

LENNOX[®]

INSTALLATION-OPERATION
&
MAINTENANCE MANUAL



PROVIDING **GLOBAL SYSTEM SOLUTIONS**

**CHILLED
WATER
CASSETTE**

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

TABLE OF CONTENTS

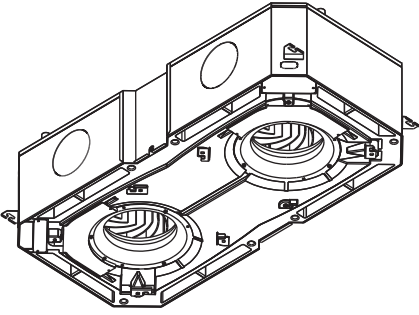
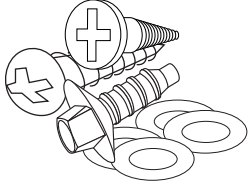
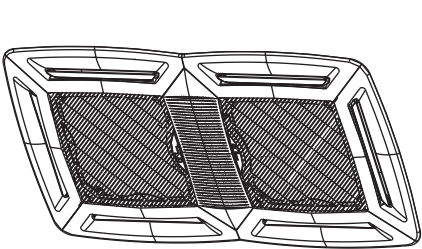
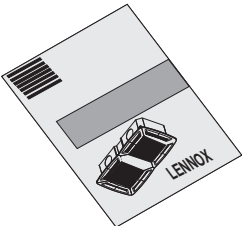
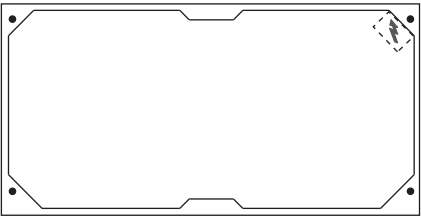
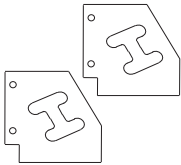
CONTENTS	PAGE
• PRODUCT RANGE	2
• GENERAL INFORMATION	3
• SPECIFICATION	4-5
• COOLING CAPACITIES	6
• HEATING CAPACITIES	7
• WATER PRESSURE DROP	8
• ELECTRICAL CONNECTIONS	8
• UNIT DIMENSIONS□	9
• DRAIN PIPEWORK□	10
• INSTALLATION□	10-11
• CONTROL PANEL□	12
• INSTALATION OF DIFFUSER AND INLET GRILLE	13
• MAINTENANCE□	14-15
• AIR DISTRIBUTION□	15
• OPTIONS□	16-17
• FAULT ANALYSIS□	17
• POINTS TO KEEP IN MIND	18

PRODUCT RANGE

MODEL	V / Ph / 50 Hz	NOMINAL CAPACITY W	
		COOLING	HEATING
CWC 070-2P	230 V - 1Ph	6750	9150
CWC 090-2P	230 V - 1Ph	8450	10600
CWC 070-4P	230 V - 1Ph	5800	6450
CWC 090-4P	230 V - 1Ph	7050	8650

Units 2P : 2 pipes system
Units 4P : 4 pipes system

PACKING CONTENT

 <p>Cassette unit</p>	 <p>Screws and washers</p>
 <p>Difusser (*)</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, and filtering the air in the process. Electrical heating elements are available as an option on all units.

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, two, 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 automatic or 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.

ELECTRIC CIRCUIT

The electrical panel is provided with a terminal block which provides connection of mains power .

OPTIONS

- Electric heater.
- 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.
- Thermostat.
- Float switch.

SPECIFICATIONS

2 PIPES SYSTEM

UNIT		CWC 070-2P	CWC 090-2P
Total cooling capacity	W(1)	6750	8450
Sensible cooling capacity	W(1)	5190	6600
Chilled water flow rate	l/h(1)	1160	1450
Chilled water pressure drop	kPa(1)	24	28
Water content	l	42	54
Total heating capacity	W(2)	9150	10600
Hot water flow rate	l/h(2)	1160	1450
Hot water pressure drop	kPa(2)	24	28
Total heating capacity	W(3)	14930	17300
Hot water flowrate	l/h(3)	1280	1490
Hot water pressure drop	kPa(3)	28	29
Air flow (max. / min)	m ³ /h	1400 / 1020	1650 / 1200
Sound level (Lp)	dB(A)(*)	47/41	51/42
Fan power consumption	W(4)	0.18	0.2
Running current	A(4)	0.8	0.9
Electric heater power consumption	KW	4	4
Running current with electric heater	A	17.4	17.4
Diffuser dimensions	HxLxW(mm)	48x1320x720	48x1320x720
Cassette dimensions	HxLxW(mm)	298x1175x575	298x1175x575
Diffuser weight	Kg	5	5
Cassette weight	Kg	43	45
Pipe connections		F 3/4" G	F 3/4" 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: 50° C

(3) Inlet air temperature: 20°C BS
Water temperature: 70/60° C

(4) Fan high speed.
Power supply 230V-1ph-50Hz 230V-1ph-50Hz

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

SPECIFICATIONS

4 PIPES SYSTEM

UNIT		CWC 070-4P	CWC 090-4P
Total cooling capacity	W(1)	5800	7050
Sensible cooling capacity	W(1)	4350	5270
Chilled water flow rate	l/h(1)	1000	1210
Chilled water pressure drop	kPa(1)	11	25
Water content	l	42	54
Heating capacity	W(2)	6450	8650
Hot water flow rate	l/h(2)	555	745
Hot water pressure drop	kPa(2)	24	17
Air flow (max. / min)	m ³ /h	1400 / 1020	1650 / 1200
Sound level (Lp)	dB(A)(*)	47/41	51/42
Fan power consumption	W(3)	0.18	0.2
Running current	A(3)	0.8	0.9
Electric heater power consumption	KW	4	4
Running current with electric heater	A	17.4	17.4
Diffuser dimensions	HxLxW(mm)	48x1320x720	48x1320x720
Cassette dimensions	HxLxW(mm)	298x1175x575	298x1175x575
Diffuser weight	Kg	5	5
Cassette weight	Kg	43	45
Pipe connections		Cold water Hot water	F 3/4" 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 230V-1ph-50Hz

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

COOLING CAPACITIES

EXAMPLE: For the unit CWC 090-2P with chilled water rise of $\Delta T = 5$ °C, chilled water temperature 7 °C and entering air temperature 27 °C DB/19 °C WB, according to the diagram the cooling capacity is:

Total cooling capacity = 8450 W

Sensible cooling capacity = 6600 W

To estimate the water flow use the formula $Q_w = \frac{P_t \times 0.86}{\Delta T}$

Q_w = Water flow (l/h)

P_t = Total cooling capacity (W)

ΔT = Inlet water temperature - outlet water temperature (°C)

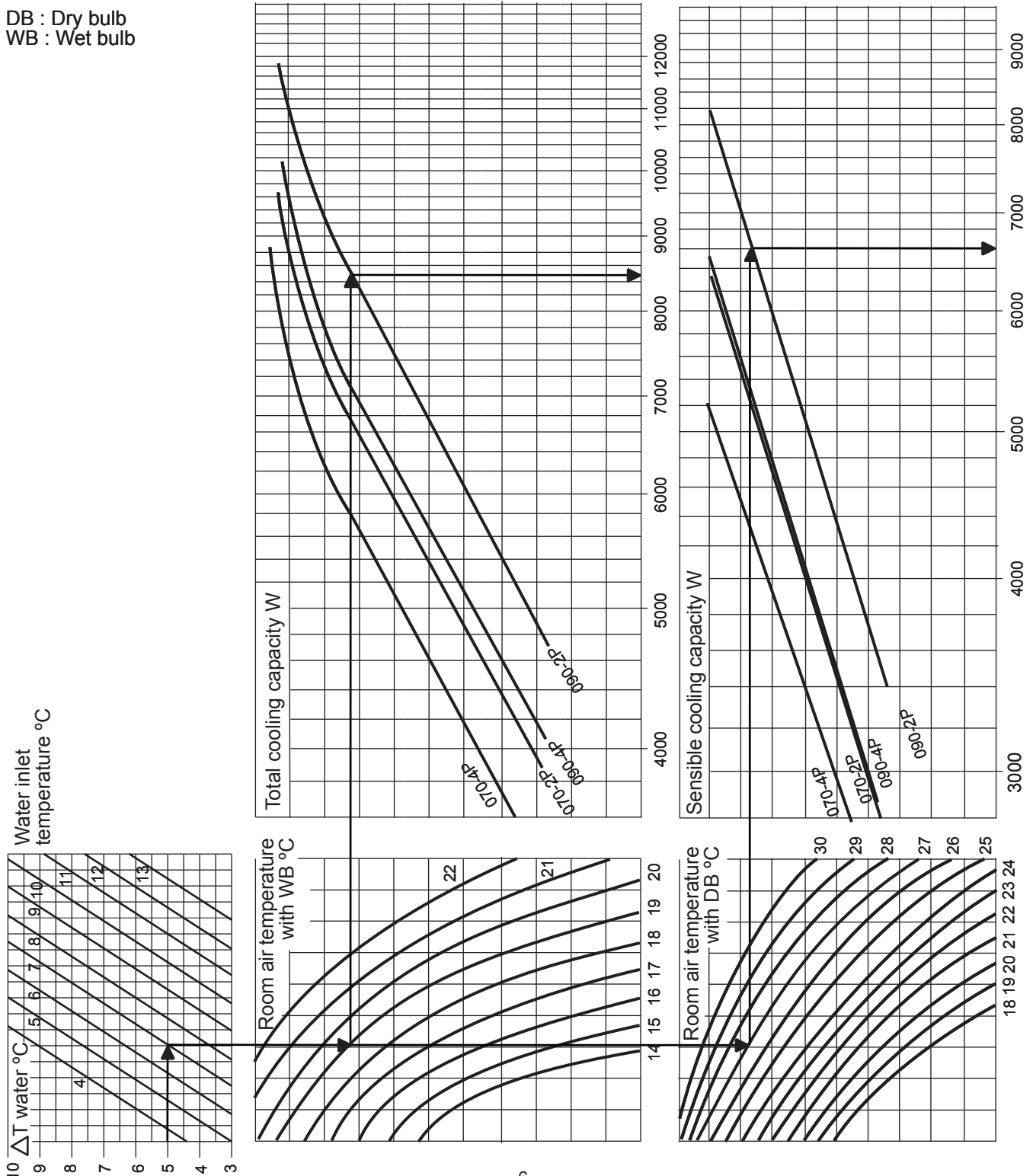
For the example given $Q_w = 1453$ l/h and water pressure drop in page 8 is 28 Kpa.

CORRECTION FACTORS

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:

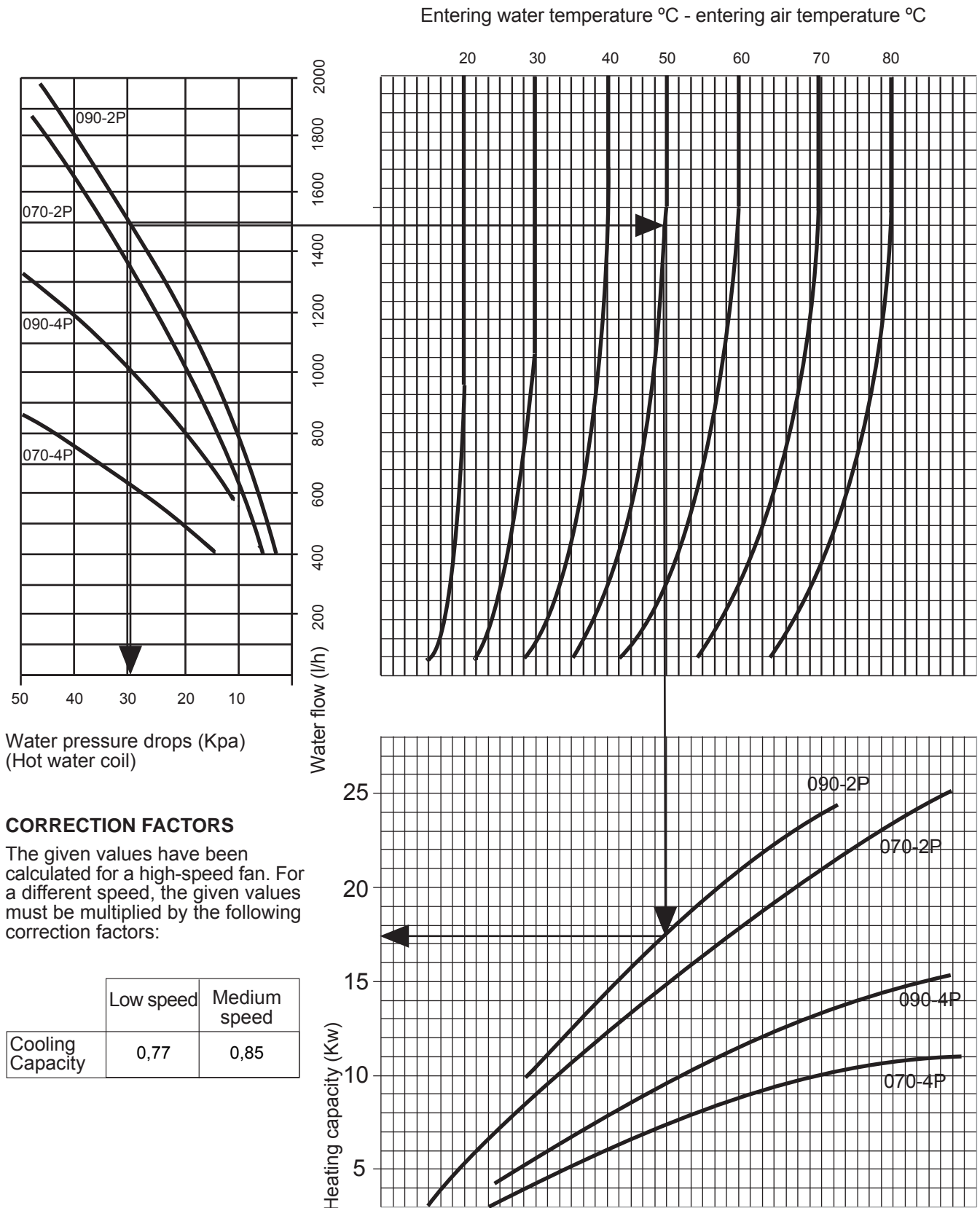
	Low speed	Medium speed
Cooling Capacity	0,8	0,9

DB : Dry bulb
WB : Wet bulb



HEATING CAPACITY

EXAMPLE: For the unit CWC 090-2P, with entering water temperature - entering air temperature equal to 50 °C and water flow 1490 l/h in the diagram we get:
 Total heating capacity = 17300 W
 Water pressure drops = 29 KPa
 (high speed fan)



Water pressure drops (Kpa)
 (Hot water coil)

CORRECTION FACTORS

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
Cooling Capacity	0,77	0,85

2 PIPES SYSTEM

FLOW RATE l/h	PRESSURE DROP Kpa	
	CWC 070-2P	CWC 090-2P
800	14	9
900	16	11
1000	19	14
1100	22	16
1160	24	18
1200	25	19
1300	28	22
1400	32	25
1450	33	28
1500	35	29
1600	38	31
1700	---	35
1800	---	38
1900	---	42
2000	---	46

4 PIPES SYSTEM

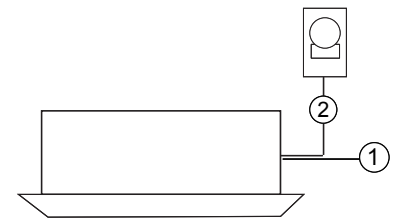
FLOW RATE l/h	PRESSURE DROP Kpa			
	COOL WATER		HOT WATER	
	CWC 070-4P	CWC 090-4P	CWC 070-4P	CWC 090-4P
400	---	---	14	---
500	---	---	20	---
555	---	---	24	---
600	---	---	27	11
700	---	---	35	15
745	---	---	41	17
800	7	14	43	19
900	9	16	53	24
1000	11	19	---	29
1100	15	22	---	34
1200	16	25	---	40
1210	16	25	---	40
1300	18	28	---	46
1400	21	32	---	---
1500	24	35	---	---
1600	27	38	---	---

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

As the percentage of glycol increases the standard pump flow decreases due to the increased pressure characteristics. This means that the cooling and heating duties will decrease. As a result the pressure drop must be multiplied by the coefficient shown in the table below.

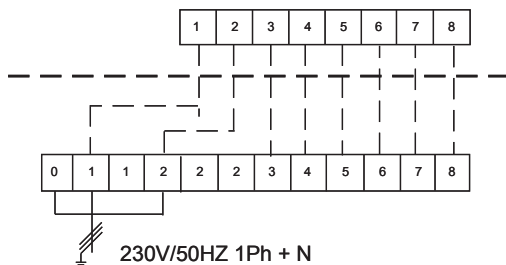
ELECTRICAL CONNECTIONS

MODEL	VOLTAGE 50Hz	N° OF WIRES X SECTION			
		COOL WATER		COOL AND HOT WATER	
		①	②	①	②
CWC070-2P / CWC090-2P	230 V / 1Ph	3 X 1,5mm ²	7 X 1,5mm ²	3 X 1,5mm ²	8 X 1,5mm ²
CWC070-4P / CWC090-4P	230 V / 1Ph	---	---	3 X 1,5mm ²	7 X 1,5mm ²



- ① Power supply
- ② Thermostat connections

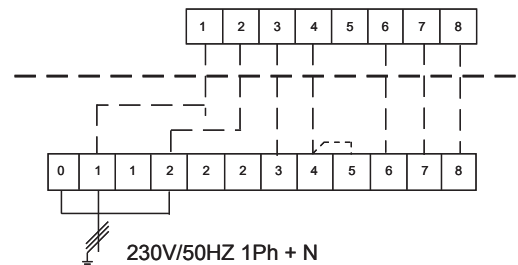
CHILLED WATER AND HOT WATER CWC 070-2P / CWC 090-2P



THERMOSTAT RC-311-X2

CASSETTE UNIT

CHILLED WATER CWC 070-4P / CWC 090-4P CWC 070-2P / CWC 090-2P

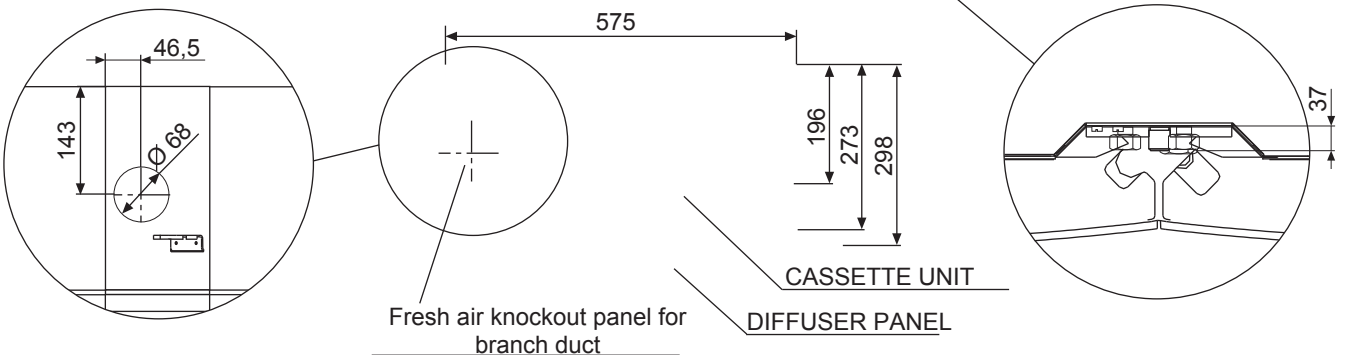
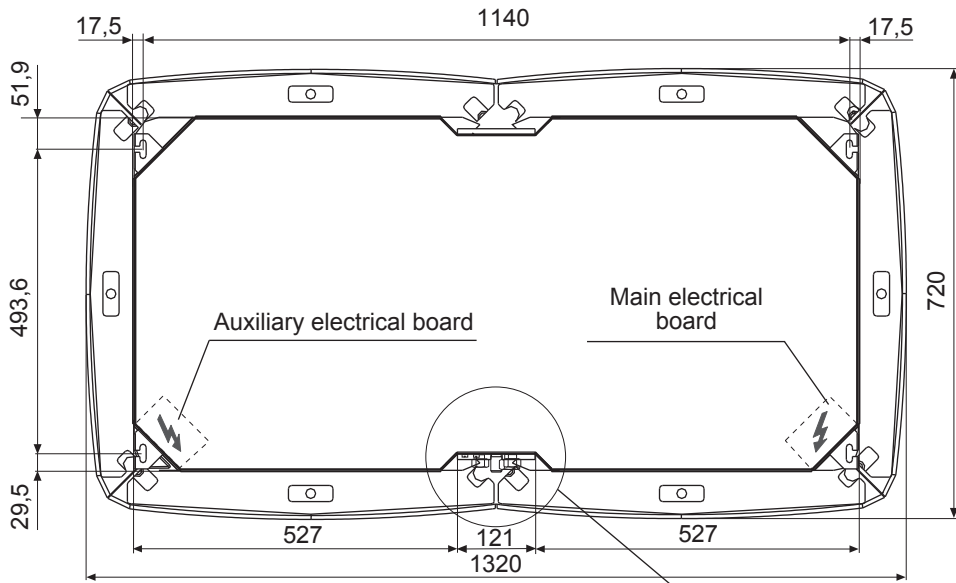
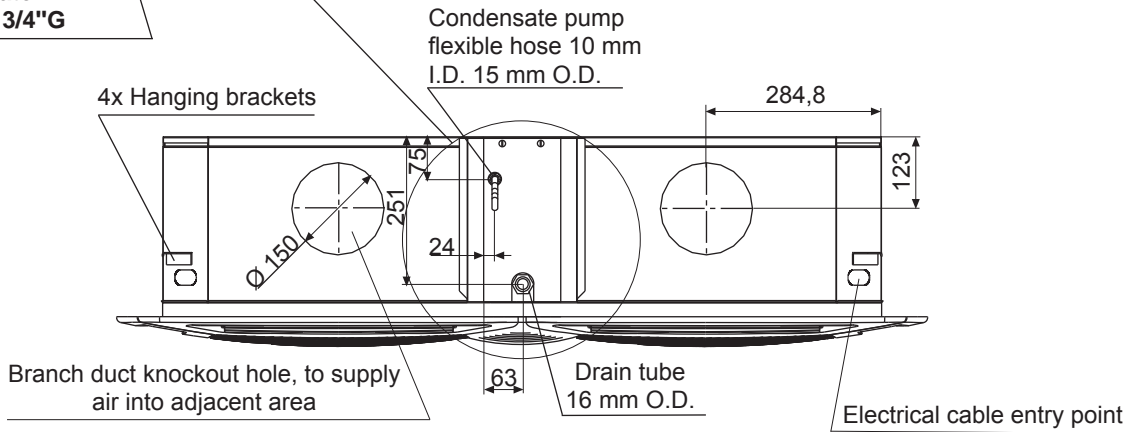
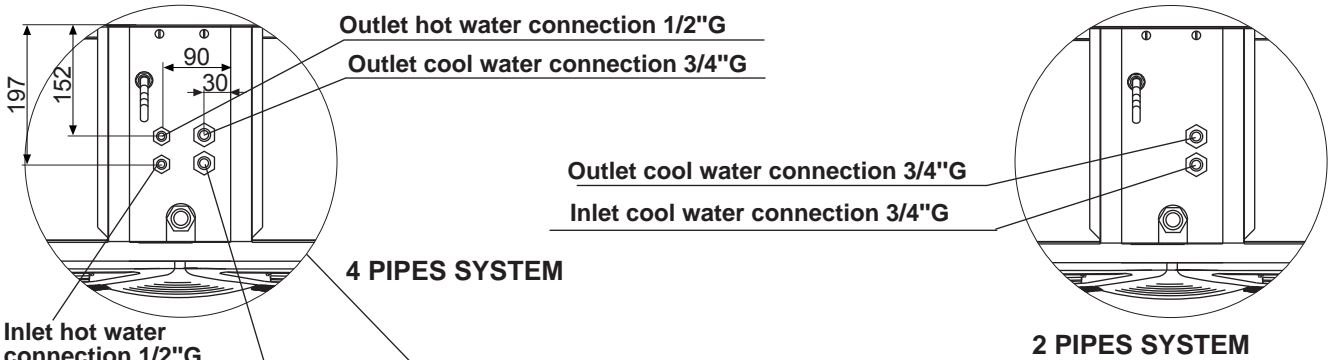


POWER SUPPLY WIRING

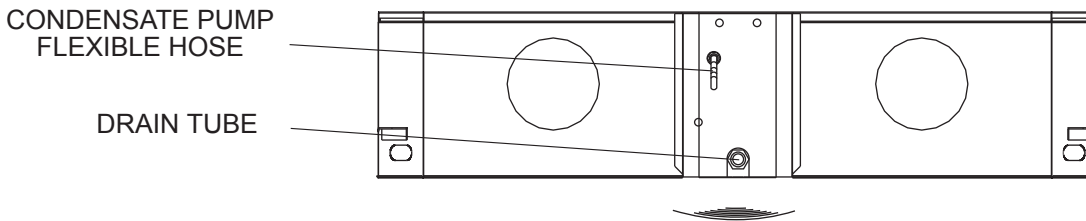
This equipment must be installed in accordance with national regulations. A suitable means of disconnecting all supply poles must be provided in the power supply wiring. The power supply must incorporate suitably rated fused or circuit breaker protection.



UNIT DIMENSIONS (mm.)

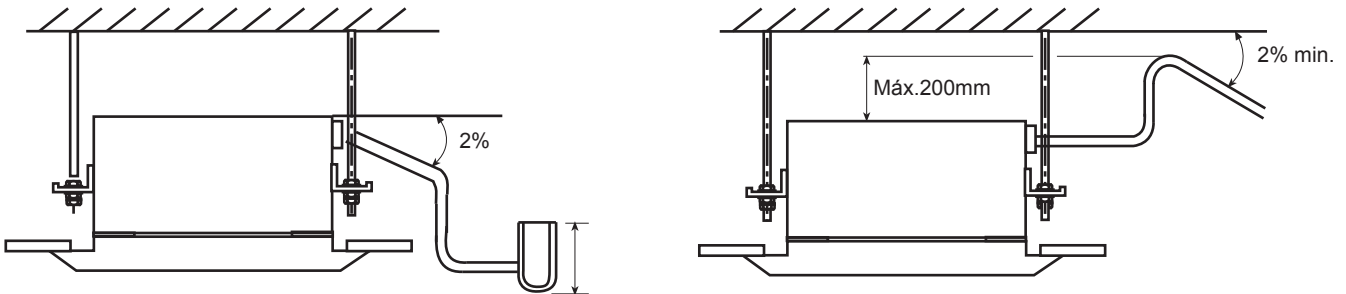


DRAIN PIPEWORK.



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.

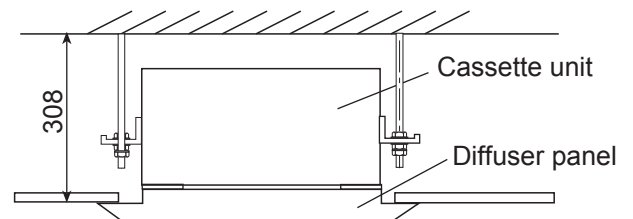


DRAIN TUBE

- 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.

INDOOR UNIT INSTALLATION METHOD

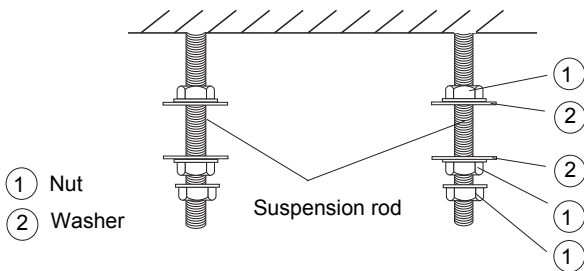
- 1.The unit should be positioned centrally within the room. The ceiling must be horizontal to ensure that the unit is on level. The unit must be installed in a position where there is sufficient strength in the structure to support the weight of the unit. The false ceiling must have at less a height of 308 mm.



- 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.

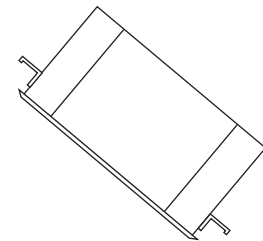
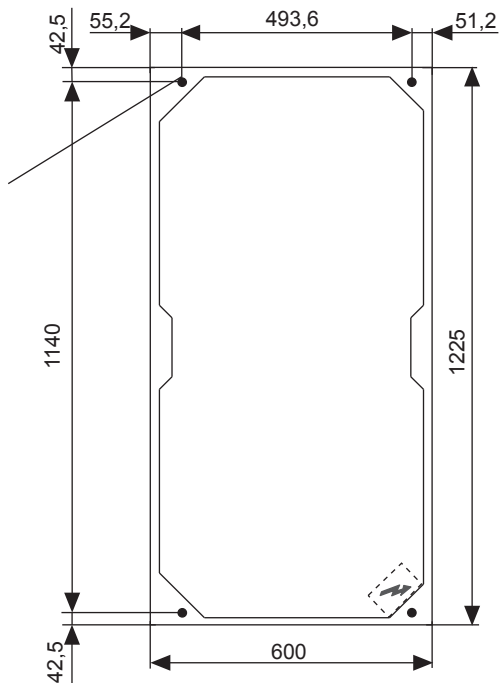
INDOOR UNIT INSTALLATION METHOD

- Cut the false ceiling, to a maximum dimension of 625x1225 mm. For a panelled ceiling removes two panels of 600x600 or one of 600x1200mm.
- 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 are required. When the unit is fixed it is not easy to change position.

SETTING UP TEMPLATE



- The water connections should be positioned, before that the unit is installed.

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

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

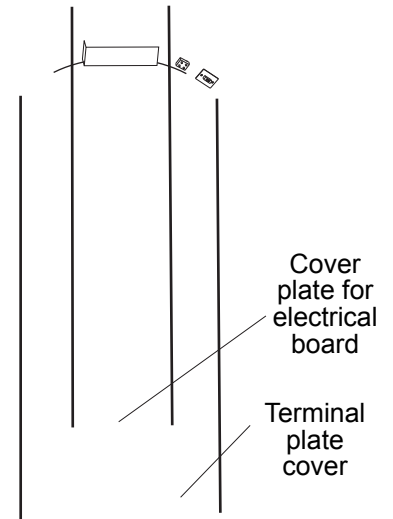
WARNING

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.

Cover plate for
auxiliary electrical
board



ELECTRICAL WIRING DIAGRAM

For electrical connection refer to wiring diagram in the unit.

③

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

INSTALLATION OF DIFFUSER AND INLET GRILLE

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 eight 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.

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.

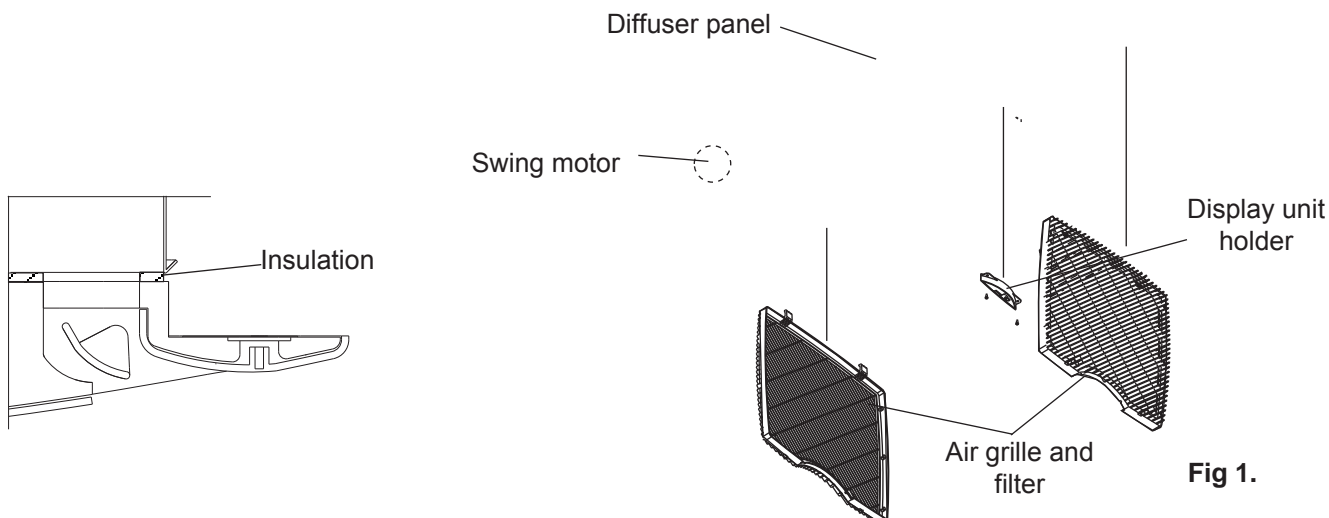
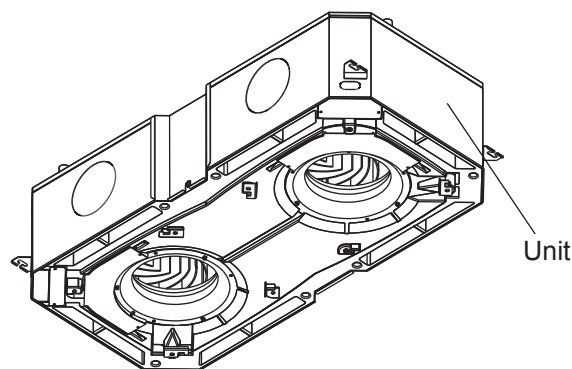


Fig 1.

INSTALLATION OF DISPLAY UNIT HOLDER

The display holder includes the infrared receiver (when the remote controller is of this type) and indicators. (Refer to the corresponding infrared controller manual)

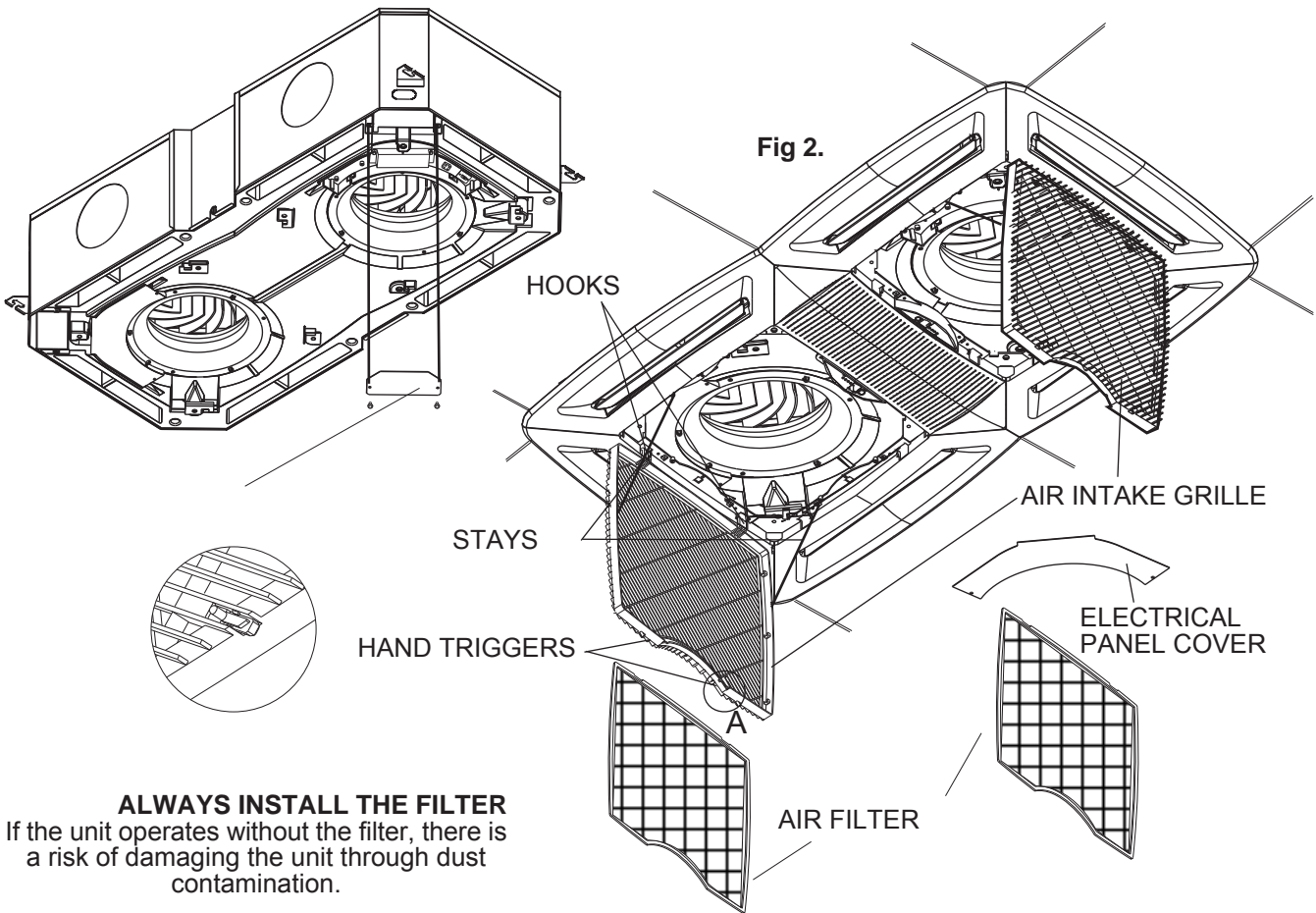
The infrared receiver panel is connected to the electrical board by means of wires.

1. - The display unit holder is mounted by two screws, on any side of the diffuser panel (Fig 1).
2. - The swing motor should now be connected with the power supply wires (it depends on versions).

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 (Fig 2).
- 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 (Fig 2).



ALWAYS INSTALL THE FILTER

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

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 (Fig. 2)

- 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.

ACCESS TO ELECTRICAL COMPONENTS (Fig. 2 & 3)

Access to terminal plate

The terminal plate can be accessed by removing the air intake grille and unscrewing the terminal cover. (Fig. 2)

Access to electrical panel

To gain access to the electrical board follow these instructions:

- 1.- Disconnect the infrared receiver display unit (if fitted), and the swing motor wire.
- 2.- Disassemble the diffuser panel by removing the screws that attaches it to the unit.
- 3.- Remove the cover of the electrical panel, where is the PCB.

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.

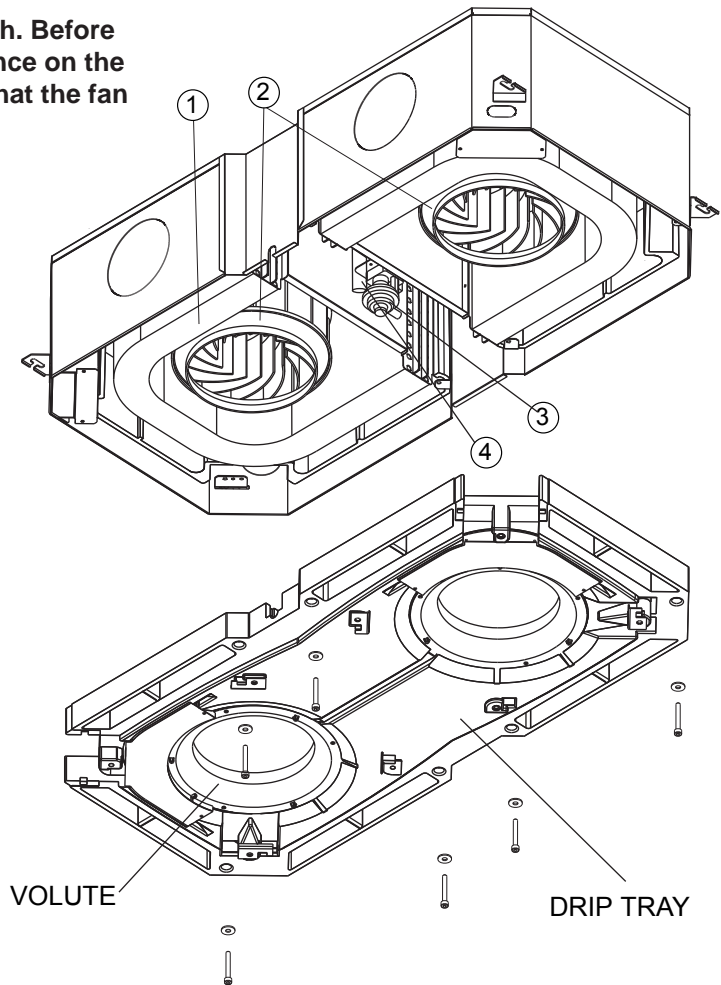
ACCESS TO INTERNAL COMPONENTS

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.

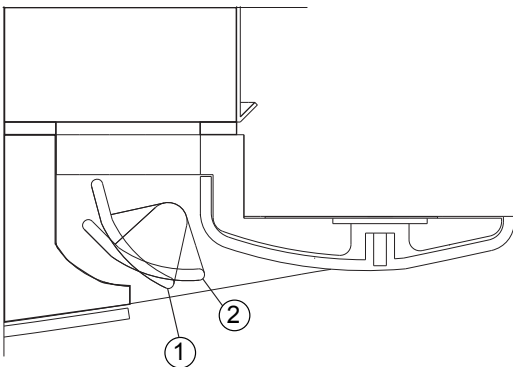
DISASSEMBLING DRIP TRAY

- Remove the air intake grille and filter.
- Disconnect the infrared receiver display unit, and the swing motor wire.
- Disassembly the diffuser panel by removing the screws that attach it to the unit.
- Detach the two volutes by removing their screws, and the two electrical panel covers.
- The drip tray can be taken apart by removing its screws. As shown in the figure.

- ① Coil
- ② Fan motor
- ③ Condensate pump
- ④ Float switch



DIRECCIONAMIENTO DE AIRE



- ① Louvre position for correct air flow in heat pump mode.
- ② Louvre position for correct air flow in cooling only mode.

IMPORTANT:

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

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

In **cooling only mode** the louvres are positioned to distribute air outwards from the discharge, which allow airflow close to the ceiling.

In **heat pump 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.

Louvres can be placed on intermediate positions by using the remote control; as well the louvres may be set to move continuously, sweep mode. (For more information, see the remote control manual.)

OPTIONS

OPTIONAL ELECTRIC HEATER TECHNICAL DATA

MODELS	POWER
070-2P / 090-2P	2,5 Kw / 4 Kw

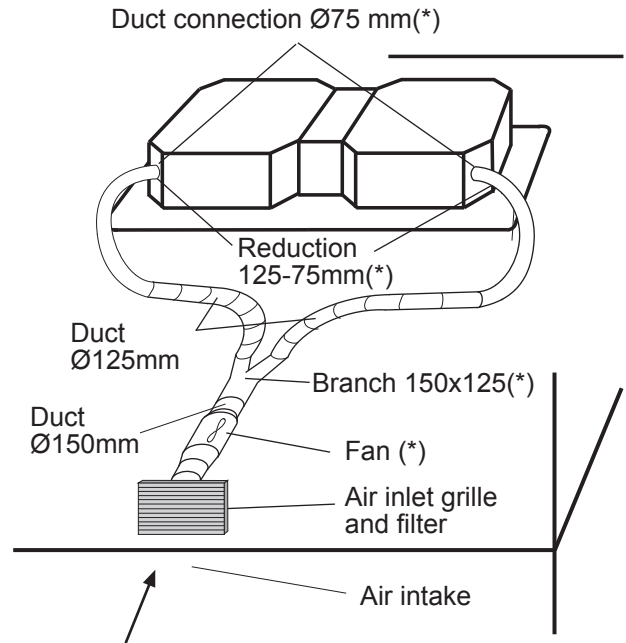
230 V 1Ph -50Hz
230 V / 400 V 3Ph -50Hz

- 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.

FRESH AIR MAKE UP

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.

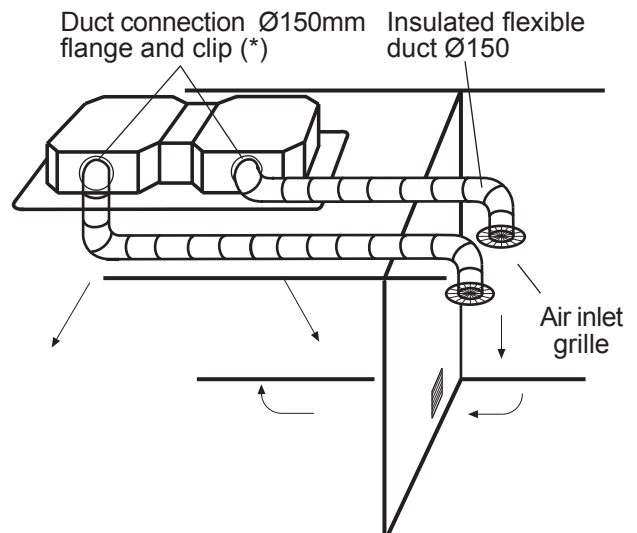


(*)Elements included in optional kit

AIR SUPPLY TO AN ADJACENT ROOM

INSTALLATION

- Remove the 150 mm insulation material and cut out the prepunched side knockouts. Do not use the same fan to provide air conditioned to both ducts.
- 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.

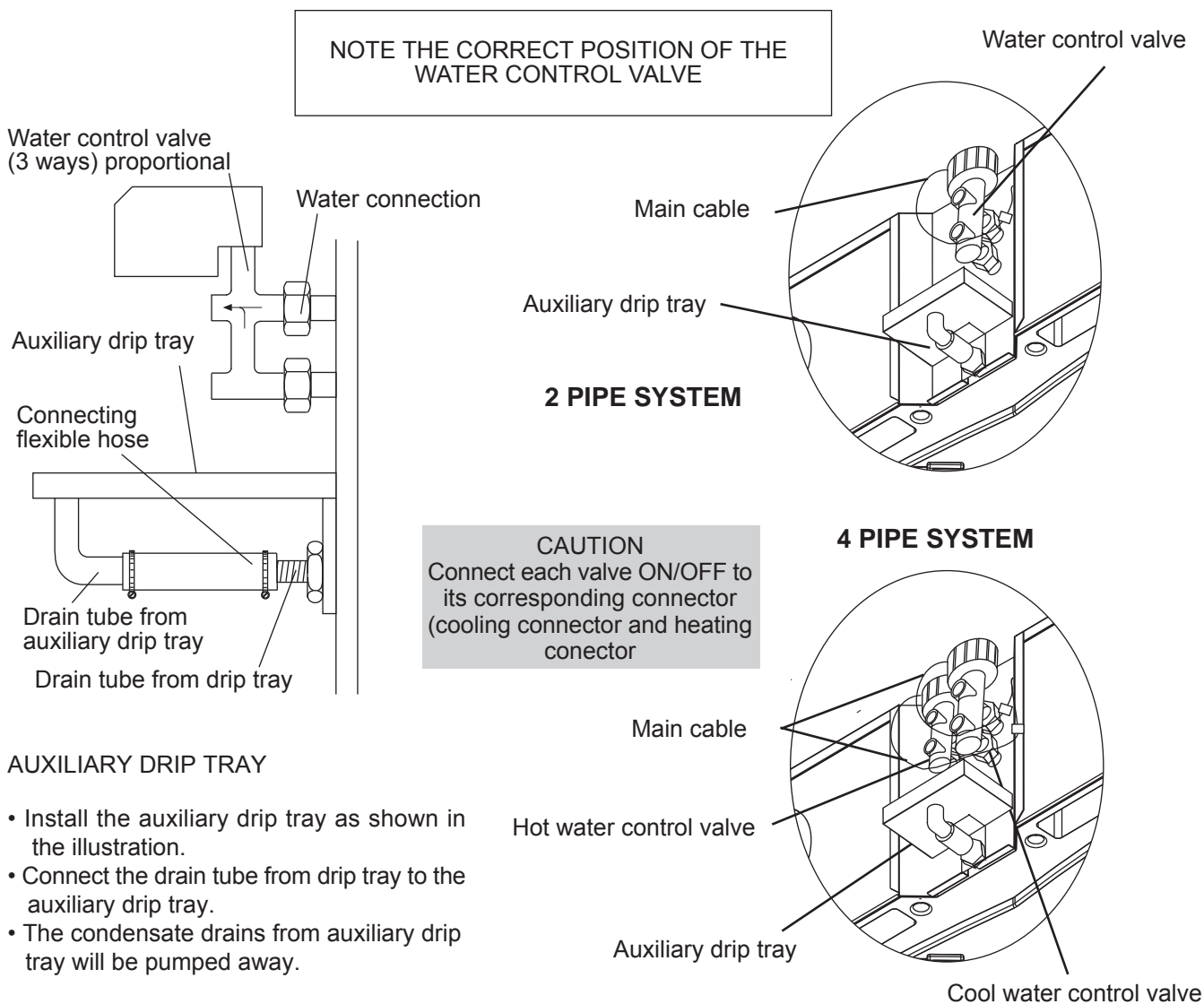


Air flow supplied to an adjacent room in m³/h, fresh air fan at high speed.

UNIT/MODELS		CWC 070-2P / CWC 070-4P			CWC 090-2P / CWC 090-4P		
Air flow	m ³ /h	400	200	50	500	250	50
Available pressure	Pa.	0	10	20	0	20	30

OPTIONS

WATER CONTROL VALVE KIT (2 AND 3 WAYS, ON/OFF AND PROPORTIONAL)



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.

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 fans running too 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



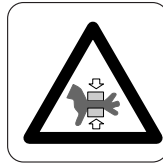
Abrasive surfaces



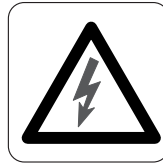
Low temperatures



High temperatures



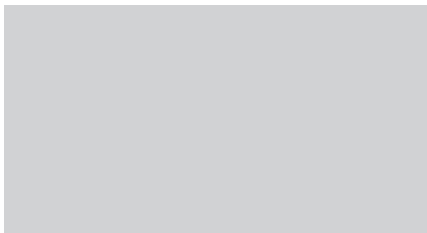
Risk of injury with moving objects



Electrical voltage

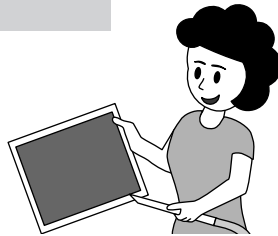
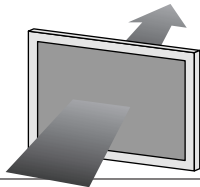


Risk of injury with rotating objects



FILTER CLEANING

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



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

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

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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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