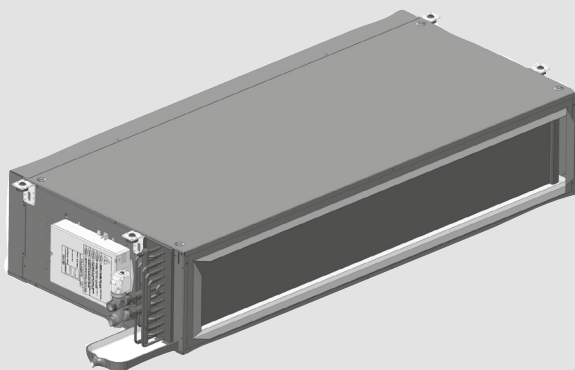




**INSTALLATION, OPERATING AND
MAINTENANCE INSTRUCTIONS**

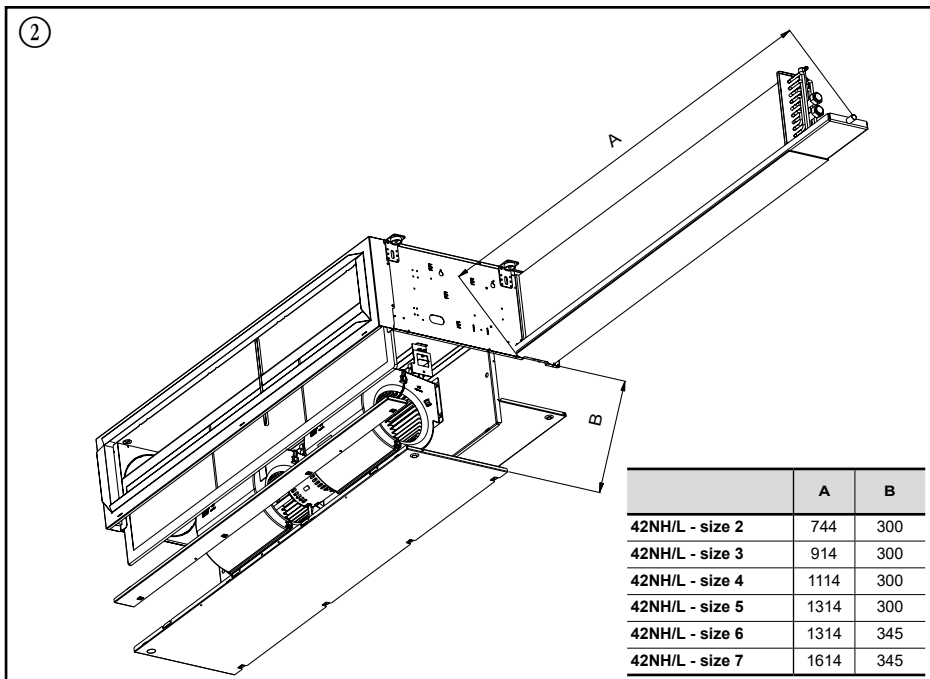
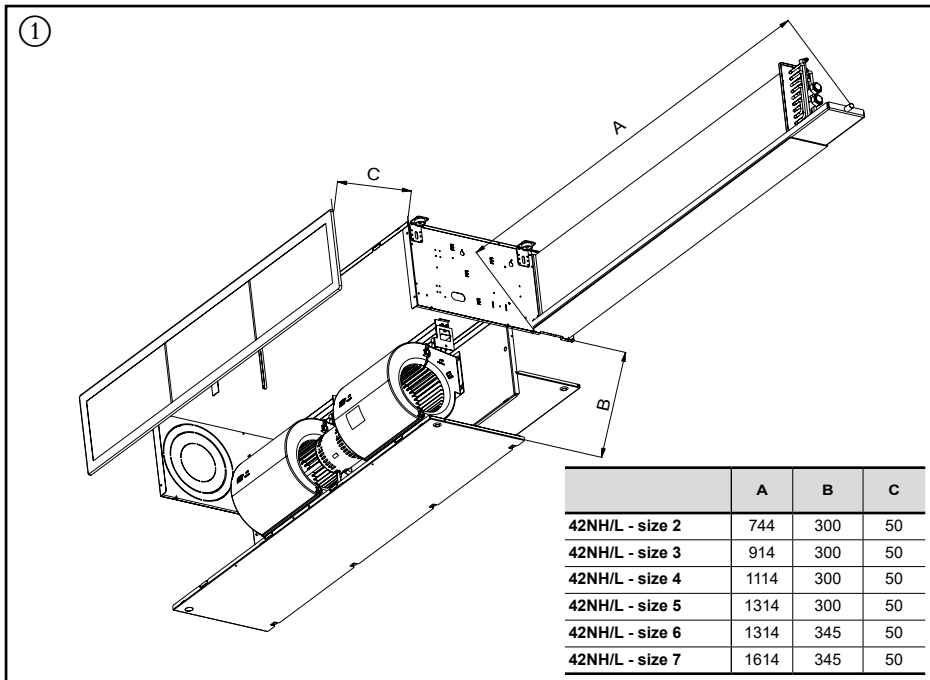


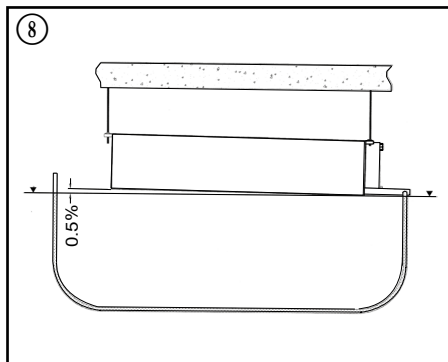
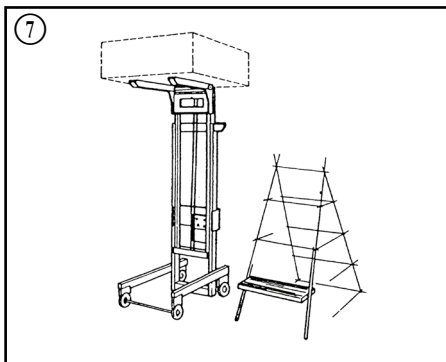
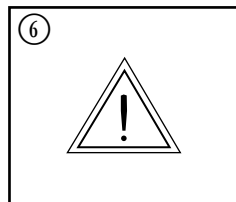
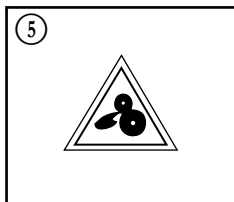
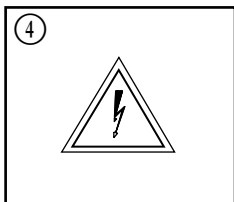
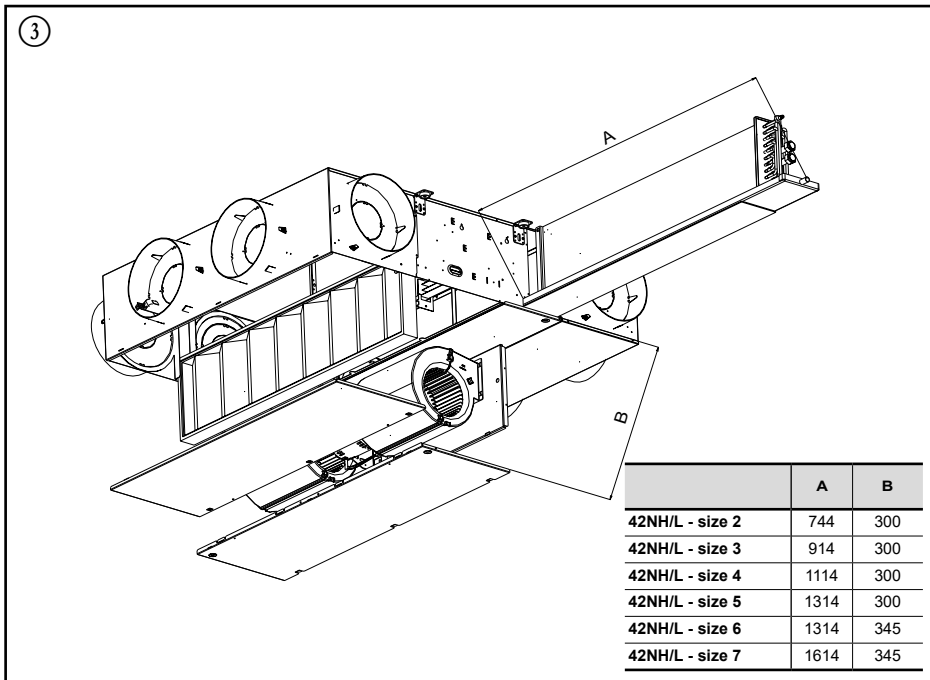
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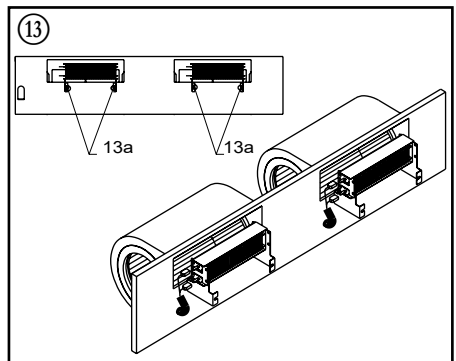
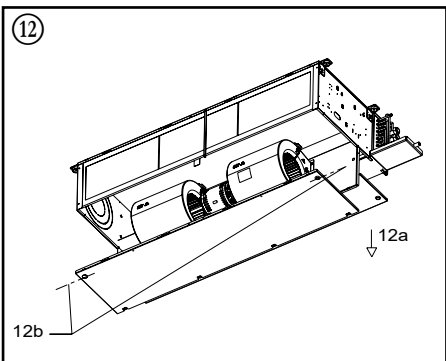
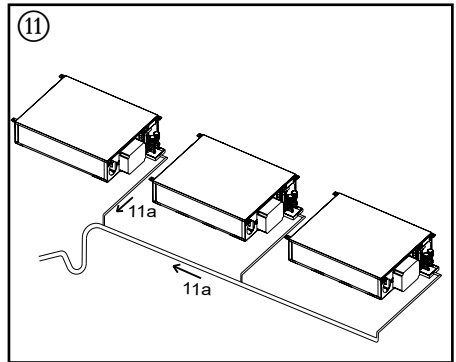
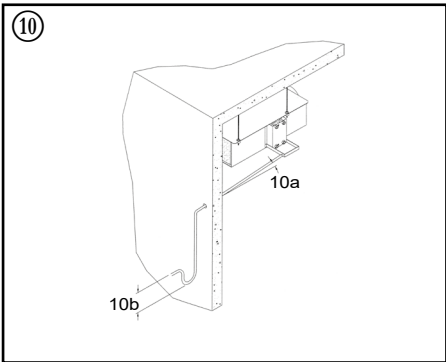
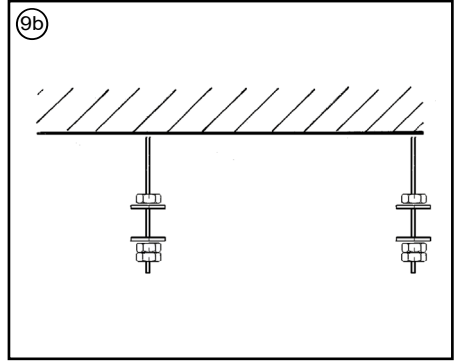
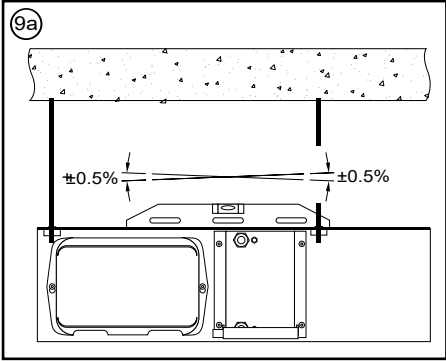
42NL & 42NH

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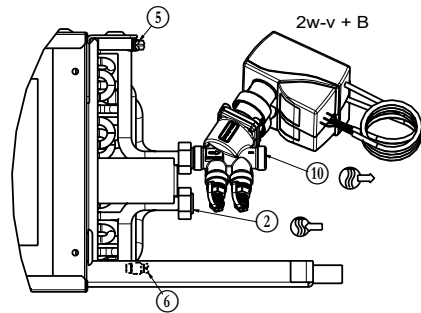
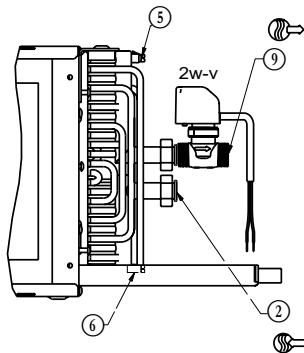
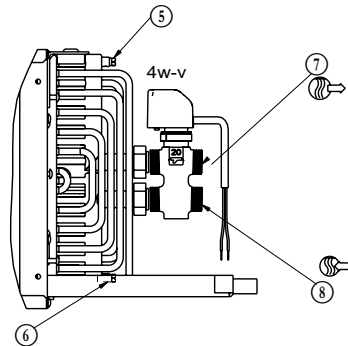
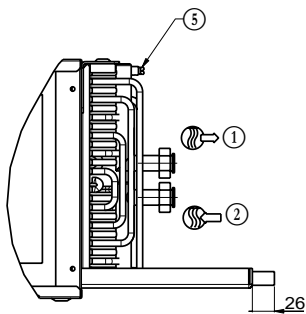
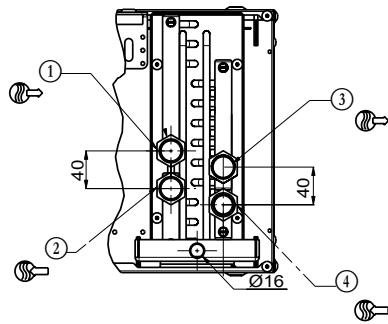
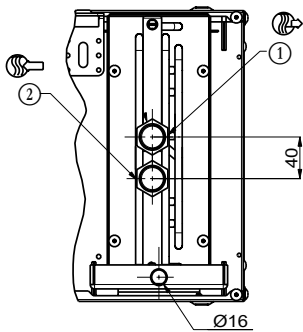
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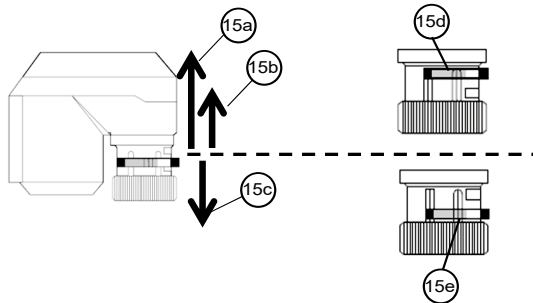




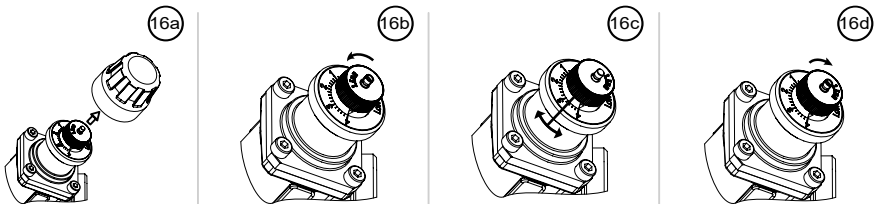
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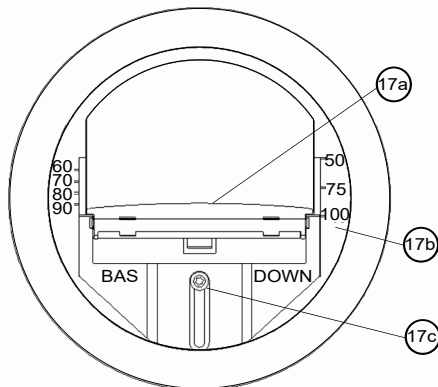
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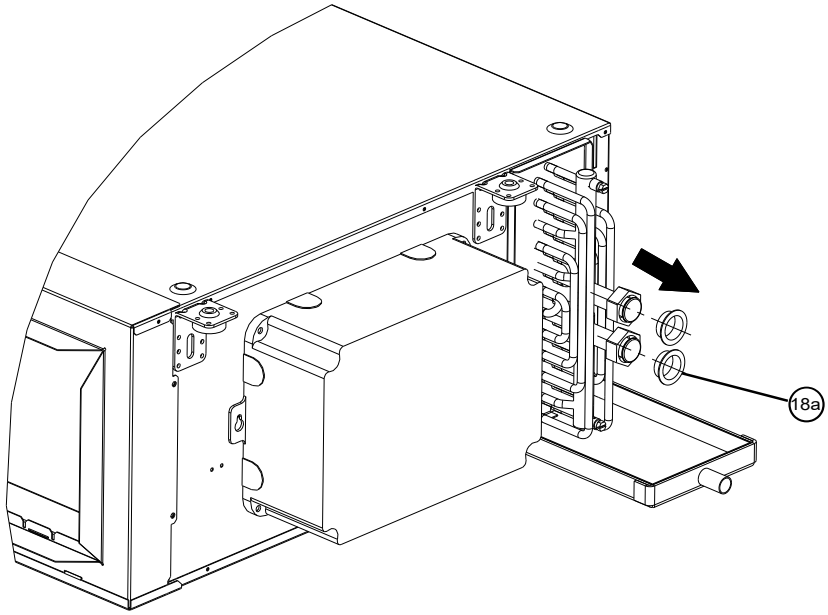


Figure titles and legends:

- 1 Clearance in mm without rectangular flange inlet
 - 2 Clearance in mm with rectangular flange inlet
 - 3 Clearance in mm with small or large plenum
 - 4 Electrical danger pictogram
 - 5 Caution hand hazard pictogram
 - 6 General danger pictogram
 - 7 Lifting unit for installation in a false ceiling
 - 8/9 Levelling the unit
 - 10 Condensate drain pipe
 - 10a 20 mm/m fall in horizontal pipe run
 - 10b 50 mm siphon
 - 11 Several units connected to one condensate collector
 - 11a 20 mm/m fall
 - 12 Fan assembly removal
 - 12a Removing fan access panel
 - 12b Position of torx screws
 - 13 Electric heater removal
 - 13a Location of screw
 - 14 Coil inlet/outlet positions, all sizes
 - 1 Cooling water outlet (4 and 2-pipe coil)
 - 2 Cooling water inlet (4 and 2-pipe coil)
 - 3 Heating water outlet (4-pipe coil)
 - 4 Heating water inlet (4-pipe coil)
 - 5 Air vent
 - 6 Water drain
 - 7 Water outlet of 4w-v
 - 8 Water inlet of 4w-v
 - 9 Water outlet of 2w-v
 - 10 Water outlet of 2w-v + B
 - 2w-v Two-way valve
 - 2w-v+B Two-way valve and balancing function
 - 4w-v Four-way valve (= Three-way valve with integral by-pass)
- Connections for two-way valve with balancing function :
- Size 2 and 3 : 3/4" diameter
 - Size 4 and 5 : 1" diameter
- Connections for other valves and coils:
- Size 2, 3, 4 and 5 : 1/2" diameter
 - Size 6 and 7 : 3/4" diameter
- 15 Meaning of wires - proportional valve actuator (not applicable for valves with balancing functions)
 - 15a Black wire (230 V valve actuator), actuator rod rising
 - 15b Green wire (24 V valve actuator), actuator rod rising
 - 15c Brown wire, Actuator rod lowering
 - 15d Actuator rod in high position
 - 15e Actuator rod in low position
 - 16 Waterflow adjustment of optional 2-way valve with balancing function
 - 16a Control knob removal
 - 16b Knurled nut untightening
 - 16c Waterflow adjustment (white knob)
 - 16d Knurled nut tightening in initial position
 - 17 Optional airflow controller
 - 17a Air Damper
 - 17b Fresh airflow setting (in m³/h)
 - 17c Airflow adjustment screw
 - 18 Coil protective caps removal
 - 18a Protective caps (factory fitted)

1 - PRECAUTIONS

Only specially trained and qualified technicians and installers who have been fully trained on the product concerned are authorized to install, to commission and service this equipment.

In particular it is obligatory to disconnect all power supplies to the unit and its accessories before carrying out any work.

1.1 - Operating limits

1.1.1 - Cooling mode

Cooling mode - Operating Limits	
Water circuit	Min. inlet Temperature >5°C ethylene / propylene glycol rate < 40% Water side pressure < 15,5 bar (1550 kPa)
Ambient temperature and humidity	T < 27°C / 65% relative humidity or humidity weight < 14,7 g/kg dry air
Supply air temperature	T > 12°C with maximum ambient humidity conditions (14,7 g/kg dry air)

1.1.2 - Heating mode

Heating mode - Operating Limits	
Water circuit	Max. inlet Temperature < 80°C ethylene / propylene glycol rate < 40% Water side pressure < 15,5 bar (1550 kPa)
Ambient temperature and humidity	T < 40°C
Supply air temperature	T < 60°C with supply plenum and spigots application

1.1.3 - Operating environment

The 42NH / 42NL has been designed for indoor application in 'urban' conditions having a non-corrosive, dust-free and non-marine environment.

The concentrations of the following chemicals must not be exceeded in any event:

- SO₂ < 0.02 ppm
- H₂S < 0.02 ppm
- NO, NO₂ < 1 ppm
- NH₃ < 6 ppm
- N₂O < 0.25 ppm

Do not install a unit where flammable gases or products of an acidic or alkaline character may be present. The copper/aluminium coil or components inside the unit could suffer irreparable corrosion damage in their presence.

1.1.4 - Recommended coil water quality

At installation handover, and then periodically every year, it is advised to analyse the water for bacteria (detection of ferro-bacteria, H₂S-producing and sulphate-reducing bacteria) and chemicals (in order to avoid problems due to corrosion and scaling).

The water circuit must include all the necessary elements for the treatment of the water: filters, additives, intermediate exchangers, purges, drains, isolating valves, etc., according to the analysis results.

The results must be in accordance with the values shown below:

- Total hardness in mmol/l: 1 < mmol/l < 1.5
- Chloride [CL⁻] < 10 mg/litre
- Sulphate [SO₄²⁻] < 30 mg/litre
- Nitrate [NO₃⁻] = 0 mg/litre
- Dissolved iron: < 0.5 mg/litre
- Dissolved oxygen: 4 < [O₂] < 9 mg/litre
- Carbon dioxide [CO₂] < 30 mg/litre
- Resistivity: 20 Ohm·m < Resistivity < 50 Ohm·m
- pH: 6.9 < pH < 8

1.2 - Clearances required

Without rectangular flange inlet : Fig.1

With rectangular flange inlet : Fig.2

With plenum : Fig.2 and Fig. 3

NOTE : All informations about dimensions and weights are available in the PSD documentation on Carrier Webportal

1.3 - Receiving a shipment - installation methods

When receiving a shipment, check the condition of the goods and report any damage in transit to the shipping company. Do not unpack the units until just before they are due to be installed, and make sure they are as close as possible to the installation site when unpacking them. Do not place heavy articles of any sort on them.

The units must be stored and handled flat.

1 - PRECAUTIONS

1.4 - Supply voltage

Check that the supply voltage and frequency correspond to the values of the unit to be installed.

	Operating Limits - Electrical input
Low consumption - EC brushless Motor	Min : 207V Max : 253 V 60 or 50 Hz -1ph
Multispeed - AC motor	Min : 207V Max : 253 V 60 or 50 Hz -1ph (60Hz not available for 42NH3_5)

NOTE: All performances data certified by Eurovent are based on 50Hz application. Carrier doesn't ensure the same performances when the unit operates at 60Hz; the RPM and power input of the fan-motor are usually higher.

WARNING: Failure to take proper account of the above advice and unauthorised modification of the electrical connections will render the Carrier warranty on the product null and void.

2 - SAFETY CONSIDERATIONS

WARNING: Switch off the main electrical power supply to the unit and accessories (if installed) before doing any work on the unit.

2.1 - General

Installing, commissioning and servicing of the various component (unit, control system, hot and cold water system, air distribution system) can be dangerous unless certain aspects of the installation, such as the presence of mains electricity and hot or cold water in the air conditioning equipment, are taken into account. Only specially trained and qualified technicians and installers who have been fully trained on the product concerned are authorised to install, commission and service this equipment.

During servicing work, it is essential to apply all recommendations and instructions given in service leaflets, on labels or in the instructions delivered with the equipment, and to comply with any other relevant instructions.

Definition of the pictograms used:

- Electrical danger - Fig.4
- Caution hand hazard - Fig.5
- General danger - Fig.6

Comply with all safety rules and regulations currently in force. Wear eye protectors and work with hand gloves and any individual protection equipment following local legislation. Take care when moving or positioning of the equipment.

2.2 - Protection against electrocution

Only personnel qualified to perform electrical and maintenance work may make electrical connections. In particular it is obligatory to disconnect all power supplies to the unit and its accessories before carrying out any work. Disconnect the main power supply with an isolating device (not supplied by Carrier).

IMPORTANT: The components, which make up the different control loops described in this manual include electronic items. As such, they may generate or be harmed by electromagnetic interference unless they are installed and used in accordance with these instructions. The components making up these control systems conform to the requirements of electromagnetic compatibility in residential, commercial and light industrial areas. They also comply with the low-voltage directive.

If the product is supplied without a Carrier control device, verification of EMC conformity is the responsibility of the installer.

2.3 - General installation conditions

IMPORTANT: The Carrier numeric controller, power module, or in general units fitted with controls loops must have an isolating device upstream (for example a double-pole circuit breaker). If necessary, an easily operated emergency stop device (such as a punch-button switch) must cut off the power to all equipment. The installation must be equipped with a device to protect against earth faults. The disconnect device must simultaneously disconnect the two poles (phase and neutral), and have a distance of at least 3 mm between the contacts, in compliance with the installation instructions. The mains power cable must have 3 conductors (blue, brown, green/yellow) and its cross section and type must comply with the specifications set out by the applicable EN or IEC standard. Refer to the selection sheet or the name plate to determine the maximum input current. These devices are not supplied by Carrier.

In general terms the following rules must be applied:

Upstream over voltage protection			
Size (42NL & 42NH)	Without Elec. Heater		
2_5; 2_9	T2A		
3_5; 3_9	T2A		
4_5; 4_9	T2A		
5_5; 5_9	T3A		
6_5; 6_9	T3A		
7_9; 7_9	T3A		
Size (42NL & 42NH)	With Elec. Heater		
	[0-1400W]	[1500-2400W]	[3000-3200W]
2_5; 2_9	T10A	NA	NA
3_5; 3_9	T10A	NA	NA
4_9	T10A	NA	NA
4_5	T10A	T16A	NA
5_5; 5_9	T10A	T16A	NA
6_5; 6_9	T10A	T16A	T20A
7_5; 7_9	T10A	T16A	T20A

- Electrical connections must be made according to the wiring diagram provided with the unit and the installation and operation manual of the controller.
- Units must be provided with over-voltage protection upstream (not supplied by Carrier).
- The power disconnection device must be clearly labelled to identify which items of equipment are connected to it.
- The wiring of the components which make up the different control systems and the communication buses must be carried out in accordance with the latest rules and regulations by professional installers.

2 - SAFETY CONSIDERATIONS

- The power supply cable must be doubly insulated and fixed using a cable clamp. A hole is provided for this purpose in the plastic Carrier controller housing. The cable must be clamped on the outer insulation.
- The control loop components must be installed in an environment, which conforms to their index of protection (IP).
- The maximum level of pollution is normally pollutant (level 2) and installation category II.
- The low-voltage wiring (communication bus) must be kept physically separate from the power wiring.
- In order to avoid interference with the communication links:
 - Keep low-voltage wiring away from power cables and avoid using the same cable run (a maximum of 300 mm in common with the 230 V a.c., 30 A cable).
 - Do not pass low-voltage wires through loops in the power cables.
 - Do not connect heavy inductive loads to the same electrical supply (circuit breaker) used by the controllers, power modules or speed controllers.
 - Use the screened cable type recommended by Carrier and make sure all cables are connected to the controllers and power modules.

2.4 - Caution for the control of the unit

IMPORTANT: It is not permitted to connect several units to the same control device (electronic NTC controller, WTC controller, or any other third party controller). Carrier electronic Thermostat type A&B for AC motors require additional accessory board to allow master/slave function. Carrier electronic Thermostat type C&D for EC motors can be connected upto 10 units, refer to thermostat installation manual instructions.

2.5 - Regulations



Declaration of Conformity UE

This unit complies with the provisions of European Directives:

2006/42/EC (Machinery)

2014/30/EU (EMC)

2011/65/EU (RoHS)

Electronic Equipment Regulations 2012

2009/125/EC (Eco Design) & regulation 327/2011/UE

REGULATION (EC) No 1907/2006 (REACH)



UK Declaration of Conformity

This unit complies with the requirements of:

Supply of Machinery (Safety) Regulations 2008

Electromagnetic Compatibility Regulations 2016

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

The Ecodesign for Energy-Related Products and Energy Information Regulations 2019, and following amendments

UK REACH Regulations 2019

UK Importer:

Toshiba Carrier UK Ltd, Porsham Close, Roborough, Plymouth, PL6 7DB

3 - INSTALLATION OF THE UNIT

3.1 - Installing the unit in the false ceiling

The positioning of the unit must not create an obstacle that may lead to an unequal distribution and/or return flow of the air. The ceiling must be sufficiently even to allow a simple installation without danger from the unit. The supporting structure must be able to carry the unit weight and prevent deformation, breaks or vibrations during operation.

INSTALLATION PRECAUTIONS: During the installation process, remove all debris and construction material from the ducts to prevent any damage to the unit.

3.2 - Installation procedure

NOTE: The fan-coil units are delivered upside down when stacked on a pallet.

- Position the unit close to where it is to be installed in the ceiling void. For installation in a false ceiling use a hydraulic lift and a folding ladder to make the task easier (Fig. 7).
- Check that the clearances around the unit are sufficient to allow easy maintenance. Please refer to the diagram that shows the service clearances.

- Mark the position of the threaded hangers on the ceiling (if several units need to be installed, it may be advisable to produce a drilling template). The method of fixing the threaded hangers (not supplied by Carrier) depends on the ceiling type (maximum diameter of the threaded hangers is 10 mm). Once the threaded hangers are fixed to the ceiling, tighten the first nuts.

WARNING: When moving the units, do not use water pipes, condensate drain pan, valves or flexible pipes to lift them.

'Without filter' unit must be connected to an air ductwork. It is not allowed to operate the unit without any filter and with a free inlet at the same time.

Lift the unit and align it on the threaded hangers, insert the second nuts and tighten them slightly.

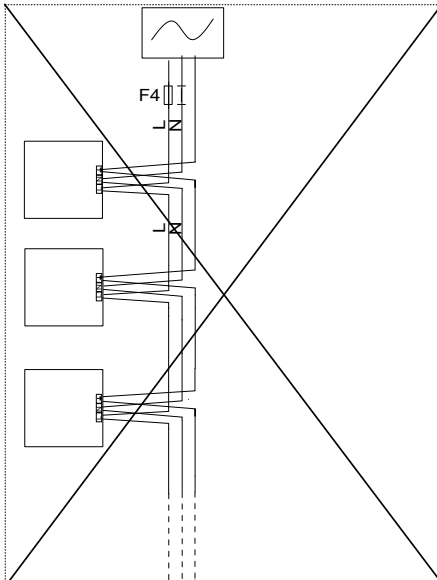
NOTE: At this point do not tighten the nuts fully and do not clamp the unit up to the ceiling (leave a space between the ceiling and the unit). The nuts will be adjusted finally, when the unit has been connected to the pipework and ducts and levelled.

Level the unit (Figs. 8 and 9).

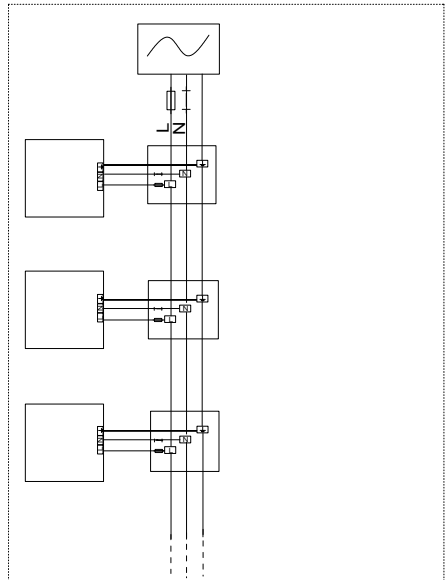
Adjust the hanger nuts so that the unit is inclined 0.5% towards the condensate drain pan. In the other direction (air flow direction) the unit must be perfectly level (Figs. 8 and 9).

Wiring diagram for connecting several units

Incorrect wiring for several units



Correct wiring for several units



3 - INSTALLATION OF THE UNIT

Condensate drain pipe (Fig. 10): Use a flexible pipe with an inside diameter of 16 mm and provide a constant fall of 20 mm/m over the whole horizontal pipe run. Install a 50 mm (minimum) siphon to prevent gases and odours from flowing back into the ceiling void.

WARNING: After drain pipe connection, control clamping of the drain pipe and be sure there is no water leakage.

If several units are connected to a common collector, a device must be installed (Fig. 11). Before operating the unit, ensure that the water flows into the internal condensate drain pan by pouring some water into it. If problems are detected, check the drain pipe slope and look for possible obstructions. In all cases the connection duct(s) at the unit outlet must be insulated to prevent any condensate formation on the walls.

NOTE: The pressure losses of these ducts must be compatible with the unit performance. The duct must be as smooth as possible. Avoid sharp bends. Check that there are no leaks or kinks, and that there is no dirt or installation debris inside the ducts. Debris within the ducts might damage the fan wheel and the damper in the air diffusers.

When installation is complete - i.e. when the unit is attached to the ceiling, air ducts are complete, water manifolds are in position with stop valves ready on the connection stubs, and electrical installation is prepared - then connect the water pipe (1/2" gas screw connector for size 2 to 5 ; 3/4" gas screw connector for size 6 and 7).

WARNING: Be sure that the coil protective caps are removed before connecting the water pipes (see Fig. 19).

NOTE : Each fan-coil units shall be connected with water flexible pipes in order to avoid any damage due to vibrations.

Ensure that a gasket (not supplied by Carrier) is installed between the screw connector and the stop valve.

When all units are installed, open the stop valves on the manifolds, bleed and then pressurize the circuits. To bleed the coils, slightly loosen the bleed screws. The installation can then be started.

NOTE: Do not switch on the power until all connections are made and earthed.

3.3 - Removal procedure

Switch off the unit power supply at the isolator provided for the purpose during installation (isolator not supplied by Carrier).

- Disconnect the power supply and connection cables.
- Close the isolating valves on the manifolds.
- Disconnect the flexible water pipes by unscrewing the gas connectors.

WARNING: Since the flexible water pipes do not have drain valves, a receiver must be provided to allow the cooling coil to be drained.

- Disconnect the supply air ducts.
- Disconnect the flexible condensate drain pipe. Drain the siphon into a suitable vessel.
- Support the unit lightly and release it by unscrewing the four nuts on the threaded hangers. Lower the unit carefully.

3.4 - Safety considerations relating to final shut-down

Separate the units from their energy sources, allow them to cool down and then drain completely.

DISMANTLING: see §3.3.

Respect the local environmental laws and regulations.

Presence of waste electrical and electronic equipment (WEEE): At the end of its life, units must be disassembled, with any contaminated fluids removed by professionals, and then processed via approved channels for waste electrical and electronic equipment (WEEE).

Check whether any part of the unit can be recycled for another purpose.

Sort the components according to their material for recycling or disposal, in accordance with regulations in force.

Materials to be recovered for recycling - Steel - Copper - Brass - Aluminium - Plastics - Insulation.

The proportions of materials for each unit are listed in the Product Environmental Profile (PEP) available at the following website: <http://www.pep-ecopassport.org/fr/consulter-les-pep/> or on request from our departments.

Any contaminated fluids must be disposed of by specialist professionals.

4 - COMPONENTS AND MAINTENANCE

4.1 - Fan motor assembly

4.1.1 - Fan assembly removal procedure

WARNING: Disconnect the power supply to the unit before carrying out any work on the unit.

Identify and note the wired fan speeds. If the fan develops a fault the whole assembly must be removed and replaced (Fig. 12).

- Remove the filter.
- Remove the fan access panel.
- Disconnect the fan assembly power supply cables (power and control wiring for variable-speed motor).
- If necessary remove the controller (fixed with screws) to gain access to the maintenance screws of the panel supporting the fan.
- The fan assembly and its panel are held in place by four screws. Remove these screws and slide the assembly down.
- Remove the fan motor assembly.

NOTE: Be careful not to touch the fan blades during the removal process to avoid unbalancing the fans.

- For units with the electric heater option, disconnect the power supply cable to the heater. Withdraw the cable through the cable gland.
- Unscrew the electric heaters.
- Replacement of the fan motor assembly is by the reversal of the above procedure.

WARNING: The electrical connections to the fan motor must be made in accordance with the labels on the connector block

4.1.2 - Capacitor replacement procedure

Disconnect the power supply to the unit before carrying any work on the unit.

- Remove the filter.
- Remove the fan motor assembly access panel.
- Remove the capacitor that is attached to the motor chassis assembly.
- Disconnect the capacitor by withdrawing the flat spade connectors from the back of the capacitor.
- Replacement of the capacitor assembly is by the reversal of the above procedure.

4.1.3 - Fan wiring

For any modifications of the wiring harness, refer to the fan wiring diagrams provided with the units.

With the optional electrical box, three of the available five or six speeds of AC motor are connected - (maximum speed = R1, minimum speed = R5 for 42NH /R6 for 42NL).

When the unit is delivered with an WTC or a NTC controller, for AC motor, three of the 5 or 6 speeds are connected. Speeds arrangement can be changed on site according to the electrical diagram.

WARNING: With the optional electric heater a minimum air flow must be maintained (see tables below).

Damages may occur if the minimal speed recommendation is not followed.

Minimum speed 42NH / (Minimum air flow in m³/h)			
Size	Multispeed AC Motor With Elec. Heater		
	0-1000W	1600-2000W	3200W
2_5	R5 (70 m³/h)	NA	NA
3_5	R5 (180 m³/h)		NA
4_5	R5 (340 m³/h)		NA
5_5	R5 (300 m³/h)		NA
6_5	R5 (300 m³/h)		
7_5	R5 (460 m³/h)		

Minimum speed 42NH / (Minimum air flow in m³/h)			
Size	EC Motor With Elec. Heater		
	0-1000W	1500-2400W	3000-3200W
2_9	3V (70 m³/h)	NA	NA
3_9	3V (180 m³/h)		NA
4_9	3V (275m³/h)		NA
5_9	3V (300 m³/h)		NA
6_9	3V (180 m³/h)		
7_9	3V (300 m³/h)		

Minimum speed 42NL / (Minimum air flow in m³/h)			
Size	Multispeed AC Motor With Elec. Heater		
	0-1000W	1600-2000W	3200W
2_5	R6 (70 m³/h)	NA	NA
3_5	R6 (180 m³/h)		NA
4_5	R6 (340 m³/h)		NA
5_5	R6 (300 m³/h)		NA

Minimum speed 42NL / (Minimum air flow in m³/h)			
Size	EC Motor With Elec. Heater		
	0-1000W	1500-2400W	3000-3200W
2_5	3V (70 m³/h)	NA	NA
3_5	3V (180 m³/h)		NA
4_5	3V (275 m³/h)		NA
5_5	3V (300 m³/h)		NA

4 - COMPONENTS AND MAINTENANCE

4.2 - Drain pan removal

WARNING: Disconnect the power supply to the unit before carrying out any work on the unit.

- Disconnect the flexible condensate drain pipe held in place by a collar (the collar is not supplied by Carrier).
- Remove the metal sheet part under the pan by loosening the two lateral screws and one additional front screw (see fig. 1, 2 and 3)
- Pull out the drain pan under the unit by sliding it from its support plate. Remove drain pan from bottom of unit.
- During the pan removal and maintenance, lay the end of the coil on the metal support plate to prevent any damage to the casing (to remove the coil see procedure in chapter 4.3.).
- Replacement is by the reversal of the procedure described above (check that the coil lays at the center of the drain pan as initially)
- Control clamping of the drain pipe and be sure there is no water leakage.

4.3 - Water coil

4.3.1 - Coil removal procedure

WARNING: Disconnect the power supply to the unit before carrying out any work on the unit.

- Close the isolating valves on the manifolds. Empty the water in the unit by opening the drain valve (see Fig. 14)
- Unscrew the union nuts to disconnect the flexible water pipes.
- Remove the valve actuators taking care to identify the cooling and heating valves.
- Disconnect the flexible condensate drain pipe held in place by a collar (the collar is not supplied by Carrier).
- Remove the two-way or four-way water flow control valve bodies. Depending on the unit configuration the four-way valve coupling may be fitted with a heating/cooling changeover switch. If so, do not remove it.
- Loosen the four fixing screws. Pull out the drain pan and coil assembly (the drain pan remains attached to the unit for approximately 100 mm) until the coil is completely detached. Then remove the coil from the drain pan.
- Replacement is by the reversal of the procedure described above. Ensure that all gaskets are changed (new gaskets fitted) and that the inlet and outlet connections to the coil are made correctly using an appropriate sealing compound applied to the valve body. Bleed all air from the coil during refilling.

NOTE : if necessary, the coil can also be removed from under the unit along with the drain pan (see chapter 4.2. "Drain pan removal")

WARNING: Take care when tightening the valve body to the coils (15 N·m is sufficient) to ensure they are not damaged.

NOTE: The orientation of the coil cannot be reversed.

4.3.2 - Coil inlet/outlet and cooling/heating side positions

Water inlets/outlets, all sizes : Fig. 14.

WARNING: Carefully observe the direction indicated by the arrow on the valves, based on the valve type.

4.4 - Duct connection spigots

These are manufactured from high density plastic with a VO fire rating, more or less equivalent to class M1 (French standard). They are encased inside the unit. The ducts should be fixed to these spigots using circular collars or adhesive. Screws and rivets should not be used.

WARNING: In order to guarantee good air tightness, the duct should overlap the whole of the spigot.

Make sure that the maximum supply air temperature does not exceed 60°C.

Do not lift or support the unit using the spigots, place loads on the spigots during installation or operation.

4.5 - Duct connection rectangular flanges

When connecting rectangular flanges to the inlet and the outlet make sure that the duct is pushed closely the unit.

4 - COMPONENTS AND MAINTENANCE

4.6 - Optional filter and filter access

4.6.1 - Description

The Carrier unit is fitted with G1 filter as standard.

A G3 or M5 filter is also available as an option

G3 and M5 filters both comply with the M1 fire class.

Different filter access are available:

- Unit without rectangular flange air inlet (plain inlet): access is from the rear of the unit.
- Unit with rectangular flange air inlet or with return air plenum: access is from below (trapdoor).

4.6.2 - Air filter replacement

Air filters should be changed regularly. Filter life depends on the rate at which the filter becomes clogged, which depends upon the cleanliness of the working environment.

If clogged filters are not changed they can increase the air pressure drop, trapped dust particles may be given off and entrained in the air supply, and the general performance of the unit may be degraded (as the air flow reduces).

NOTE: When installing a unit in a ceiling void, check that no T-bars will obstruct filter access and removal.

4.7 - Fresh air controller

4.7.1 - Fresh air controller with (adjustable) constant air volume

The unit can be fitted with three ranges of constant and adjustable fresh air flow. The 3 ranges are 15 to 50 m³/h, 50 to 100 m³/h and 100 to 180 m³/h.

The diameter of the spigot housing the fresh air flow controller is 125 mm. The fresh air controller can be modified on site by unscrewing and repositioning the damper of the controller. See fig 17.

IMPORTANT: If the unit is fitted with a return air temperature sensor, the constant fresh air flow rate must not exceed 50% of the supply air flow delivered by the unit at minimum speed.

NOTE: To operate correctly the constant fresh air flow controller requires a differential pressure in the range of 60 Pa to 210 Pa.

4.7.2 - Fresh air controller with variable air volume

The unit can be equipped with a variable fresh air flow controller from 0 to 55 l/s (0 to 200 m³/h).

This is connected to the numeric Carrier controller and can regulate the fresh air intake in two ways:

- Either using a fixed rate set by the installer that can be reconfigured as required
- Or based on the CO₂ level; in this case it is connected to a CO₂ sensor via the Carrier numeric controller (the CO₂ sensor is located opposite the fresh air inlet).

NOTE: With the variable fresh air flow controller the upstream pressure in the fresh air duct must be 180 Pa. It is available as an accessory.

4.7.3 - Fresh air filtration

If the unit is provided without any filter or if the fresh air inlet is fitted in the base unit or in the return plenum, it is the responsibility of the installer to check if the fresh air is filtered beforehand.

4.8 - Optional water flow control valves

These valves are either two-way or four-way type (three-way with integral bypass). The body of the valve is designed to withstand a 15.5 bar (1550 kPa) bar operating pressure.

With this option, the couple (valve + actuator) is usually normally closed (NC). Thus, the water flow is null in case of power cut. To fill the installation, to equalise the water circuits and to purge the units, the actuators must be connected to the power supply and the valves must be opened via the controller (thermostats or BMS).

For the replacement of these components refer to the chapter 4.8.4. - "Actuator replacement procedure".

4 - COMPONENTS AND MAINTENANCE

4.8.1 - Optional balancing valves

Two-way valve with waterflow balancing function is embedded with a differential pressure controller (with or without pressure test points to control the waterflow settings). The setting of the valve is shown in Fig. 16.

The manual control knob (16a) is ready fitted to protect valve stem and pre-set mechanism and facilitates manual control of valve during commissioning.

Setting procedure:

- Remove control knob from the valve (16a)
- Loosen knurled nut (16b).
- Adjust the desired dial setting with the white knob (16c)
 - See table below.
- Retighten knurled nut by hand (16d).

Waterflow to adjust [l/h]				
1/2' valve	Not Standard			
3/4' valve		Available		
1" valve			Available	Available
ON/OFF actuator	Not Standard	Available	Available	
Moduling / 3p actua.	Not Standard	Available		Available
Waterflow range :	200 l/h (*)	600 l/h (*)	1200 l/h (*)	1600 l/h (*)
MINI	NA	NA	NA	NA
0,2	NA	NA	NA	NA
0,4	NA	NA	NA	NA
0,5	30	100	NA	NA
0,6	35	115	200	220
0,8	40	130	260	290
1	50	160	310	250
1,2	60	180	380	420
1,4	70	210	430	480
1,6	80	240	490	550
1,8	90	270	550	610
2	100	300	610	680
2,2	110	320	660	740
2,4	120	350	730	810
2,6	130	380	780	870
2,8	140	410	840	940
3	150	440	900	1000
3,2	160	460	960	1070
3,4	170	490	1010	1130
3,6	180	520	1070	1200
3,8	190	550	1130	1260
MAX	200	575	1190	1330

(*): Maximum specified water flow on the valve body

WARNING: The valves have to be open when flushing or pressure testing the system. Strong pressure impacts can damage closed valves.

Differential pressure across the valve's control path is not allowed to exceed 400 kPa.

4 - COMPONENTS AND MAINTENANCE

4.8.2 - 230 V - Actuators

Two types of valve actuators are provided : electrothermal actuator (on/off control) or modulating actuator (3-point).

The actuator supply is 230 V a.c.

4.8.3 - 24 V - Actuators

Three types of valve actuators are provided : one electrothermal actuator (on/off control) or two modulating actuators (3-point or 0-10V).

Both modulating actuators can be operated manually with a hexagonal key. The 0-10V command voltage range of the modulating actuator can also be adjusted.

The actuator supply is 24 V a.c.

NOTE: 24V actuators are not compatible with Carrier controllers (Thermostats A/B/C/D, WTC & NTC).

4.8.4 - Actuator replacement procedure

The actuators on both the chilled water and the hot water valves may be replaced in case of failure.

WARNING : Do not connect on the same neutral wire the valve actuator 24 Vac and the controller.

- Disconnect the power supply to the unit before carrying out any work on a unit.
- Disconnect the actuator power supply cable.
 - 230 V type actuator used with the Carrier numeric controller: Disconnect the actuator power supply cable fitted with a quick connector.
 - 230 V actuator used with an electronic thermostat: Remove the plastic protection cover held in place with two screws. Disconnect the actuator power supply cable connected to the quick connector. This can be done by pressing down the spring tongue using a screwdriver and pulling out the wire from the appropriate terminal.
- Uncouple the faulty actuator. Refitting is by the reversal of the procedure described above.

WARNING: Ensure that the actuator is firmly screwed to the valve body (maximum torque 15 N·m).

4.8.5 - Valve body replacement procedure

- Disconnect the power supply before carrying out any work on a unit.
- Close the isolating valves on the manifolds.
- Unscrew the union nuts to disconnect the flexible water pipes.
- Remove the valve actuators taking care to identify the cooling and heating valves.
- Disconnect the flexible condensate drain pipe which is held in place by a collar (the collar is not supplied by Carrier). Remove the two-way or four-way water flow control valve bodies. Depending how the unit is configured, the four-way valve coupling may be fitted with a heating/cooling changeover switch, if so do not remove it.
- Fit the new valve body to the coil (fit new gaskets).
- Reconnect the flexible condensate drain pipe which is held in place by a collar (the collar is not supplied by Carrier).
- Refit the valve actuators taking care to ensure that they are correctly fixed to the valve body.
- Reconnect the flexible water pipes by tightening the union nuts. Retighten all the water connections and ensure that all gaskets have been changed and correctly fitted (maximum torque 15 N·m).
- Open the isolating valves on the manifolds and purge all air from the system.
- Check that there are no leaks and reconnect the power to the unit.

WARNING: When replacing a valve always ensure that the direction of flow through the valve is as shown by the arrow on the valve body. If the direction of flow is wrong, the valve body will deteriorate rapidly and the flow control will be distorted.

4.9 - Flexible pipe option

Minimum bending radius:

- Non-insulated pipes 72 mm
- Insulated pipes 106 mm.

Connections for unit size 2, 3, 4 and 5: 1/2" diameter (female)

Connections for unit size 6 and 7: 3/4" diameter (female)

4 - COMPONENTS AND MAINTENANCE

4.10 - Optional electric heater

WARNING: Disconnect the power supply before carrying out any work on the unit.

If the electric heater develops a fault, it must be replaced; this requires the removal of the fan motor assembly: Fig. 12.

CAUTION: Do not touch the live metal heater elements when the electric heater is connected to the power supply.

Electric heater replacement procedure:

- Remove the filter.
- Remove the fan motor assembly access panel.
- Identify and note the fan speeds wired to the auto-transformer terminal block. Disconnect the power supply cable.
- Remove the fan motor assembly.

NOTE: Be careful not to touch the fan blades during the removal process to avoid unbalancing the fans.

- Disconnect the electric heater power supply cables and remove them through the cable conduit.
- Unscrew the defective heater(s) and replace it (them).
- Replacement of the fan motor assembly is by the reversal of the above procedure. Carrier Electronic thermostat type B is embedded with Electric heater relay 8 Amps. Accordingly, Carrier requires an additional protection relay for electric heater with above 1400 W capacity.

All units delivered with an electrical box or a Carrier controller are always equipped with a relay if the capacity of the electrical heater is above 1400W.

WARNING : In case of customer supplied controller, it is the responsibility of the installer to set up an additional protection relay corresponding to the electrical heater capacity.

4.11 - Optional water sensor

A water temperature sensor can be provided. It has to be installed on the water circuit as described below :

- For 2-pipe coil : the sensor shall be installed on a cooling water pipe (for change-over function). The sensor is installed on a part where the water flow is continuous.
- For 4-pipe coil : the sensor shall be installed on a heating water pipe (for cold-draft function that prevents the operation of the unit when the heating network is off).

NOTE: In case of unit with an electrical box (for Carrier Thermostats), a “switch” is provided as an option instead of the water sensor.

4.12 - Optional condensate pump

Check the sealing of the hydraulic connection of the condensate pump and condensate recovery.

The meaning of the electrical wires is described below:

- Brown - Blue wires : Electrical supply 230V 50/60Hz
- Black - Grey wires : Alarm contact Normally Closed (NC) 250V/8A maxi.



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