

OPERATION SERVICE AND
INSTALLATION MANUAL



PROVIDING **GLOBAL SYSTEM** SOLUTIONS

CWC
600X600

Congratulations, you have made a wise choice with the purchase of your Lennox chilled water ceiling cassette CWC/CWC-D.

This product has been designed, assembled and supplied in one of our world class manufacturing facilities and we feel sure that it will meet your expectations.

Lennox an international organisation with world wide distribution takes pride in supplying you with this product.

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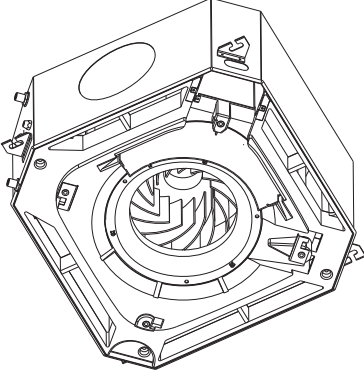

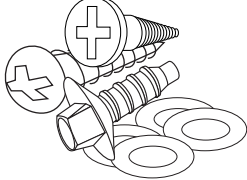
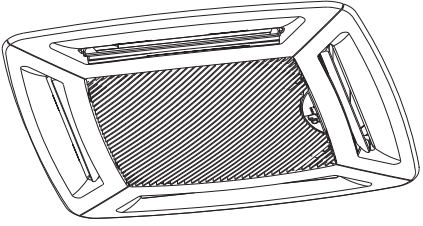
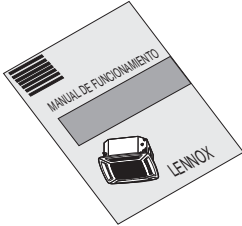
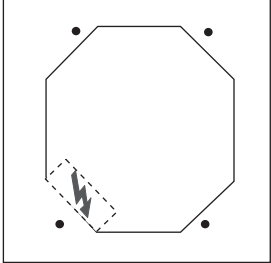
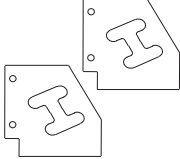
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PRODUCT RANGE

MODEL	V / Ph / 50 Hz	NOMINAL CAPACITY KW	
		COOLING	HEATING
CWC 020 4P	230 V - 1Ph	1.95	1.40
CWC 030 4P	230 V - 1Ph	2.70	3.00
CWC 040 4P	230 V - 1Ph	3.30	3.30
CWC 050 4P	230 V - 1Ph	4.20	4.00

CWC 020/030/040/050 : Cassette unit with electro-mechanical control.

PACKING CONTENT

 <p>Cassette unit</p>	 <p>Mando de control electromecánico</p>	 <p>Screws and washers</p>
 <p>Diffuser panel (*)</p>	 <p>Installation manual</p>	 <p>Setting up template</p>
		 <p>Hanging bracket insulation</p>

(*) Packed separately

GENERAL INFORMATION

The CEILING CASSETTES are designed to operate with chilled and hot water. They provide both cooling and dehumidification in cooling mode and heating in the latter, cleaning and filtering the air in the process. Electrical heating elements are available as an option on all units excluding the CW050. The units are available with cooling capacities of 1950 to 4200 W and heating capacities of 1400 W to 4000 W.

CABINET

The unit chassis is made of galvanised steel and is fully insulated both inside and out.

DIFFUSER PANEL

Made in decorative plastic, with a smooth finish. Internal insulation prevents condensation from forming.

Four louvres ensure air distribution.

HEAT INTERCHANGE

Made of copper tubes and aluminium fins. Coils have been designed and manufactured to ensure maximum efficiency.

FAN

The units are supplied with a 3 speed centrifugal fan. The impellor blades have been designed specifically for this type of units ensuring exceptionally low sound levels and the motor is protected with internal thermal protection.

AIR DISTRIBUTION

The air discharge louvres change position in manual mode, (according to versions).

In the case that this function has not been incorporated the position of the louvres can be adjusted manually.

AIR FILTER

A polypropylene washable air filter is incorporated in the unit it is easily accessible for maintenance.

INTERNAL COMPONENTS

The unit is designed, with serviceability in mind, and all components are easily accessible. A drip tray collects condensate which is removed by means of a condensate pump operate via a float switch (included in version D).

ELECTRIC CIRCUIT

The electrical panel is provided with a terminal block which provides connection of mains power or to a control box. A fused isolator is not included and where required shall be installed by others.

OPTIONS

- Fresh air kit.
 - Duct connection.
 - Fresh air fan.
 - Duct supports.
- Discharge of air to an adjacent room kit.
 - Duct connection.
 - Duct supports.
- Water control valve kit with 2 way or 3 way proportional control valves.
- Auxiliary drip tray.

SPECIFICATIONS

4 PIPES SYSTEM

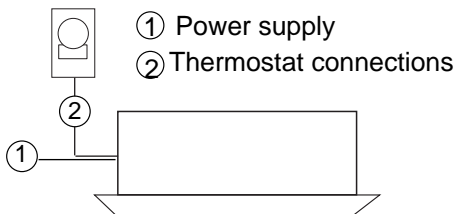
UNIT		CWC 020-4P	CWC 030-4P	CWC 040-4P	CWC 050-4P
Total cooling capacity	W(1)	1.950	2.700	3.300	4.200
Sensible total capacity	W(1)	1.500	2.100	2.520	3.000
Chilled water flow rate	l/h(1)	330	465	570	720
Chilled water pressure drop	kPa(1)	11	24	16	25
Water content	l	0,7	1,0	1,2	1,5
Heating capacity	W(2)	1400	3.000	3.300	4.000
Hot water flow rate	l/h(2)	120	260	280	350
Hot water pressure drop	kPa(2)	4	18	23	55
Water content	l	0,1	0,25	0,25	0,4
Air flow (max. /min.)	m ³ /h	650/445	650/445	880/600	920/650
Sound level(LP)	dB(A)(*)	40/32	40/32	44/38	48/39
Fan power consumption	W(3)	46	46	69	94
Running current	A(3)	0,2	0,2	0,3	0,5
Electric heater power consumption	W	1,5	2	2	----
Running current with electric heater	A	6,5	8,7	8,7	----
Diffuser dimensions	HxWxL(mm)	48x720x720	48x720x720	48x720x720	48x720x720
Cassette dimensions	HxWxL(mm)	298x575x575	298x575x575	298x575x575	298x575x575
Diffuser weight	Kg	3	3	3	3
Cassette weight	Kg	21	22	23	24
Pipe connections		F 1/2" G	F 1/2" G	F 1/2" G	F 1/2" G

- (1) Inlet air temperature: 27°C BS / 19°C BH
Water temperature: 7/12°C
(2) Inlet air temperature: 20°C BS
Water temperature: 70/60°C

- (3) Fan high speed.
Power supply 230V-1Ph-50Hz

(*) Sound level has been tested at a distance of 2 m from the unit, at standard conditions.

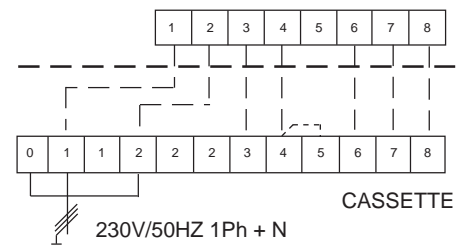
ELECTRICAL CONNECTIONS



MODEL	VOLTAGE 50Hz	N° OF WIRES X SECTION	
		①	②
CWC 020-4P / CWC 030-4P CWC 040-4P / CWC 050-4P	230 V / 1Ph	3 X 1,5mm ²	7 X 1,5mm ²

CASSETTE CWC

THERMOSTAT RC 311-X2



ELECTRICAL WIRING DIAGRAM

For electrical connection refer to wiring diagram in the unit

COOLING AND HEATING DUTIES

1) CORRECTIONS FACTORS FOR HIGH MEDIUM AND LOW SPEED

The given values have been calculated for a high-speed fan. For a different speed, the given values must be multiplied by the following correction factors.

	Low speed	Medium speed	High speed
Cooling capacity	0,80	0,90	1
Heating capacity	0,77	0,85	1
Air flow	0,68	0,86	1

2) COOLING CAPACITY CORRECTION FACTORS

		Water temperature rise (inlet- outlet)													
		3K				5K				7K					
		Air inlet temperature DB/WB °C				Air inlet temperature DB/WB °C				Air inlet temperature DB/WB °C					
Water inlet temperature °C	5	7	10	21/15	24/17	27/19	29/21	21/15	24/17	27/19	29/21	21/15	24/17	27/19	29/21
	5	0,80	1,00	1,52	1,98	0,66	0,80	1,11	1,40	0,60	0,71	0,93	1,14		
	7	0,61	0,82	1,23	1,55	0,55	0,72	1,00	1,22	0,47	0,60	0,81	0,99		
	10	0,42	0,57	0,84	1,06	0,35	0,51	0,71	0,87	0,29	0,44	0,61	0,72		

3) HEATING CAPACITY

	Water flow l/h	Heating capacity related to water flow and air inlet temperature °C		
		40	50	60
CWC 020-4P	120	1.100 W	1.400 W	1.670 W
CWC 030-4P	260	2.400 W	3.000 W	3.570 W
CWC 040-4P	280	2.600 W	3.300 W	3.890 W
CWC 050-4P	350	3.200 W	4.000 W	4.760 W

NOTE: Large variations of the water flow only produce a (\pm 5%) variation of heating capacity.

EXAMPLE:

To calculate the cooling capacity of a fan-coil cassette CWC 040-4P for the following characteristics:

Fan medium speed Water inlet = 5°C Water outlet = 12°C ----- $\Delta T = 7K$

Air inlet temperature: 29°C DB / 21°C WB

Solution: Cooling capacity x Correction factor : 3300 x 1,14 x 0,9 = 3385 W

To calculate the heating capacity of a fan-coil cassette CWC 050-4P for the following characteristics:

Fan medium speed

Heating capacity related to water flow and air inlet temperature = 60°C

Air inlet temperature =15°C

Water inlet temperature=75°C

From heating capacity table the related nominal heating capacity is 4760 W

Solution: Nominal heating capacity x fan speed correction factors: 4760 x 0,85 = 4046 W

WATER PRESSURE DROP

1) COOL WATER PRESSURE DROP Kpa

	Water flow l/h															
	250	300	330	350	400	450	465	500	550	570	600	650	700	720	750	800
CWC 020-4P	6	9	11	12	14	17	---	---	---	---	---	---	---	---	---	---
CWC 030-4P	---	---	---	---	18	22	24	27	31	33	35	45	---	---	---	---
CWC 040-4P	---	---	---	---	---	10	11	12	14	16	17	19	22	24	26	33
CWC 050-4P	---	---	---	---	---	---	---	---	16	17	18	21	24	25	28	35

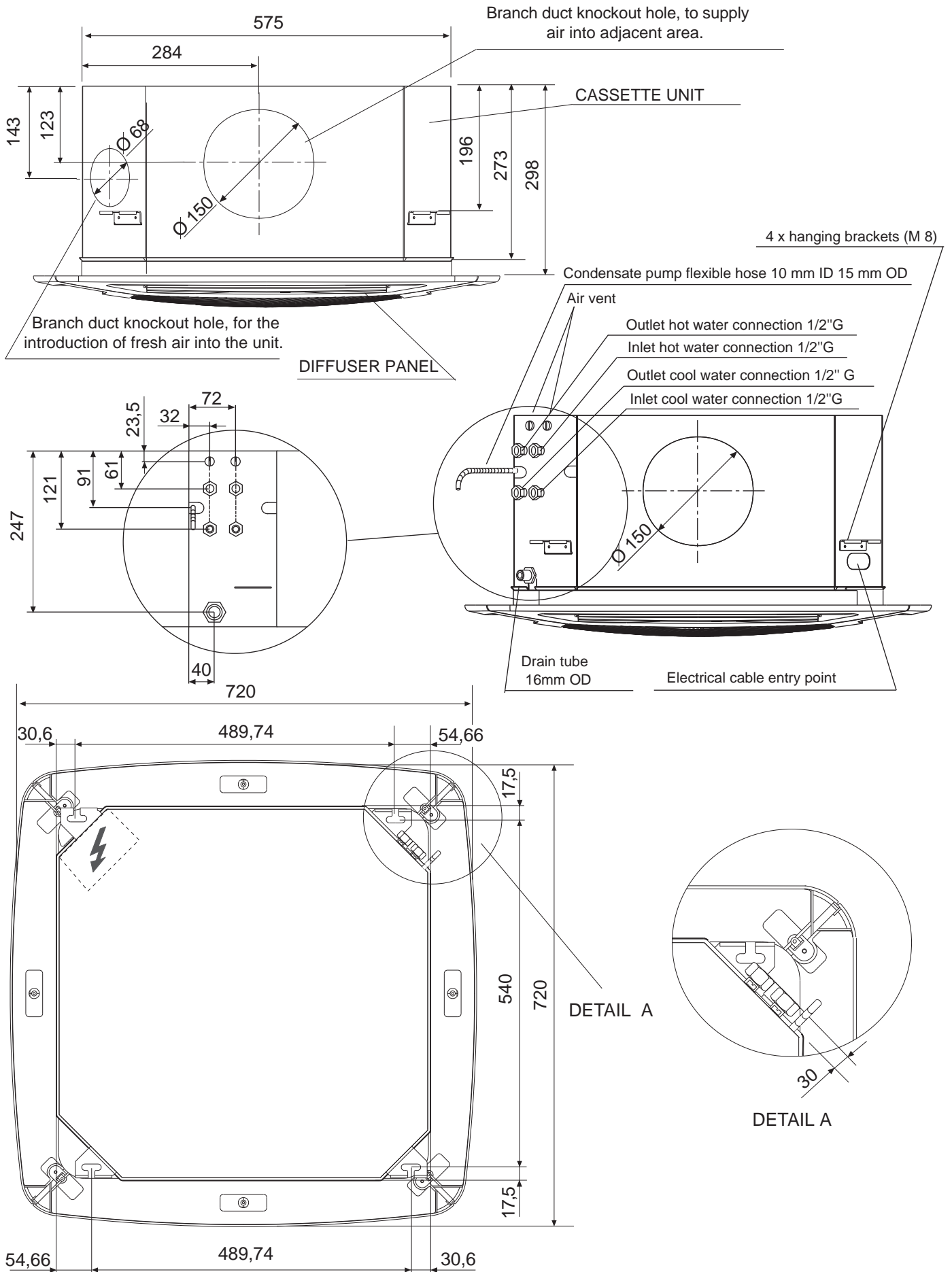
2) HOT WATER PRESSURE DROP Kpa

	Water flow l/h															
	50	75	100	120	125	150	175	200	225	250	260	275	280	300	325	350
CWC 020-4P	1	2	3	4	4,5	5	7	---	---	---	---	---	---	---	---	---
CWC 030-4P	---	---	---	---	---	7	9	11	14	17	18	20	23	26	---	---
CWC 040-4P	---	---	---	---	---	---	---	---	14	17	18	20	23	26	30	34
CWC 050-4P	---	---	---	---	---	---	---	---	---	30	33	36	39	44	49	55

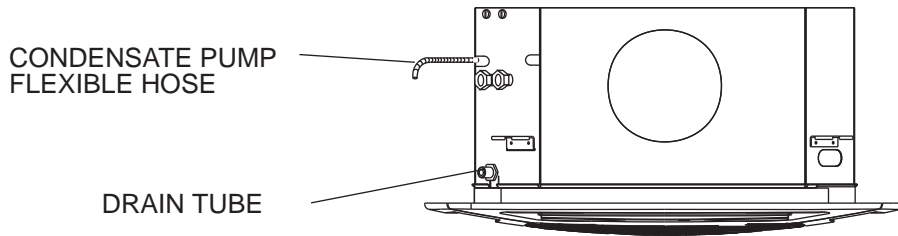
When using a mixture of water and glycol, the water pressure drop indicated on above table must be multiplied by the coefficient indicated on the following table:

Ethylene glycol %	10%	20%	30%
Pressure drop	x 1,07	x 1,12	x 1,20

UNIT DIMENSIONS (mm.)

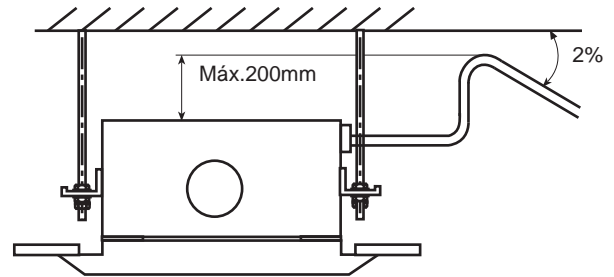
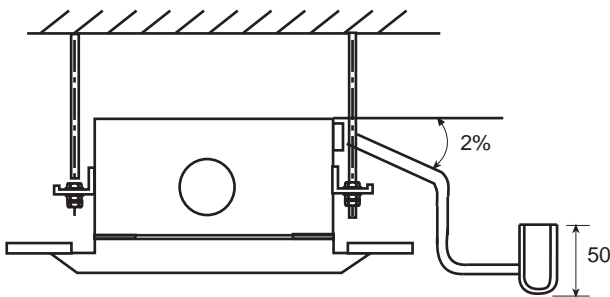


DRAIN PIPEWORK



CONDENSATE PUMP FLEXIBLE HOSE

- The unit is fitted with a condensate pump to ensure condensate removal.
- To insure that there is condensate flow, the drain tube must be installed with a fall of 2 % without obstructions, or without rising sections.
- To avoid any unpleasant odours from the drainage system a trap must be fitted with a trap depth of no less than 50 mm.
- The condensate pump has a maximum lift of 200 mm. The rising tube must always be vertical.
- On completion the drain line must be insulated.

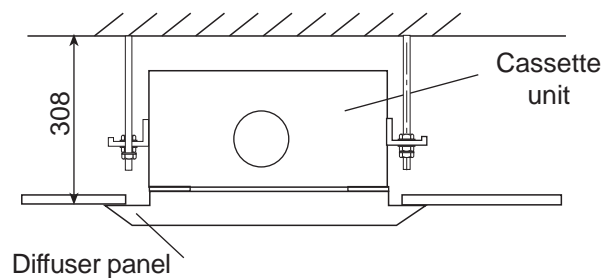


DRAIN TUBE

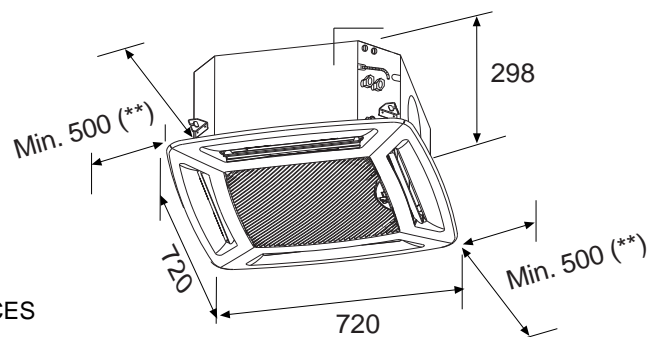
- The drain tube is connected to drip tray.
- This drain tube is supplied with a cap; the cap can be removed when it is necessary to remove any water that accumulates in the drip tray.

INSTALLATION METHOD

1. The unit should be positioned centrally within the room. The ceiling must be horizontal to ensure that the condensate water can drain away thoroughly. The unit must be installed in a position where there is sufficient strength in the structure to support the weight of the unit.



2. Ensure there is sufficient space around the unit to service it. Where there is a false ceiling ensure that there is enough space to provide access. Where there is a false, panelled ceiling ensure that there is sufficient space adjacent to remove the panels.

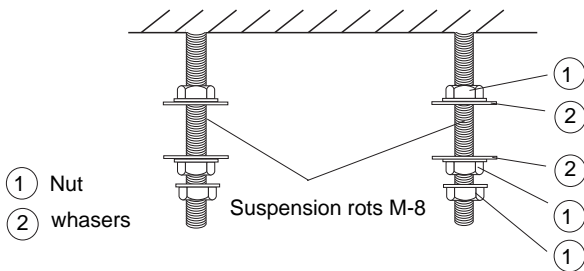


(**) INSTALLATION CLEARANCES

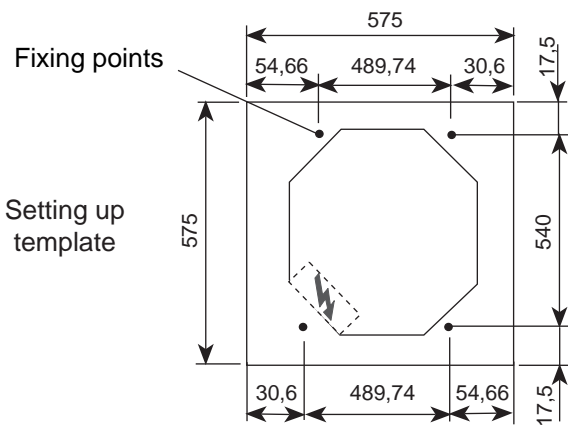
INSTALLATION METHOD (CONTINUED)

3. Cut the false ceiling, to a maximum dimension of 625x625 mm. For a panelled ceiling removes one panel of 600x600 mm.

4. Install the suspension rods to the ceiling, the rods should have three nuts and two washers, as in next figure. The setting up template can be used to indicate the position for the suspension rods.



NOTE: Before marking the fixing points to the ceiling, ensure that the unit is positioned in the correct orientation taking into account of where the electrical cabinet is required. Ensure that water pipes can be run easily. When the unit is fixed it is not easy to change position.



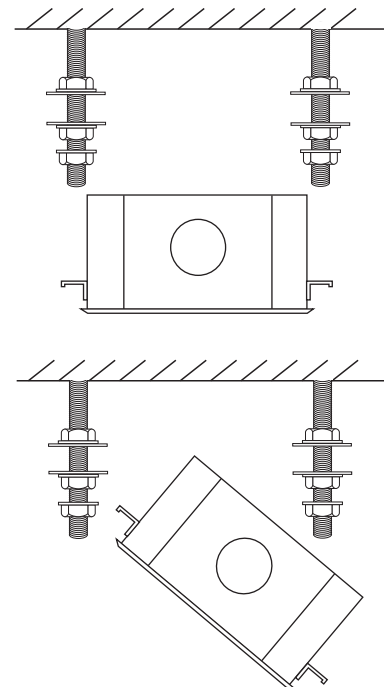
5. The condensate connections should be positioned, before that the unit is installed.

6. To facilitate the connections of water pipes and the drain tube is advisable to disassemble the supporting bracket situated on this corner. Once the installation is completed; the bracket must be reassembled.

7. When lifting the cassette into position care should be taken not to lift the unit by, the drip tray, water connection, drain tube; which could be damaged. The cassette should be lifted by the hanging brackets.

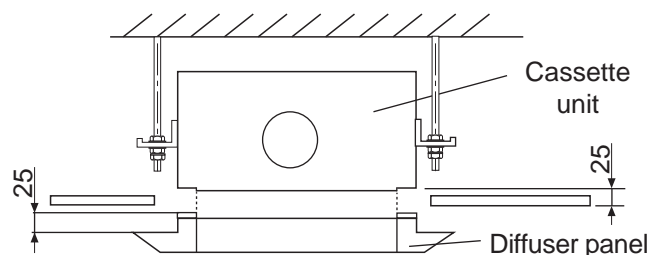
The hanging brackets should be insulated, with the supplied insulation.

8. The cassette brackets hook over the washer. Tighten the cassette, with the lower nuts.



9. Check to ensure the unit is level. The drain will then automatically be lower than the rest of the drip tray.

10. Tighten the nuts on the suspended rods to ensure a distance of 25 mm between the bottom face of the body of the unit and false ceiling.



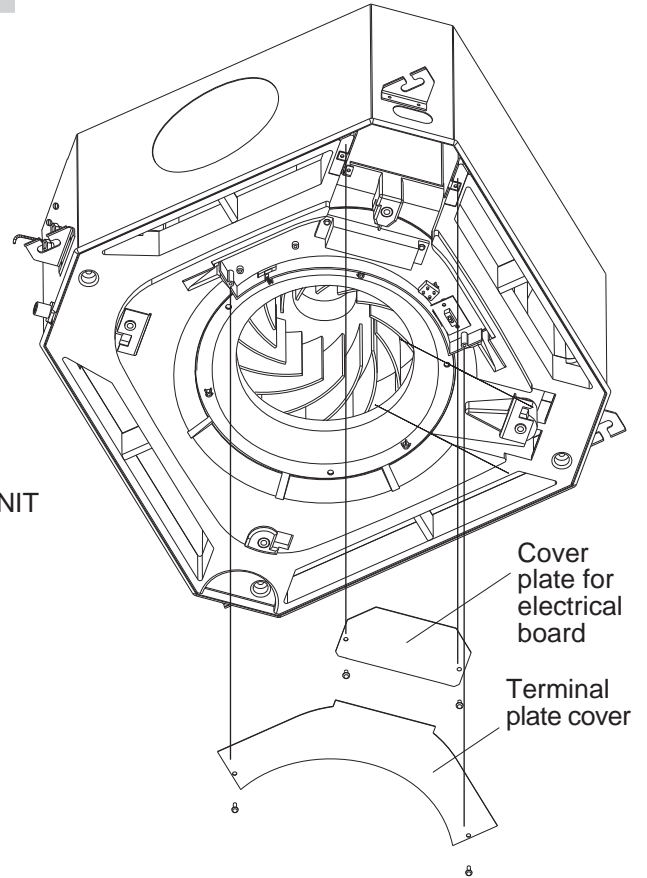
CONTROL PANEL

WARNING

Electric shock hazard can cause injury or death. Before attempting to perform any service or maintenance on the unit, turn OFF the electrical power, and check that the fan has stopped.

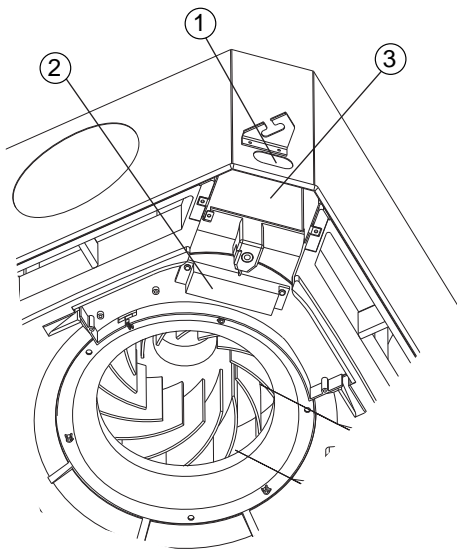
ACCESS TO THE ELECTRICAL COMPONENTS OF THE UNIT

Removing the corresponding plate cover screws gives access to the electrical board and terminal plate, as indicated on the drawing.



ELECTRICAL WIRING DIAGRAM

For electrical connection refer to wiring diagram in the unit.



- ① Electrical inlets, power supply and remote controller
- ② Terminal plate
- ③ Electrical connections (it depends on versions)

INSTALLATION OF DIFFUSER AND INLET GRILLE

WARNING

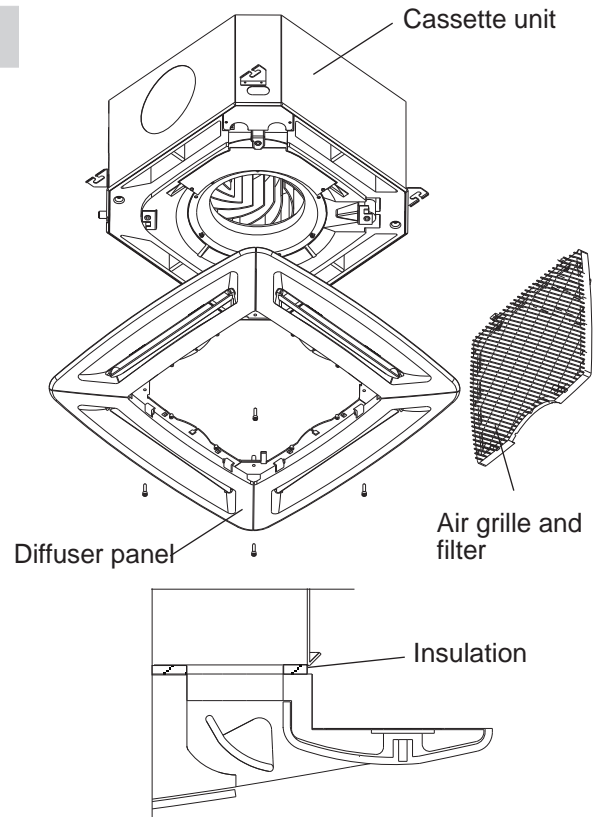
Electric shock hazard can cause injury or death. Before attempting to perform any service or maintenance on the unit, turn OFF the electrical power, and check that the fan has stopped.

MOUNTING THE DIFFUSER PANEL TO THE UNIT

Check that the position in which the diffuser is mounted is the right one.

1. - Release the air intake grille.
2. - The diffuser panel can then be provisionally positioned on the cassette using the fixing clips.
3. - The diffuser is fastened with the four bolts supplied.
4. - Make sure that the frame has not been deformed in the installation, by an excessive tighten of the bolts. There must be no recirculation of air between intake and outlet air paths.

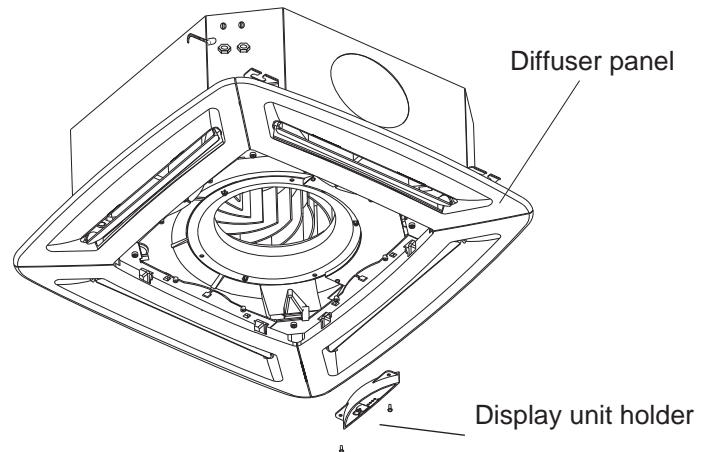
The diffuser panel is sealed with insulation to avoid air gaps between the unit and the air panel. The insulation can be compressed from 8 mm to 3 mm, allowing the panel to be tightened to the cassette by up to 5 mm.



INSTALLATION OF DISPLAY UNIT HOLDER (Elements used depend on versions)

Depending on the control type, the display holder will either include both the infrared receiver and indicator or be empty.
(Refer to the corresponding infrared controller manual)

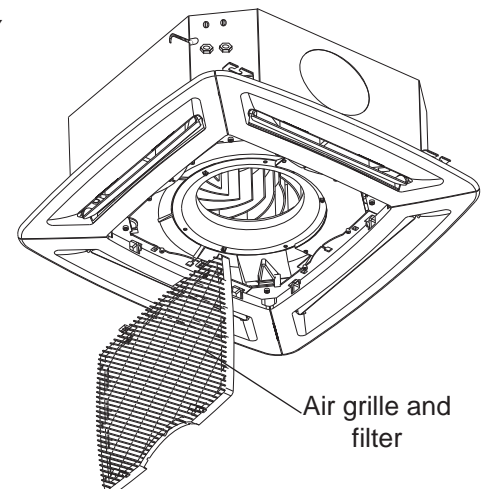
1. - The display unit holder is mounted by two screws, on any side of the diffuser panel.



MOUNTING THE AIR INTAKE GRILLE AND FILTER ASSEMBLY

The position in which the grill is mounted depends on the position of the display unit holder.

- 1.- The grill fixing hooks should be fitted into the holes provided.
- 2.- The stays need to be placed between the diffuser and the inlet grille.
- 3.- The grille is mounted on the diffuser via two hand triggers. Initially pull off the hand triggers, then insert the grille into the diffuser and release the hand triggers. When this operation is completed the grille is attached to the diffuser.



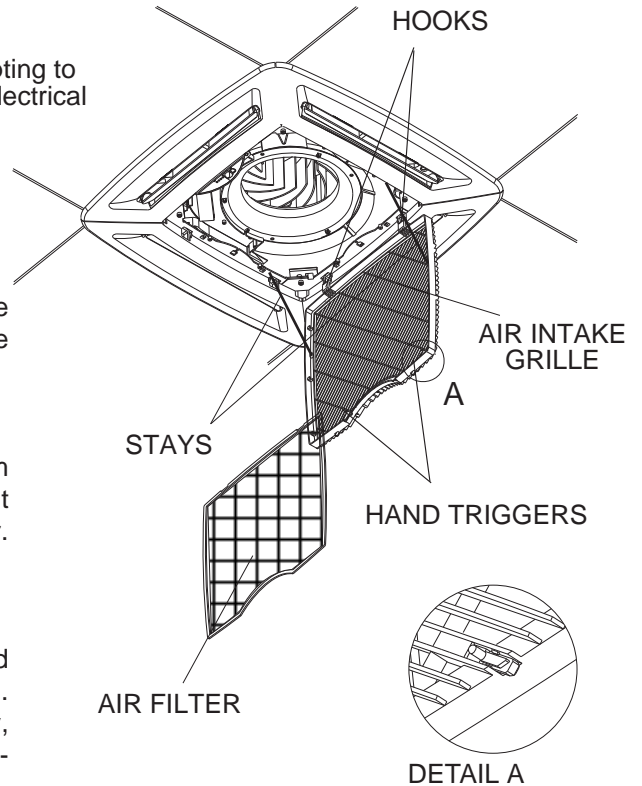
MAINTENANCE

WARNING

Electric shock hazard can cause injury or death. Before attempting to perform any service or maintenance on the unit, turn OFF the electrical power, and check that the fan has stopped.

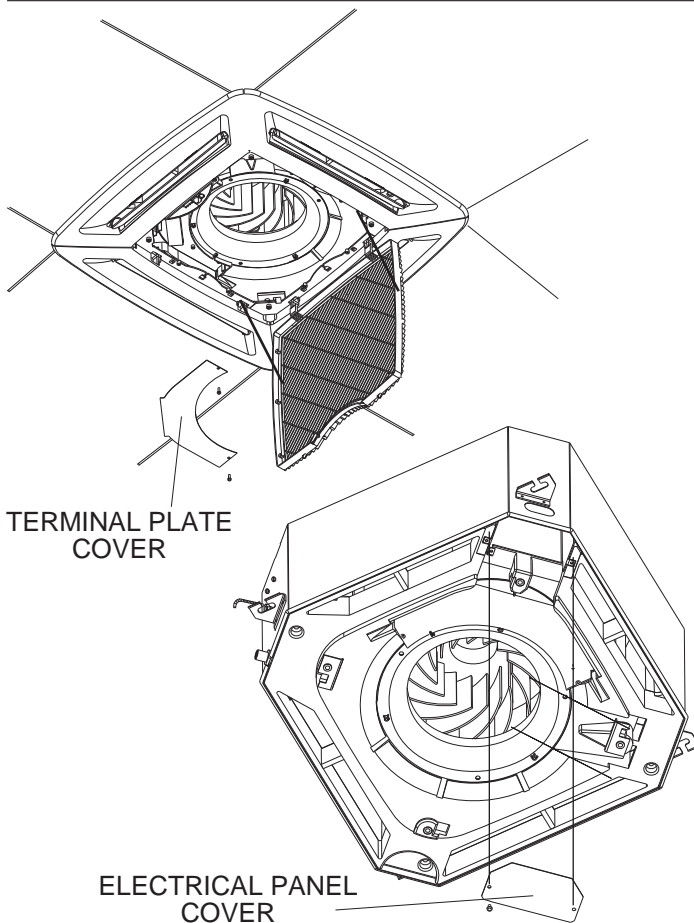
CLEANING THE AIR FILTER

- 1.- Stop the unit.
- 2.- Open the air intake grille on the unit.
Open the grille by way of two hand triggers, which are close to the display unit holder. The grille will swing down supported by the stays and the hooks.
- 3.-Release the air intake grille from de unit.
To release the grille pull it down until the stays can be unlock from the diffuser, then pull it back to an angle greater of 90° and lift it lightly, finally the grille hooks will come away from the diffuser.
- 4.-Remove the air filter once the air intake grille have been released
Clean the air filter depending on the operation conditions and working time, (approximately once every 6 months). Use a vacuum cleaner to clean dust off. If the filter is too dirty, wash it with water and neutral detergent. Dry the filter before re-fitting.
- 5.-Replace the filter in the right position.
- 6.- Close the air intake grille.
Place the hand triggers on position again.



INSTALL THE FILTER

If the unit operates without the filter, there is a risk of damaging the unit through dust contamination.



ACCESS TO ELECTRICAL COMPONENTS

Access to terminal plate

The terminal plate can be accessed by removing the air intake grille and unscrewing the terminal cover.

Access to electrical panel

To gain access to the electrical board follow these instructions:

- 1.- Disassemble the diffuser panel by removing the four screws that attaches it to the unit.
- 2.- Remove the cover of the electrical panel, where is the PCB, (Depending on cassette version.)
- 3.- The PCB can be checked or replaced, by loosening the screws that hold it.

MAINTENANCE

WARNING

Electric shock hazard can cause injury or death. Before attempting to perform any service or maintenance on the unit, turn OFF the electrical power, and check that the fan has stopped.

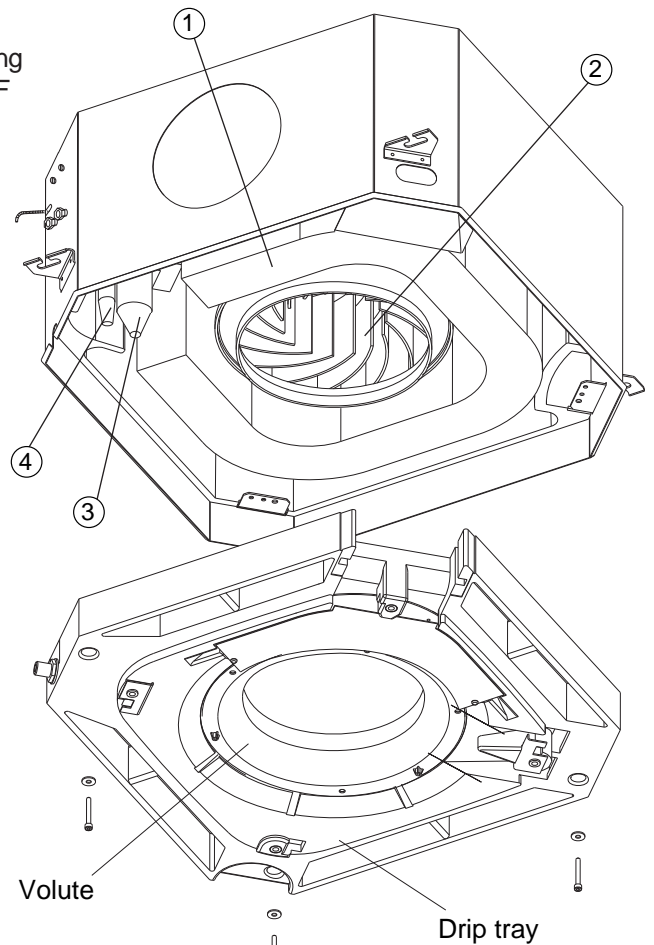
ACCESS TO INTERNAL COMPONENTS

When checking or replacing any internal component of the unit eg coil, fan motor, condensate pump, float switch, the drip tray and volute must be removed.

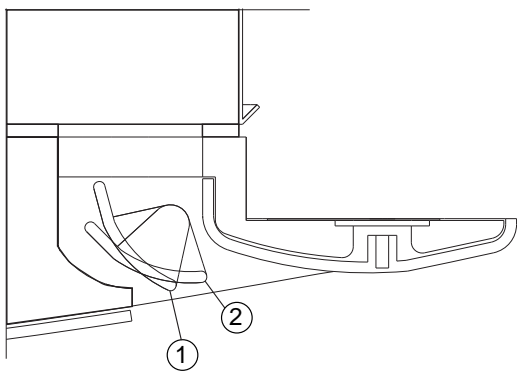
DISASSEMBLING DRIP TRAY

- Remove the air intake grille and filter.
- Disassembly the diffuser panel by removing the four screws that attach it to the unit.
- Detach the volute by removing its three screws, and the electrical panel cover.
- The drip tray can be taken apart by removing its three screws. As shown in the figure.

- ① Coil
- ② Fan motor
- ③ Condensate pump
- ④ Float switch (It depends on cassette version)



AIR DISTRIBUTION



- ① Louvre position for correct air flow in heating mode.
- ② Louvre position for correct air flow in cooling mode.

Louvres change position to distribute air according to heating or cooling operation.

- In cooling operation the louvres are positioned to distribute air outwards from the discharge, which allow airflow close to the ceiling.
- In heating mode the louvres are repositioned to blow air in a downward direction. The air should flow towards to the floor to prevent layers or stationary hot air forming in the upper part of the room.

When the Electro-mechanical thermostat is used the louvres movement is manual, louvres should be positioned manually.

IMPORTANT:

Do not try to move the louvres, when they are connected to a motor.

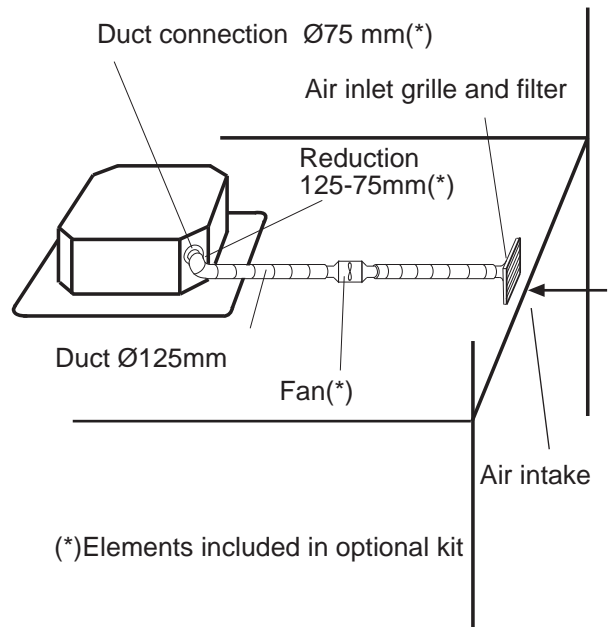
OPTIONS

FRESH AIR MAKE UP

- Side knockouts panel are provided. One to connect a fresh air inlet duct, and another to connect an air distribution duct to deliver air to an adjacent room.

INSTALLATION

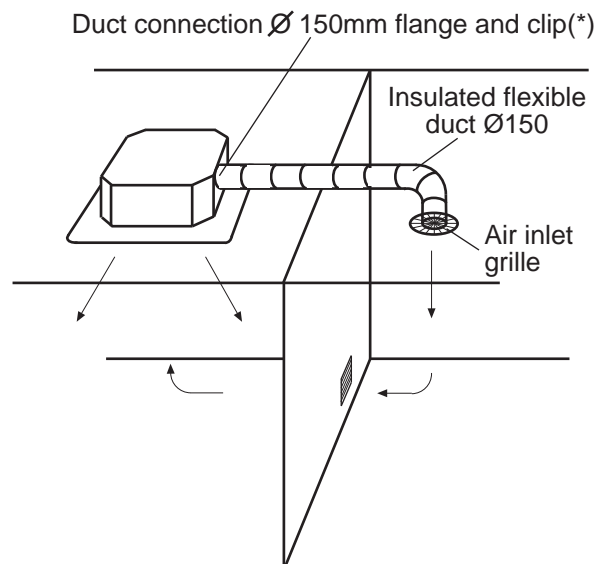
- Remove the 68 mm insulation material and cut out the prepunched side knockouts.
- Secure the duct connection flange to the unit. Conduits can be of flexible polyester type or corrugate aluminium, externally covered with anti-condensate material.
- Install a supplementary fresh air fan for the introduction of fresh air into the unit. The fan motor must be controlled by an ON-OFF switch.
- Fresh air flow must be less than 10% of the total air flow, to avoid operating problems. A speed controller should be installed in the supplementary fan motor, for adjusting the air flow.



AIR SUPPLY TO AN ADJACENT ROOM

INSTALLATION

- Remove the 150 mm insulation material and cut out the prepunched side knockouts. The two prepunched side knockouts must not be used at the same time to provide conditioned air to an adjacent room.
- Cut away the polystyrene around the inside edge of the opened panel, remove the polystyrene.
- Use a duct connection flange and a suitable duct.
- Air supply to an adjacent room requires that outlet corresponding with the duct is closed.
- An air inlet grille must be fitted (if possible near the floor) between the air conditioned room (where the unit is situated) and the adjacent room.
- Conduits can be of flexible polyester type or corrugate aluminium, externally covered with anti-condensate material. The duct length can be calculated by taking into account the pressure drop through the unit, using the following table.

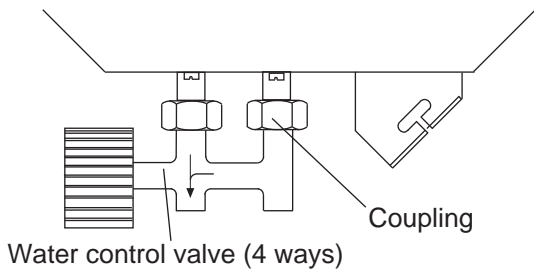


Air flow supplied to an adjacent room in m³/h, fresh air fan at high speed.

UNIT/MODELS		CWC 020 4P-CWC 030 4P			CWC 040 4P			CWC 050 4P		
Air flow	m ³ /h	175	100	25	200	100	25	250	125	25
Available pressure	Pa.	0	8	15	0	10	20	0	20	30

OPTIONS

WATER CONTROL VALVE KIT (2 AND 4 WAYS, ON/OFF AND PROPORTIONAL)

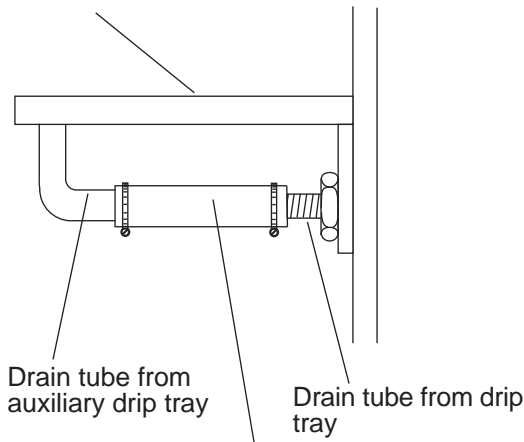


NOTE THE CORRECT POSITION OF THE WATER CONTROL VALVE

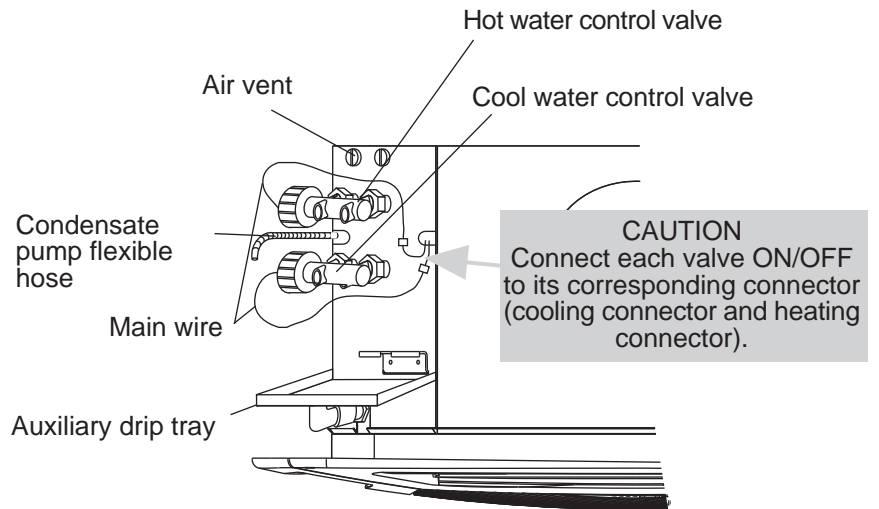
AUXILIARY DRIP TRAY

- Install the auxiliary drip tray as shown in the illustration.
- Connect the drain tube from drip tray to the auxiliary drip tray.
- The condensate drains from auxiliary drip tray will be pumped away.

Auxiliary drip tray



Connecting flexible hose



NOTE: Proportional valves, must be connected to a proportional flow regulation control (not included in optional kit).

FAULT ANALYSIS

PROBLEM	ACTION
1.- Unit not operating	<ul style="list-style-type: none"> • Check power is available at unit. • Check wiring. • Check remote control is functioning and set properly (if any).
2.- Indoor unit fan running to fast without apparent speed change	<ul style="list-style-type: none"> • Check the indoor unit filter is clean. • Check wiring • If problem persists then motor may be faulty.
3.- Condensate overflowing	<ul style="list-style-type: none"> • Check drip tray for blockage, and condensate drains away. • Check unit is level. • Check condensate pump is working. • Check service drain pipework.

POINTS TO KEEP IN MIND



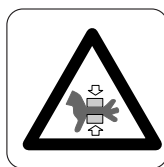
Abrasive surfaces



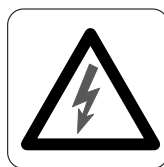
Low temperatures



High temperatures



Risk of injury with moving objects



Electrical voltage



Risk of injury with rotating objects

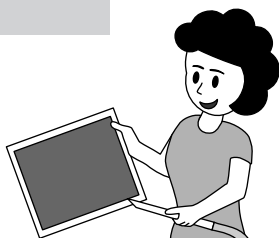
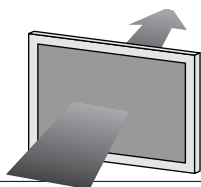
WARNING

Electric shock hazard can cause injury or death. Before attempting to perform any service or maintenance on the unit, turn OFF the electrical power, and check that the fan has stopped.

The air filter cleaning operations do not require technical service; however when an electrical or mechanical operation is required call an Engineer.

FILTER CLEANING

Check the air filter and make sure it is not blocked with dust or dirt.



If the filter is dirty, wash it in a bowl with neutral soap and water, drying it in the shade before inserting it in the unit.

Standard Guidelines to Lennox Refac equipment

All technical data contained in these operating instructions including the diagrams and technical description remains the property of Lennox Refac and may not be used (except for the purpose of familiarising the user with the equipment), reproduced, photocopied, transferred or transmitted to third parties without prior written authorisation from Lennox Refac.

The data published in the operating instructions is based on the latest information available. We reserve the right to make modifications without notice.

We reserve the right to modify our products without notice without obligation to modify previously supplied goods.

These operating instructions contain useful and important information for the smooth operation and maintenance of your equipment.

The instructions also include guidelines on how to avoid accidents and serious damage before commissioning the equipment and during its operation and how to ensure smooth and fault-free operation. Read the operating instructions carefully before starting the equipment, familiarise yourself with the equipment and handling of the installation and carefully follow the instructions. It is very important to be properly trained in handling the equipment. These operating instructions must be kept in a safe place near the equipment.

Like most equipment, the unit requires regular maintenance. This section concerns the maintenance personnel and management.

If you have any queries or would like to receive further information on any aspect relating to your equipment, do not hesitate to contact us.

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