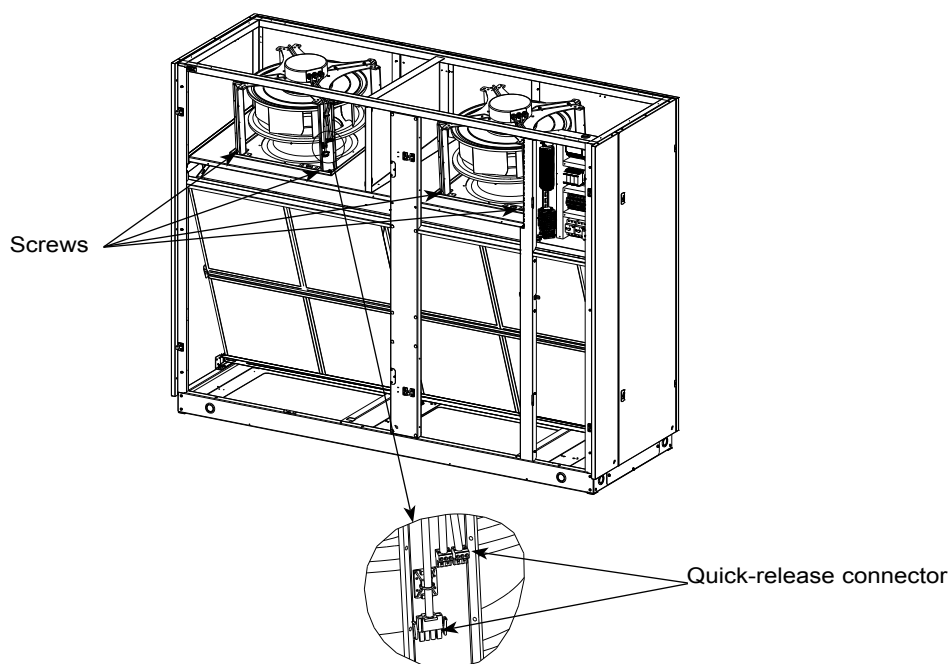


- Remove the front screws
- Gently unscrew the rear screws so that the FMAs do not fall out and so that they allow the FMAs to be removed by moving them forwards, as shown in figure C.

When mounting the FMA(s), follow the steps in reverse order and ensure the FMA screws are sufficiently tightened.



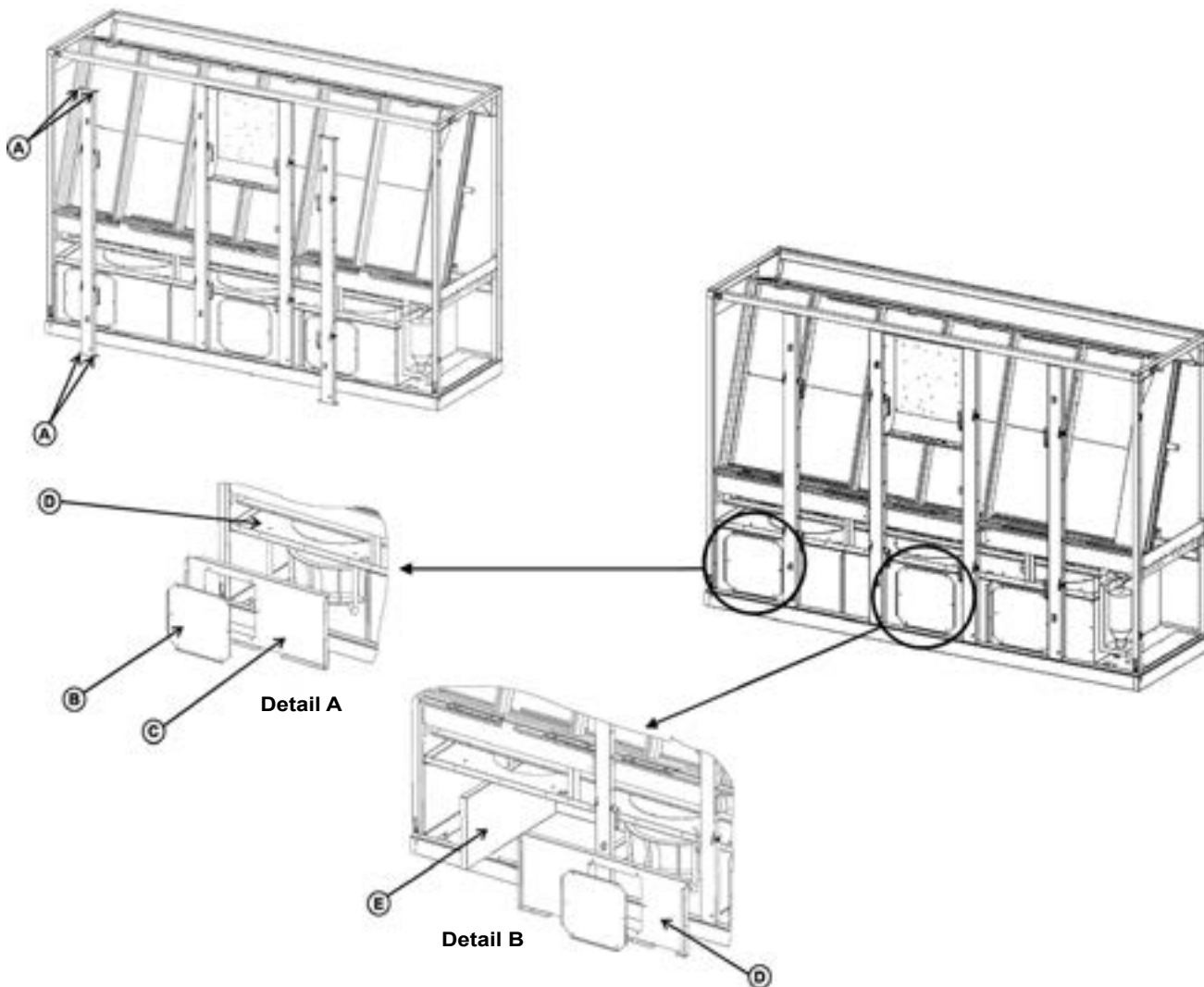
- Remove the screws on the fan access hatches and remove the hatches (figure A)



- Disconnect the quick-release connectors (figure B) for each FMA.
- Then unscrew the 4 screws per FMA that are situated level with the arches.
- When refitting the FMA(s), follow the steps in reverse order and ensure the FMA screws are sufficiently tightened.

Size CW115

- Fan access: remove the 6 screws from the fan access hatch (B)
- **Removing the lateral panels from the fans (A):**
- Remove the 4 screws (A) from the uprights then remove the uprights
- Remove the screws from the fan removal panel (C),
- Remove the fan attachment screws (D).
- **Removing the central fan (B):**
- Remove the four screws (A) on the left upright then remove the upright
- Remove the central and left fan removal panels
- Remove the fan divider panel (E)
- Slide the central fan to the left and pull it out.

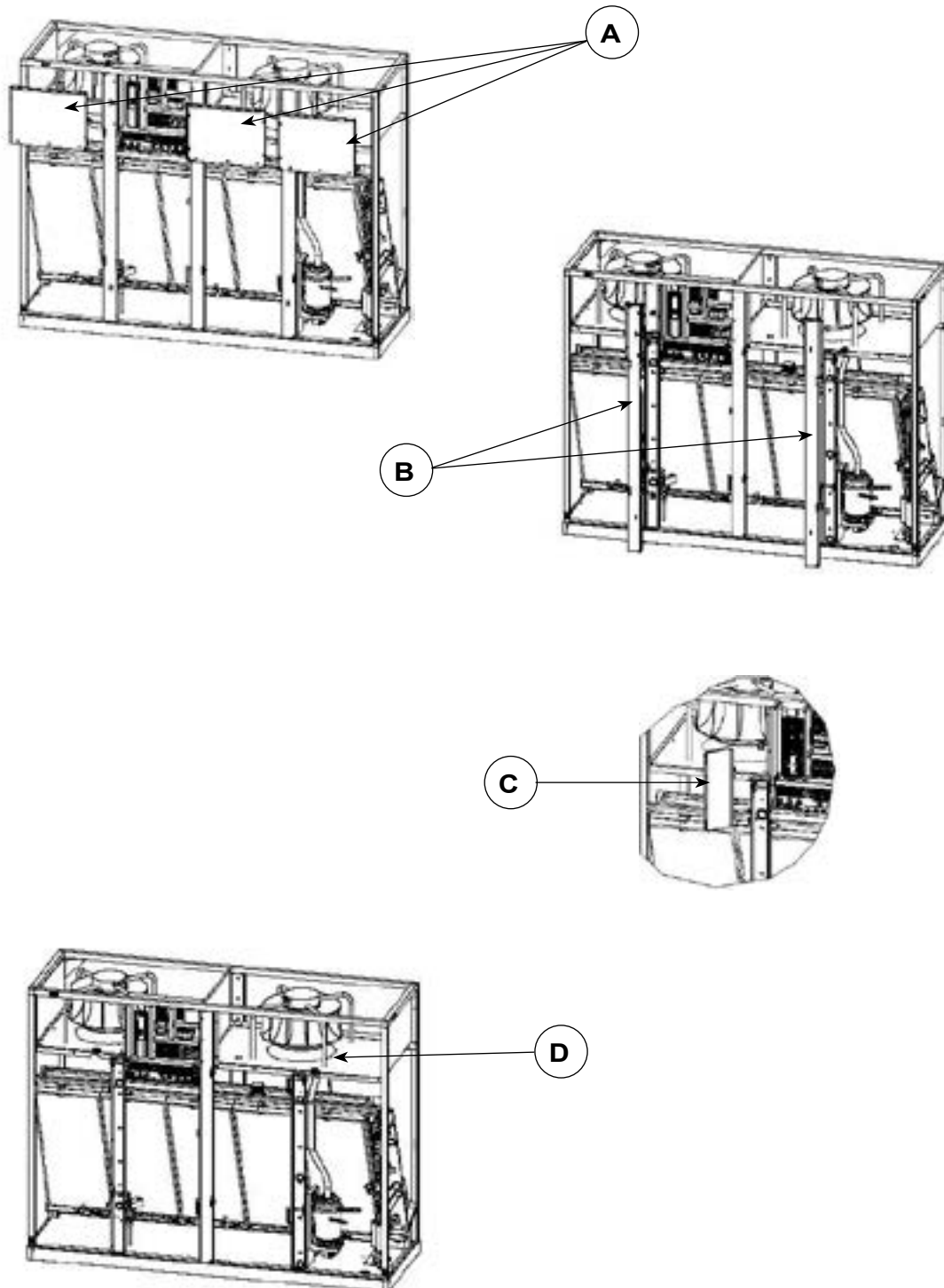


DXA 59 to DXA 85

Fitting OVER

Accessing and removing the fans:

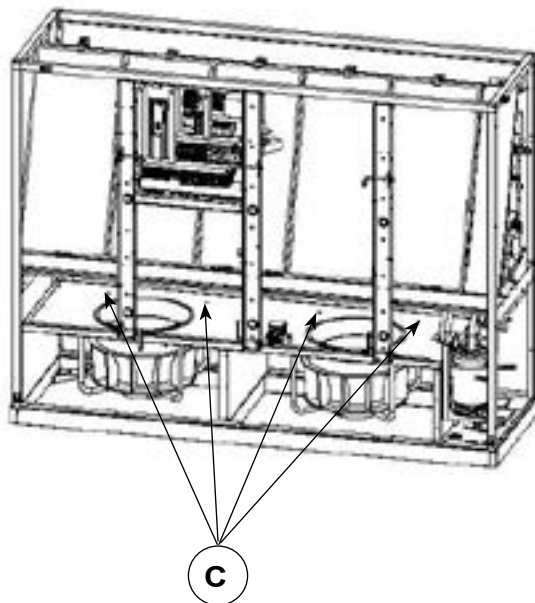
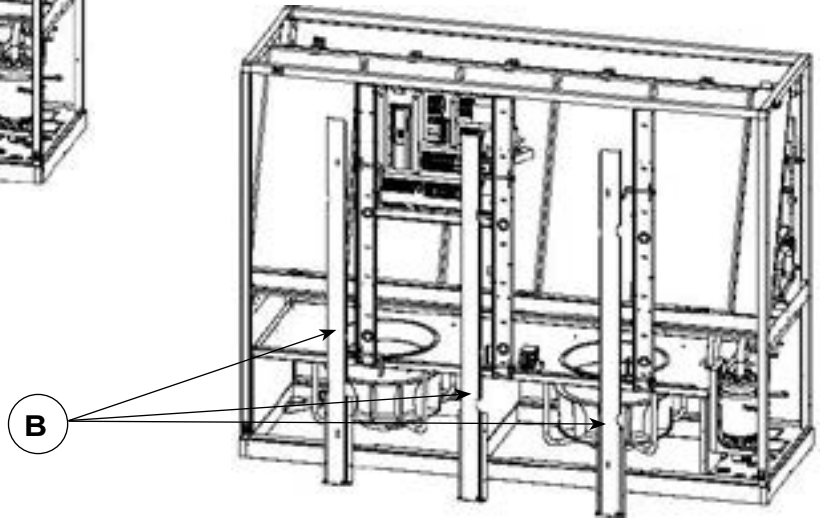
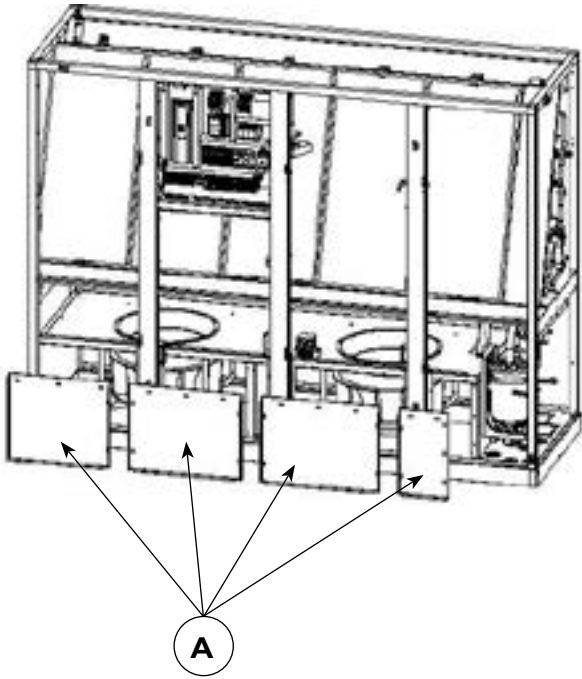
- Undo the screws for the fan access hatch and remove them (A)
- Remove the screws and take off the trim strips (rep.B)
- Remove the screws from the deflector and remove the deflector (C)
- Remove the FMA retaining nuts (D) (located under the retaining arches)
- When refitting the FMAs, make sure the nuts are torque tightened to 40 Nm.



Fitting UNDER

Accessing and removing the fans:

- Undo the screws for the fan access hatches and remove the hatches (A)
- Remove the screws and take off the trim strips (rep.B)
- Slide shims/supports under the FMAs to support them,
- Remove the FMA retaining nuts (C)



13-6 Electrics box

Retighten the connections twice a year.
Visually inspect the components, wires and cables.

14 - SERVICE INTERVALS

DEVICE	AT COMMISSIONING	2-3 MONTHS	12 MONTHS
Filters		- Replace	- Replace
Cooling coil		- Clean	- Check and clean the condensate drains
Electric heater (option)	- Check the connections	- Clean	- Retighten the electrical connections - Check the components
Humidifier (option)*	- Check the connections	- Check the condition of the tank; replace if necessary	- Retighten the electrical connections - Check the components - Check the condensate drains - Make sure that steam is evenly distributed - Retighten the electrical connections
Fan(s)	- Check correct operation		
Electrics box	- Check the connections		- Retighten the electrical connections - Check the components - Check the insulation - Check correct operation
Hydraulic circuit		- Check correct operation	
Water leak detection sensor and relay	- Check correct operation		
Filter pressure switch	- Check correct operation and the adjustment of the setpoint	- Check correct operation and setpoint adjustment	- Check correct operation and setpoint adjustment
Thermostat and fire control relay	- Check correct operation	- Check correct operation	- Check correct operation
Valve	- Check the circuit for correct operation and tightness		- Check correct operation
Pressure gauge	- Check the pressure and top up or fill the circuit as necessary		

* If a water softener or water treatment system is used, the water hardness should not be less than 40% of the initial hardness and should never be less than 15°f.

15 - OPERATING READINGS

DATE/TIME					
Rated voltage (V)					
Voltage at terminals (V)					
Fan motor absorbed current (A)					
Mechanical check: pipes, screws, etc.					
Electrical connection tightness check					
Clean the coil					
Control check					
Filter check					
Leak test					

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