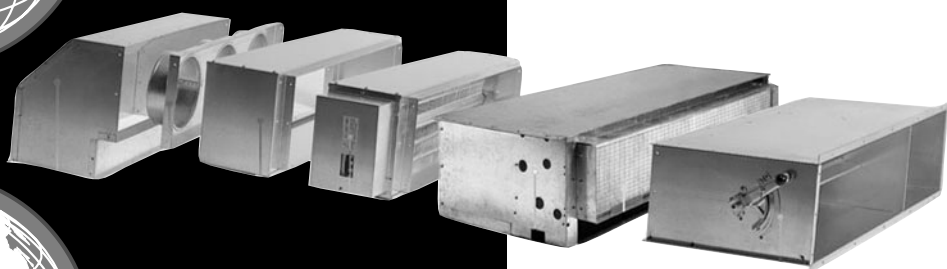


LENNOX[®]

**INSTALLATION
OPERATING &
MAINTENANCE MANUAL**



PROVIDING **GLOBAL SYSTEM SOLUTIONS**

**Comfair
HH**

ENGLISH
MARCH 04

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INTRODUCTION

This installation and maintenance booklet should always accompany the air treatment unit for ready consultation by the installer or user if necessary.

The unit should be installed in compliance with the regulations in force in each country and according to the manufacturer's or qualified person's instructions.

The manufacturer cannot be held liable for any damage to property or injury to persons and animals caused by incorrect installation of the unit.

Only qualified persons should install the unit and connect it to the mains electricity supply. Before carrying out any work on the unit, ensure that it is disconnected from the electricity supply. Read this instruction booklet prior to installation.

RECOMMENDATIONS

This unit is easy to use, but it is important to read all the contents of this guide before using it for the first time. This will help you to:

- use the unit in all safety
- obtain best performance
- avoid incorrect actions
- respect the environment

Do not allow children or unassisted handicapped persons to use the unit.

Do not touch the unit with wet parts of the body or if barefoot.

Do not tug, pull or twist electrical cables attached to the unit, even when disconnected from the electricity supply.

Do not open the flaps giving access to the internal parts of the unit without having first put the system on-off switch to "off".

Do not introduce sharp pointed objects through the air intake and outlet grilles.

Do not leave packing material (boards, staples, plastic bags, etc.) within reach of children since they could be a source of danger. Dispose of correctly.

Do not spray or throw water directly on the unit.

Do not use the unit in places with suspended dust/powder or in potentially explosive atmospheres, in very damp environments or in the presence of oil in suspension or in particularly aggressive atmospheres.

Do not cover the unit with objects or drapes that even partially obstruct the air flow.

The unit works by electricity at mains voltage (230 Vac, 50 Hz). Always bear in mind that mains voltage is potentially dangerous and any appliance connected to it should be used with caution. Before carrying out any work on the unit, disconnect it from the electricity supply (by pulling out the plug from the mains socket or isolating the supply line by putting the on-off switch to off).

If the unit is not be used for long periods, make sure that the controls are in the position 0 (off). If the unit is not going to be used in winter when temperatures are near to freezing, drain the system and ensure that the unit heat exchanger has no water in it in order to prevent the formation of ice and consequent breakage.

To make the unit inoperable, disconnect it totally from the electricity supply.

It is unsafe to alter or try to alter the characteristics of this product. Any tampering or alteration in any case makes the warranty null and void.

In the event of malfunction or failure, do not try to repair the unit yourself; contact a qualified technician. Repairs carried out by incompetent persons could cause damage or accidents.

Always keep the unit clean. In particular clean the air filter periodically (at least once a month).



FAILURE TO COMPLY WITH THE ASSEMBLY INSTRUCTIONS GIVEN IN THIS GUIDE RELIEVES LENNOX OF ALL AND ANY LIABILITY. INCORRECT INSTALLATION COULD CAUSE MALFUNCTIONING OR FAILURE OF THE UNIT. IT COULD ALSO REPRESENT A HAZARD FOR THE USER.

IDENTIFICATION OF THE UNIT

The HH air treatment units come with a rating plate, which shows:

- The manufacturer's address
- "CE" marking
- Model
- Lot number
- Date of production
- Rated absorbed current in "A"
- Input in "W"
- Supply voltage in "V"
- Supply frequency in "Hz"
- Number of phases, indicated with "Ph"
- Total cooling capacity in "W"
- Sensible cooling capacity in "W"
- Heat output.

TRANSPORTATION, RECEIVING, HANDLING

The units and their accessories are enclosed in cardboard boxes up to size 50, while the other sizes are palletised. The packs should be kept intact until positioned in the final place of installation.

Use suitable handling equipment according to the weight of the unit, as provided for by directive 89/391/EEC and subsequent amendments.

The weight of each single machine is given in this guide (table 2).

Upon receiving the unit, check all the parts for any damage caused in transit. Any damage should be reported to the carrier by affixing an accepted with reservation on the accompanying note, specifying the type of damage.

In the event of prolonged storage, keep the units protected against dust and far from sources of vibration or heat.

The number of units that may be positioned on one pallet are given in the table (table 1).

MODE		HH 10	HH 20	HH 30	HH 40	HH 50	HH 60	HH 70
Unit overall dim.	mm	650x533x299	1.000x533x299	1.100x533x324	1.339x533x324	1.339x533x374	1.341x853x674	2.028x853x674
Max. number per pallet	N.	10	5	5	5	5	2	2
Pallet size		140x80	120x80	120x80	150x80	150x80	150x100	230x100

Tab. 1

N.B.: the units may be stacked up to a maximum of 1.80 m in height



LENNOX CANNOT BE HELD LIABLE FOR DAMAGE DUE TO INCORRECT HANDLING OR LACK OF PROTECTION AGAINST THE ELEMENTS.

SAFETY PROVISIONS



Secure packs during transportation.



Do not expose to the elements.



Do not tread on packs.



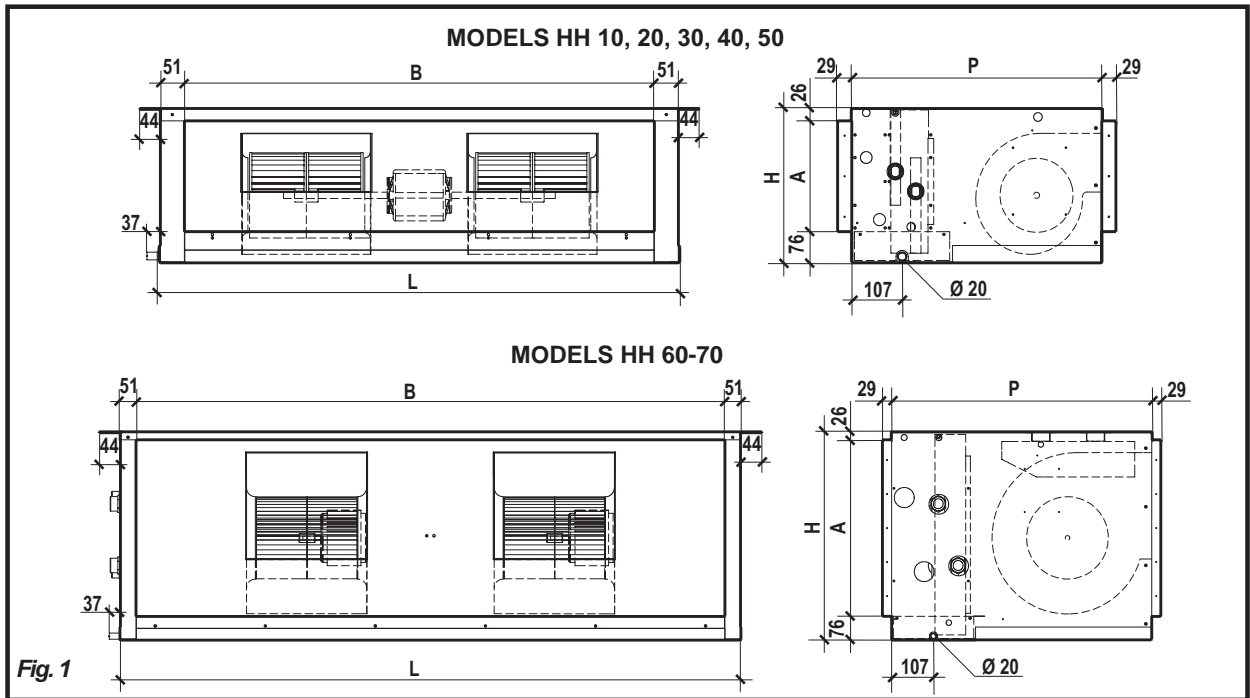
Protect hands with work gloves when dismantling the unit.



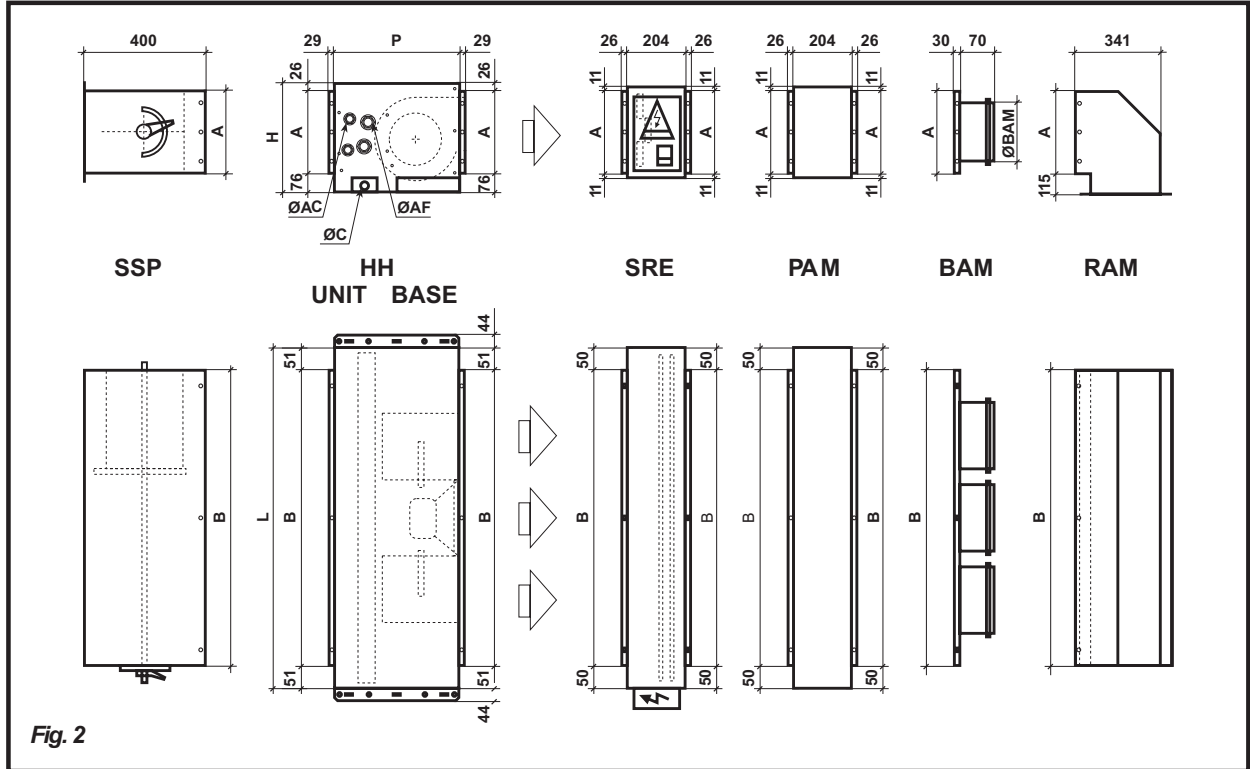
Work in PAIRS if the appliance weighs more than 25 kg.

DESCRIPTION OF THE UNIT

GENERAL SIZE OF THE BASE UNIT



GENERAL SIZE OF DUCTWORK ACCESSORIES



GENERAL TECHNICAL DATA

MODEL			HH 10	HH 20	HH 30	HH 40	HH 50	HH 60	HH 70
Fans - Motors		No.	1-1	2-1	2-1	2-1	2-1	1-1	2-2
Standard coil	Rows	No.	3	3	3	3	3	4	4
	Fittings (ØAF)	Ø	1/2"	1/2"	3/4"	3/4"	1"	1"1/4	1"1/2
Auxiliary coil	Rows	No.	1	1	1	1	1	2	2
	Fittings (ØAC)	Ø	1/2"	1/2"	1/2"	1/2"	3/4"	1"	1"1/4
Condensate drain fitting (ØC)		Ø mm	20	20	20	20	20	20	20
Height	(H)	mm	299	299	324	324	374	674	674
Width	(L)	mm	650	1.000	1.100	1.339	1.339	1.341	2.028
Depth	(P)	mm	533	533	533	533	533	853	853
	(A)	mm	197	197	222	222	272	572	572
	(B)	mm	548	898	998	1.237	1.237	1.239	1.926
		mm							
No. x Ø BAM		mm	2xØ200	3xØ200	3xØ200	4xØ200	4xØ200	2xØ200	4xØ200
Net weight		kg	28	26	41	46	57	117	192
Electric fan power		W	162	218	322	340	582	1.320	2.600
Electric fan current		A	0,72	0,97	1,43	1,51	2,58	5,86	11,54

ELECTRICITY SUPPLY 230 V/1/50 Hz

Tab. 2

MAIN PARTS

LOAD-BEARING STRUCTURE

Galvanised (1 mm for mod. 10-50 and 1.5 mm for mod. 60-70) plate, insulated wherever it is in indirect contact with the heat-carrying fluid. Condensate collecting tray in insulated, galvanised plate complete with fittings for condensate drainage. Slots for easy wall-mounting and levelling of unit.

HEAT EXCHANGER COIL

Coils in copper piping expanded into aluminium fins in continuous block. Copper headers with brass connections equipped with male fittings (gas thread) and easily accessible air valves.

Water fittings placed on the left (facing the unit). They may be supplied on the right on request.

ELECTRIC FAN UNIT

Double-inlet centrifugal fans with statically and dynamically balancing horizontally-oriented aluminium impellers. Single-phase asynchronous electric motor with overload cutout. 3 speeds of rotation. The motor is directly coupled to the fans and cushioned with flexible mountings to ensure low noise.

ACCESSORIES

SSP Section with external air intake (manual). Made in galvanised sheet metal, it allows a change of air in the rooms. Internal air flow: 100%-66.6%. External air flow: 0%÷33.3%

SRE Heating section with electric heating element (380V), fabricated to international safety standards. It comes complete with safety thermostat with automatic reset, interface control relay, wiring and control panel with on-off/magnetothermal switch

FAM Connecting flange

GAM Vibration isolation joint

PAM Straight intake/delivery plenum

BAM Intake/delivery union with circular fittings

RAM 90° intake/delivery plenum

SFA Air filter section. Filtering membrane enclosed within a metal frame for easy extraction. Filtering rate EU3. Regenerable by washing in water, blowing, suction

AUXILIARY COIL for heating (4 rows)

4 AND 6-ROW COIL



RECOMMENDATIONS FOR INSTALLATION!

Before installing the unit, ensure that:

- 1) the place of installation has sufficient space for carrying out installation as well as routine and extraordinary maintenance work (see fig. 3). If the unit is installed behind a suspended ceiling, an access should be provided;
- 2) there are no obstructions for air intake and delivery;
- 3) the water fittings are of the sizes, in the position and spaced apart as required by the unit;
- 4) the system pressure does not exceed 8 bar for the water-filled versions;
- 5) the electricity supply corresponds to the data on the unit rating plate and that there is a circuit breaker switch readily accessible to the user to cut off the power supply whenever necessary;
- 6) the circuit breaker is in the OFF position so that there is no voltage on the unit supply line.

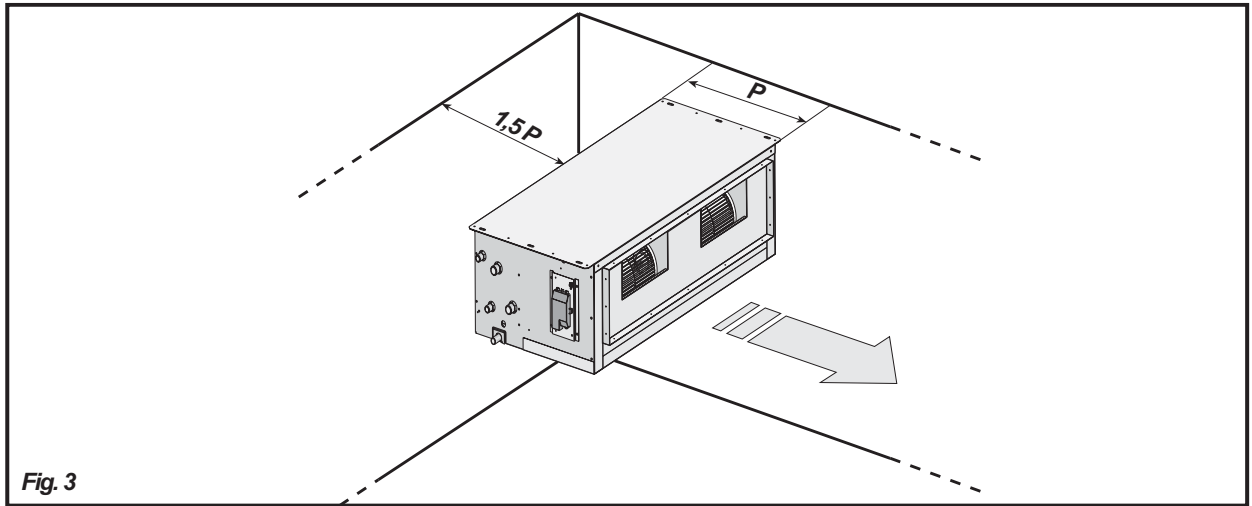


Fig. 3

INSTALLATION OF THE AIR TREATMENT UNIT

Preliminary operations:

- check that the various unit components are perfectly intact;
- check that the installation accessories and documentation are in the pack;
- place the packed section as close as possible to the place of installation;
- do not place tools or weights of any kind on the packed unit.

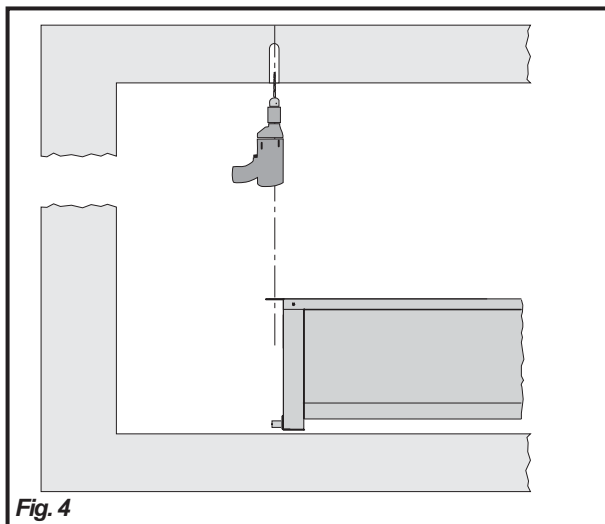


Fig. 4

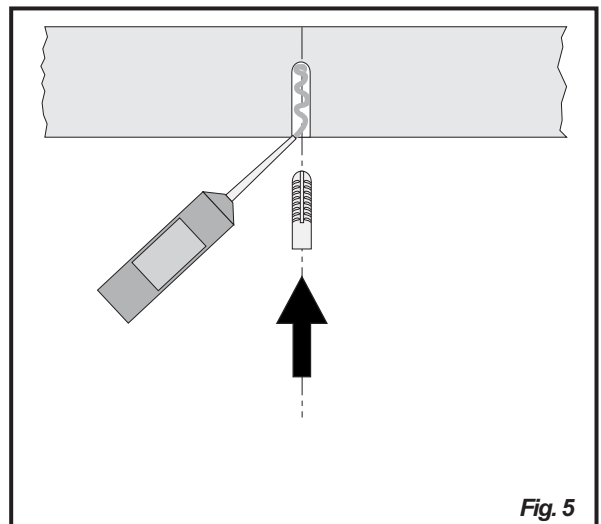
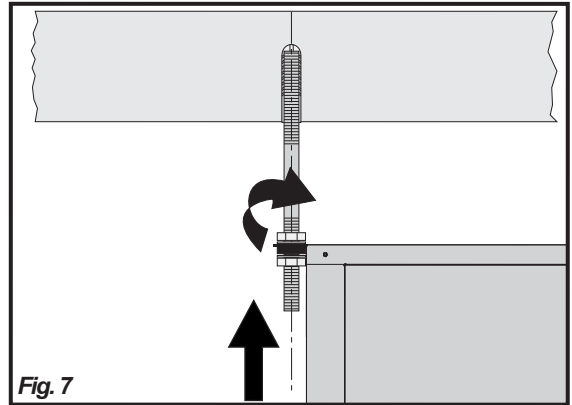
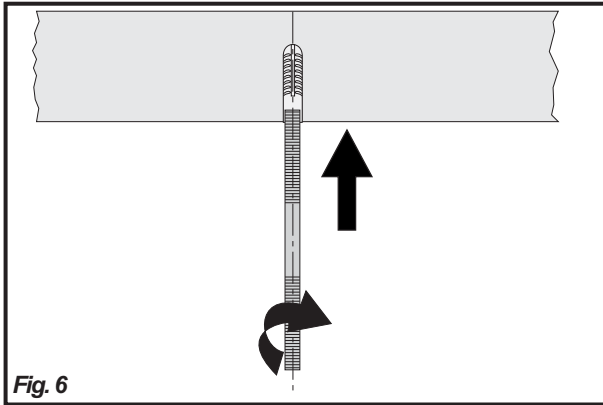


Fig. 5

Drill the holes in line with the relative slots for the 6 unit screw anchors (fig. 4). Inject thermosetting resin into the holes and then insert the screw anchors (fig. 5).

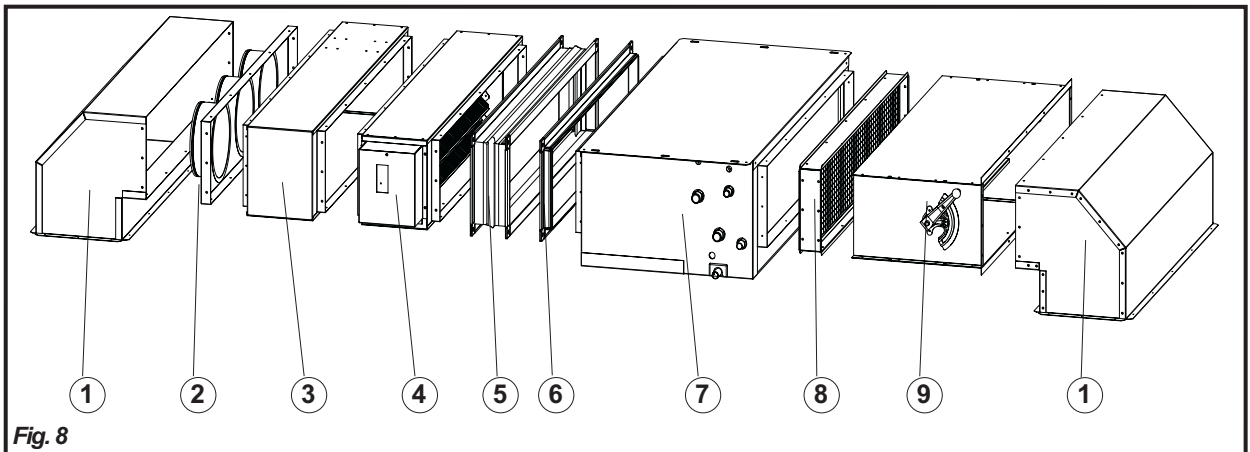
UNIT INSTALLATION



Fix the threaded rods of the correct length to the screw anchors (fig. 6) and insert them into the relative slots (fig. 7). After having created a slope (max. 3 cm/m) in the direction of the condensate outlet, lock the threaded rod with a nut and check nut. To prevent possible noise being created by vibrations from the unit, it is advisable to insert a vibration-damping joint.

N.B.: the screw anchors, threaded rods and whatever else is necessary for accomplishing the installation are NOT included in the supply of the air treatment unit.

INSTALLATION OF THE ACCESSORIES



N.B.: Fig. 8 shows the exploded view of the unit with ALL the accessories.

- LEGEND**
- 1 **RAM** 90° intake/delivery plenum
 - 2 **BAM** intake/delivery union with circular fittings
 - 3 **PAM** straight intake/delivery plenum
 - 4 **SRE** heating section (with electric heating element)
 - 5 **GAM** vibration isolation joint
 - 6 **FAM** connecting flange
 - 7 **UTC** base unit
 - 8 **SFA** air filter section
 - 9 **SSP** section with external air intake (manual).

INSTALLATION OF THE ACCESSORIES

Some examples are given below of assembling the accessories for ducted air treatment units.

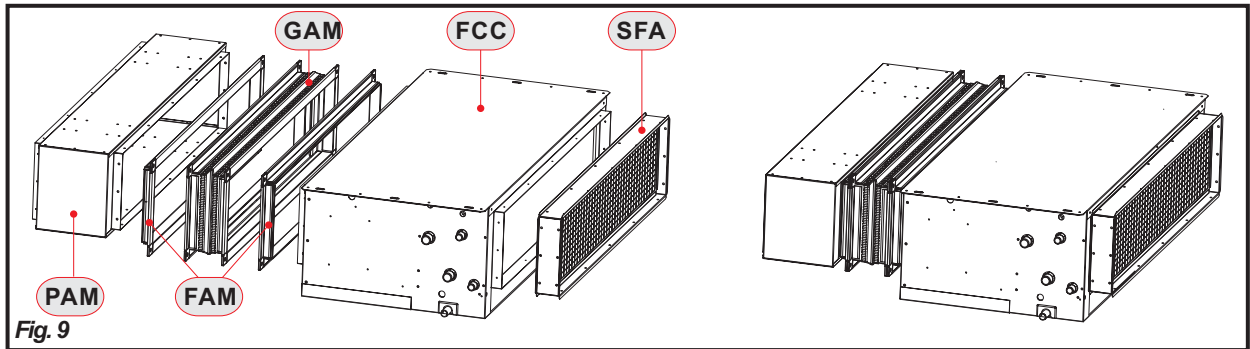


Fig. 9

First of all put the air filter section (SFA) on the unit intake, inserting it into the special rim (male-female) and fixing it with the galvanised self-tapping screws 4.2x9.5.

Proceed as described above on the delivery end with the connecting flange (FAM).

Put the vibration isolation joint (GAM) on the flange and fix it using the cheese-headed screws M8x16 and hexagon bolts.

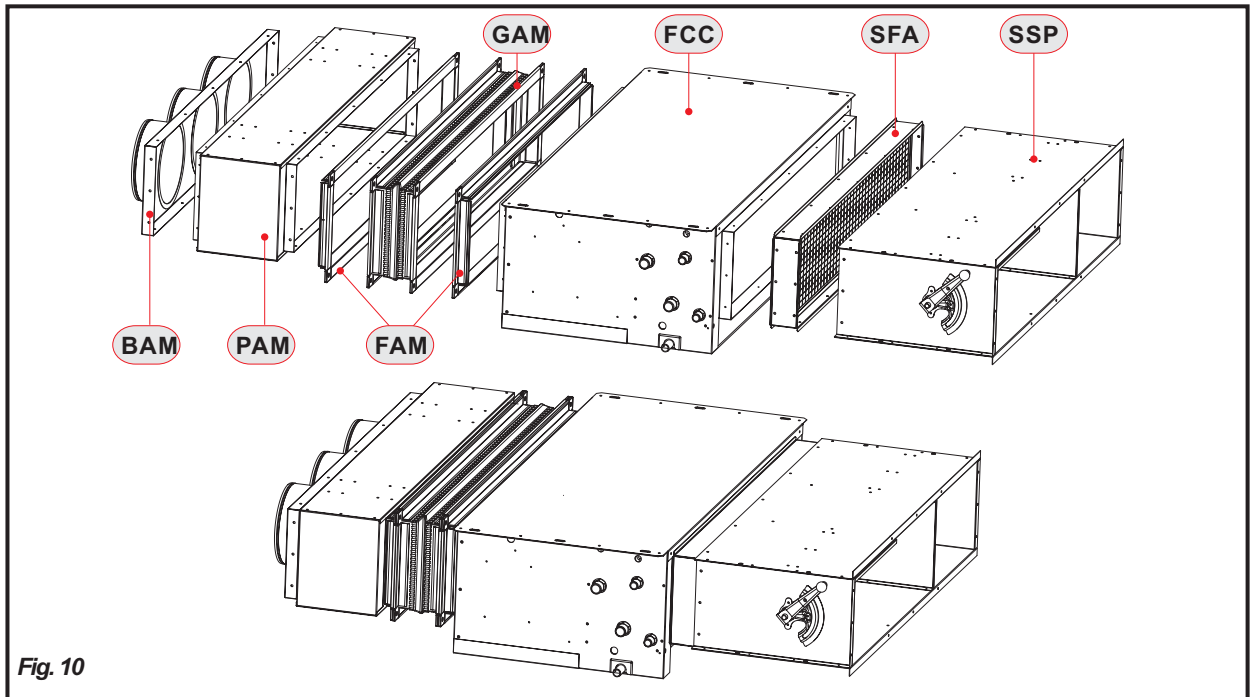


Fig. 10

Proceed by inserting the manual air intake section (SSP) into the air filter section (SFA) by means of the male-female coupling.

After having secured it with the self-tapping screws (4.2 x 9.5 galvanised), anchor it to the ceiling as illustrated for the base unit in figures 4-7.

Put another connecting flange on the vibration isolation joint (GAM) and secure it using cheese-headed screws M8x16 and hexagon bolts.

Insert the straight delivery plenum (PAM) in the connecting flange and fix it using galvanised self-tapping screws 4.2 x 9.5.

Connect the air delivery union with round fittings (BAM) with the procedure described above.

WATER CONNECTIONS

CONNECTION TO THE TRUNK LINE

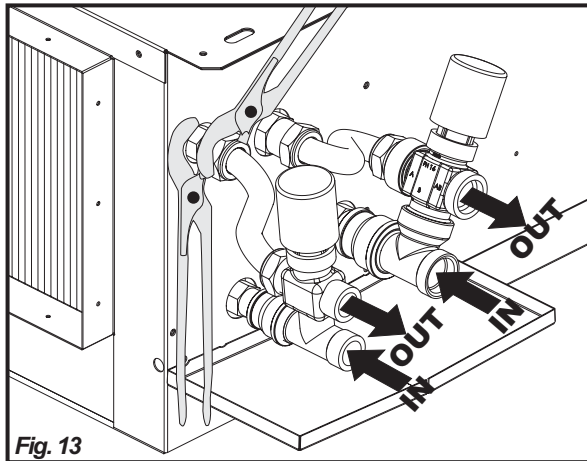


Fig. 13

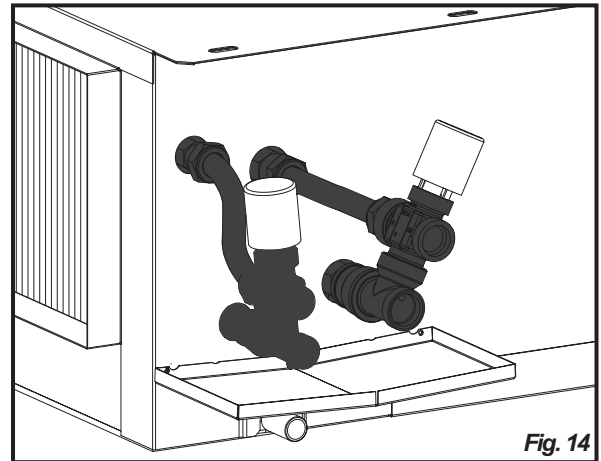


Fig. 14



CAUTION!

Always use a wrench and counter-wrench for connection of the coil to the pipes (fig. 13). If the solenoid valve is installed, suitably insulate the valve body with insulating material (fig. 14).

Connect the water inlet and outlet pipes, observing the indications given on the side of the unit. Correctly insulate the water supply pipes to prevent dripping during the cooling mode of operation. A shutoff valve should be inserted on the water supply pipe and a balancing valve on the outlet pipe. The valve body and balancing valve should also be properly insulated to prevent dripping. It is the installer's responsibility to insulate properly and the manufacturer cannot be held liable for any insulation work.

N.B.: It is always advisable to install the solenoid valve.

In the heating mode of operation the solenoid valve reduces consumption because upon reaching the set temperature the circulation of water is stopped to avoid wasting energy (the fan coil would otherwise continue to heat like a radiator, even with the motor at a standstill).

In the cooling mode of operation the solenoid valve stops the circulation of water when the set temperature is reached, thus stopping the internal exchanger from continuing to condense water with possible undesirable dripping onto the floor. It also reduces chiller operation with consequent energy saving.

CONDENSATE WATER DRAINAGE

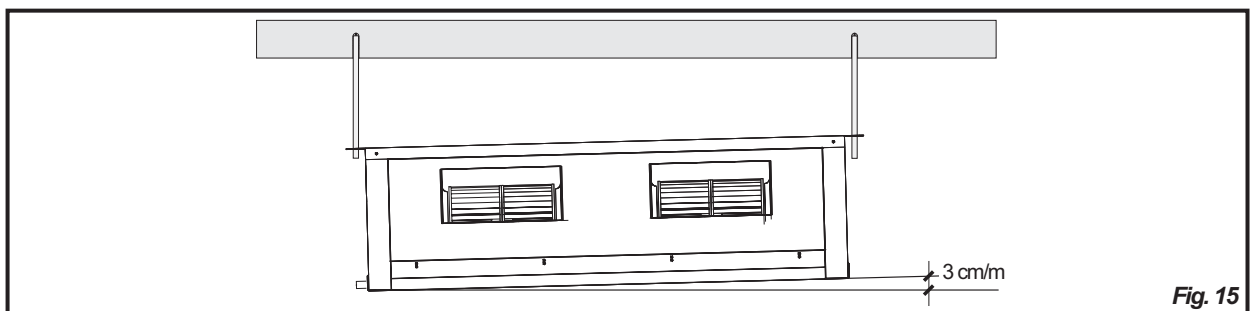


Fig. 15

The condensate drain pipe should slope downwards by at least 3 cm/m and should not have ascending or throttled sections in order to ensure a regular flow of water. It is advisable for a trap to be fitted. The condensate drain pipe should be connected to a rainwater drainage system. Do not use sewage systems to avoid possible rising of odours in the event of evaporation of the water in the trap. Upon completion of work, check that the condensate flows out properly by pouring water into the tray. The condensate water drainage system should be fabricated in a workmanlike manner and should be periodically checked.

The manufacturer cannot be held liable for any damage caused by dripping in the absence of a solenoid valve or of periodic maintenance of the drainage system.



RECOMMENDATIONS

ELECTRICAL CONNECTIONS



Before carrying out electrical connections, ensure that the electricity supply to the supply line has been cut off, checking that the on-off switch is in the OFF position.

- Only qualified electricians should carry out the electrical connections.
- Check that the mains supply is single-phase 230 Vac/1/50 Hz (± 10%).
- Operating the unit with voltages outside the above limits could cause malfunction and renders the warranty null and void.
- The power supply line should be fitted with at least a switch isolator in conformity with European standard EN60947-3.
- Make sure that the electrical system is suitable for providing not only the working current required by the unit, but also the necessary current for powering household and other electrical appliances already in use. Any electrical and mechanical alterations or tampering render the warranty null and void.

The cables should be sufficiently long so that they are not permanently taut or create throttling or compression on metal parts .

The power cables should be sufficiently long so that in the event of accidental tugging the active wires are subjected to stress before the earth wire.

Connect the earth wire to the relative terminal marked with the symbol \perp .

Check the earth connection.

Comply with the safety regulations in force in the country of installation.

CONNECTIONS TO THE TERMINAL BLOCKS

The electrical connections should be made to the terminal block on the side of the appliance. Each terminal is identified by the label to be found on the terminal block.

Wiring diagram of ductable air treatment unit mod. 10 - 20 - 30 - 40.

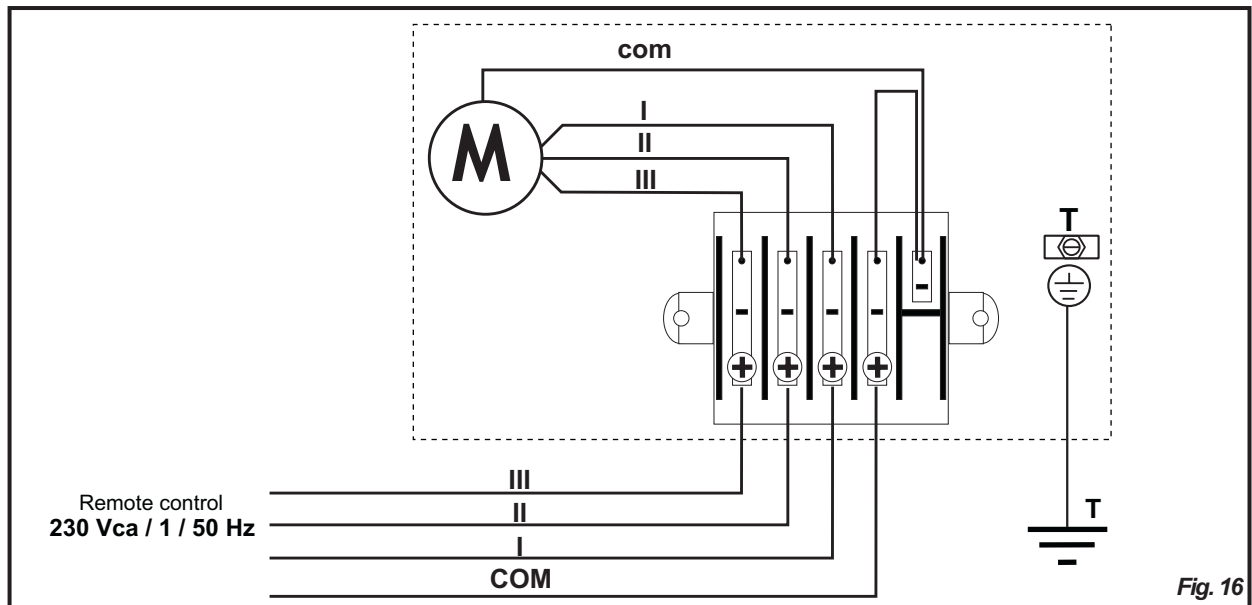


Fig. 16

LEGEND

- | | | | |
|----|----------------------|-----|-----------------------|
| Ph | Phase (brown) | I | Minimum speed (red) |
| N | Neutral (blue) | II | Medium speed (blue) |
| T | Earth (yellow/green) | III | Maximum speed (black) |
| M | Fan motor | Com | Common (white) |



CAUTION!
FAILURE TO COMPLY WITH THE INDICATED CONNECTIONS MAY CAUSE MOTOR BURNOUT!

ELECTRICAL CONNECTIONS

Wiring diagram of ductable air treatment unit mod. 50 - 60 .

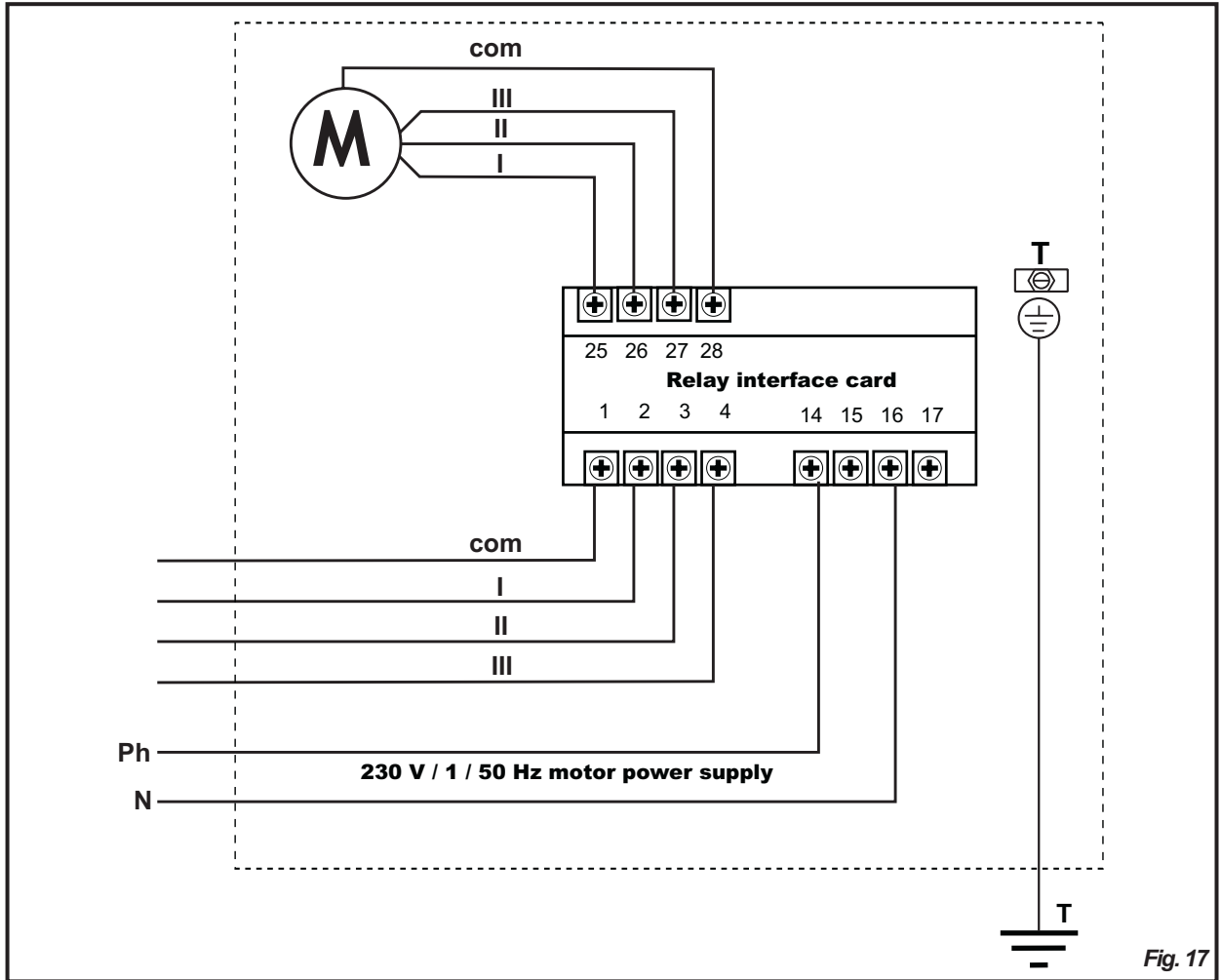


Fig. 17

LEGEND

- Ph Phase (brown)
- N Neutral (blue)
- T Earth (yellow/green)
- M Fan motor
- I Minimum speed (red)
- II Medium speed (blue)
- III Maximum speed (black)
- Com Common (white)



CAUTION!
FAILURE TO COMPLY WITH THE INDICATED CONNECTIONS MAY CAUSE MOTOR BURNOUT!

ELECTRICAL CONNECTIONS



Wiring diagram of ductable air treatment unit mod. 70.

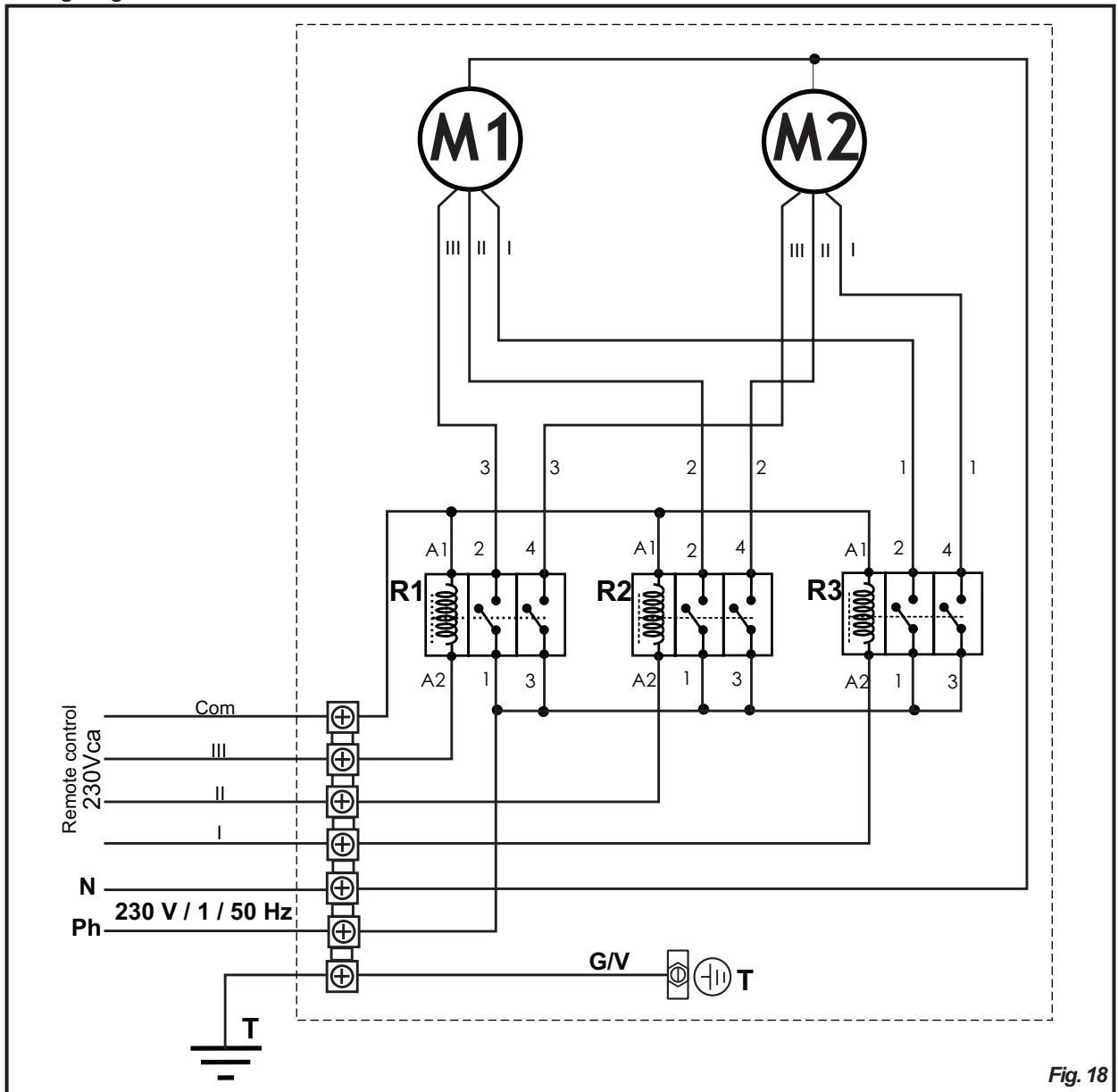


Fig. 18

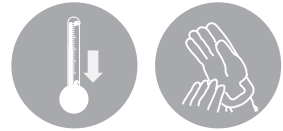
LEGEND

- Ph Phase (brown)
- N Neutral (blue)
- T Earth (yellow/green)
- M1, M2 Fan motor
- Com Common (white)
- I Minimum speed (red)
- II Medium speed (grey)
- III Maximum speed (black)
- R1 Relay
- R2 Relay
- R3 Relay



CAUTION!
FAILURE TO COMPLY WITH THE INDICATED CONNECTIONS MAY CAUSE MOTOR BURNOUT!

TURNING THE COIL



CAUTION

The fan wheels may reach the speed of 1,000 rpm. Do not insert objects into the electric fan and certainly not hands. The motor becomes hot during operation; wait for it to cool before touching it. During the heating mode of operation the exchanger and the connecting pipes may become very hot (80°C). Wait for the exchanger to cool before touching it or protect hands with suitable gloves.

The heat exchange water coils are suitable for working up to a maximum pressure of 8 bar.

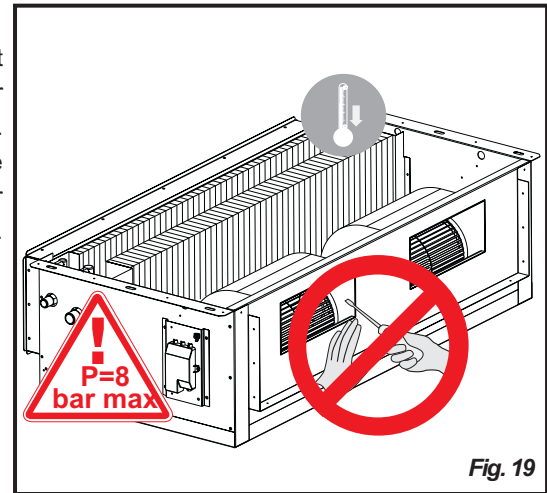


Fig. 19

To turn the coil, proceed as follows:

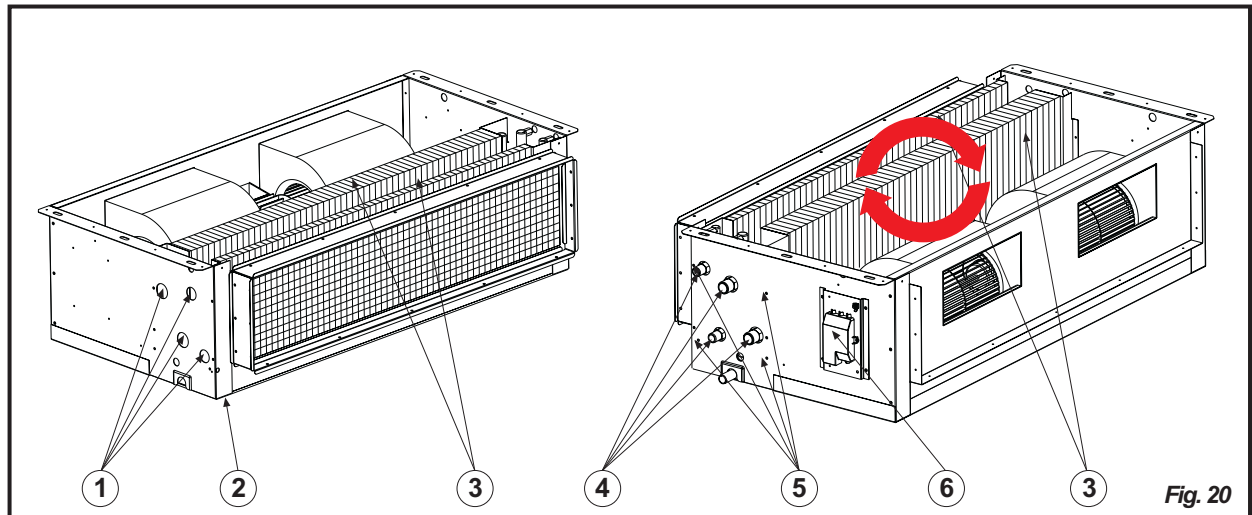


Fig. 20

1. Disconnect the terminal block (6) from the side of the unit.
2. Remove the condensate collecting tray (2).
3. Remove the coil fixing screws (5).
4. Take out the coil (3), being careful not to be cut by the fins and not to damage them.
5. Remove the knockouts (1) on the opposite side of the unit (using a screwdriver) to allow the coil connections to pass through.
6. Position the coil, turning it without tipping it upside down, so that the fittings are in line with the holes left by the knockouts.
7. Fix the coil using the previously removed screws (5).
8. Shift the terminal block (fixing it to the side opposite the water fittings) and the motor cables, fixing them with their clamps. Ensure that the cables pass through the hole in the side of the unit, protecting them with the relative grommet. If it proves easier to carry out this operation by separating the wires from the terminal blocks, mark the positions of the wires to avoid making mistakes when reconnecting.
9. Reconnect the wires to the relative terminal blocks (6), taking care that they are correctly positioned.
10. Replace the condensate collecting tray (2).

CLEANING AND MAINTENANCE



CAUTION! Before carrying out any cleaning or maintenance work, disconnect the unit from the mains electricity supply!



ROUTINE MAINTENANCE

The user is duty bound to have all maintenance operations carried out by trained and qualified personnel only. If the unit has to be dismantled, protect hands with work gloves.

Monthly checks:

- Ensure that the fan impellers are clean. If they are dirty, clean them by suction so as not to damage them.
- Check the whole of the electrical part and in particular that the electrical connections are tight.

Yearly checks:

- Check the whole of the electrical part and in particular that the electrical connections are tight.
- Check the tightness of all the bolts, nuts and whatever else may be loosened by the constant vibrations of the unit.
- Check the motor for dust, dirt or other impurities. Periodically check that the motor works without unusual vibrations or noise and that the fan inlet is not obstructed, which could otherwise leading to overheating of the windings.
- Check the fans for dirt or any foreign matter.

CLEANING THE AIR FILTER

The unit is fitted with an air filter on the fan inlet. During normal operation the filter holds back impurities in the air. The filter should be cleaned periodically to keep its filtering properties and the airflow to the fan unchanged. It is advisable to clean the filter at least once a month, proceeding as follows.

1. Take out the filter.
2. Place the filter on a flat, dry surface and remove the accumulated dust with a vacuum cleaner.
3. Wash the filter with water and detergent (no solvents).
4. Leave the filter to dry in a ventilated place in the sun.
5. Replace the filter when it is perfectly dry.

Clean the filter at the beginning and end of every season.

N.B.: the filter may also be taken out from the side or from the top.

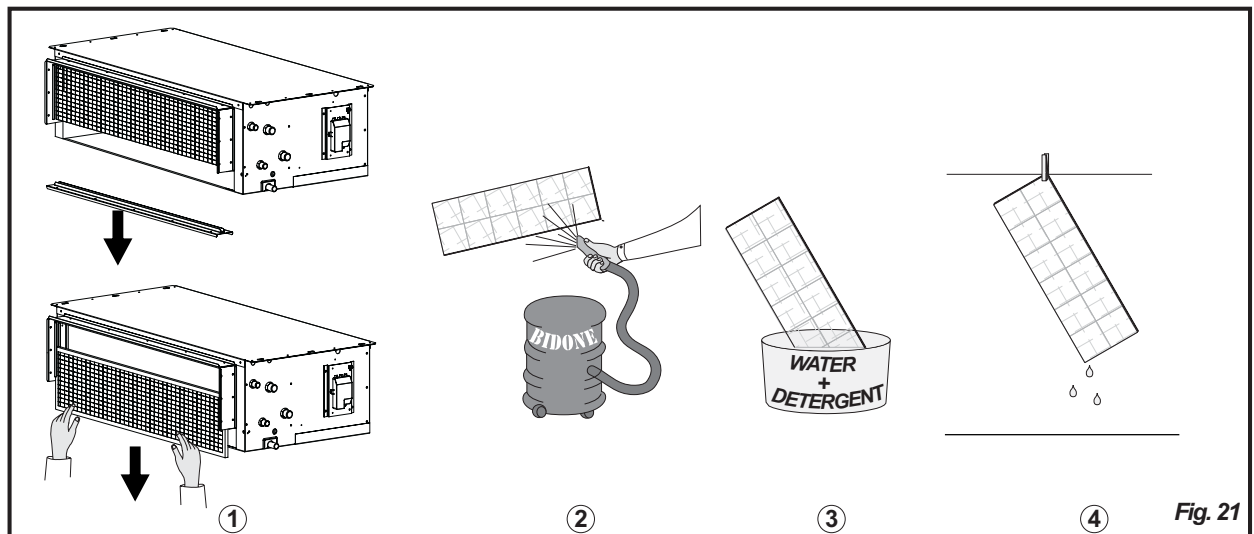


Fig. 21

WHAT TO DO IF...

There is little outflowing air?

- Incorrect speed setting on the control panel (select the right speed).
- Clogged filter (clean the filter)
- Obstruction of the airflow on the intake or delivery line (remove obstruction).

The motor does not turn? Check that...

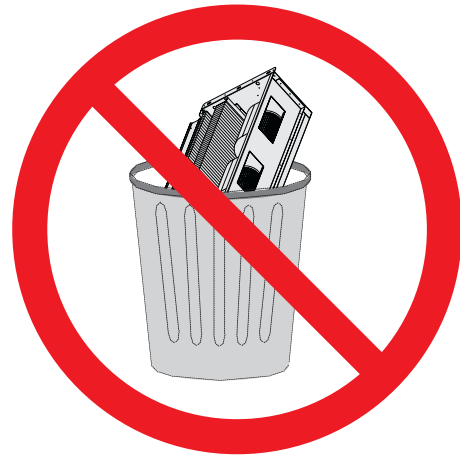
- the power supply is switched on;
- the switches or thermostats are in the correct operating position;
- there is no foreign matter jamming the rotation of the fan.

The unit does not heat/cool as before? Check that...

- the filter and the coil are clean;
- no air has entered the water circuit by bleeding from the relative valve;
- the installation is correctly balanced;
- the boiler/chiller is in proper working order.

DISMANTLING THE UNIT

This unit is made to last for many years. Qualified personnel are needed to dismantle it in all safety. The first operation to be carried out before dismantling the unit is to disconnect it once and for all from the electricity supply. This unit has been made using recyclable materials (copper, aluminium, brass, plastic) and assembled by screws and push-fits to make separation of the parts easy. Contact a firm specialised in differentiated waste disposal; it is the only way to be certain of correct recycling and thereby contribute to protection of the environment.



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