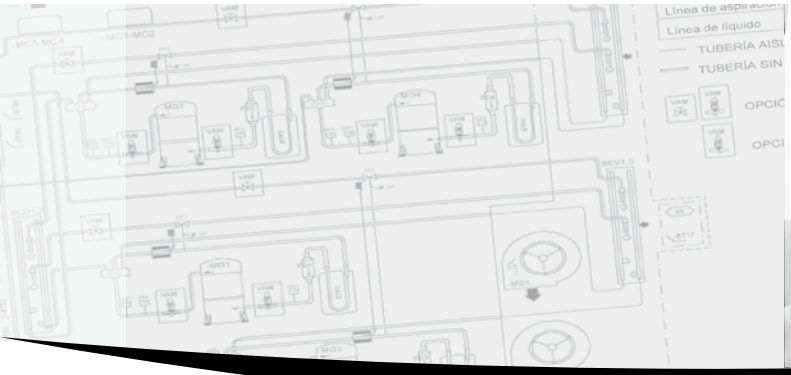
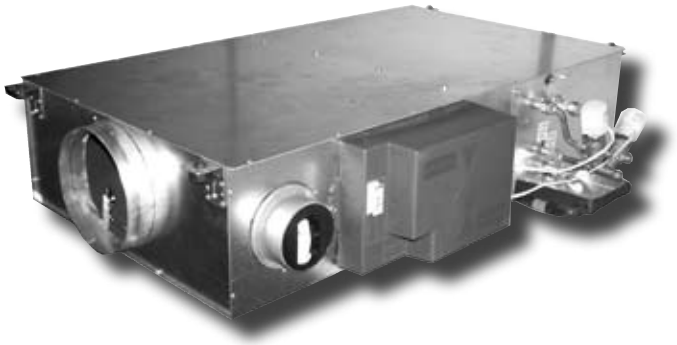
Installation, operating and maintenance
QUANTUM M



• • • **Providing indoor climate comfort**



QMLC-IOM-0807-E

GENERAL INFORMATION

Foreword

This installation and maintenance manual is destined for users of the Lennox Quantum M range units. It describes all the operations to ensure a long product life and reliability. The warnings shown in this manual are aimed at guaranteeing the safety of persons working on these units and must be respected.

Guarantee

This is subject to Lennox's general terms and conditions of sale and delivery. Any repairs or modifications made to the equipment without Lennox's approval will render the grantee void. The guarantee does not cover any damage due to negligence, poor maintenance or non-respect of the recommendations and prescriptions. The guarantee and the manufacturer's obligations may be declared invalid if the user fails to respect the recommendations given in this manual. The manufacturer declines all responsibility for installations or maintenance operations carried out by unqualified personnel.

Receiving equipment

Check the condition of the equipment and report any transport damage to the transporters by recorded delivery letter within 24 hours; with a copy to the sales office. Do not unpack the equipment until just before installation, and make sure they are as close as possible to the installation area; respect the storage precautions marked on the packaging.

Installation conditions

Respect the Local safety in force. Make sure that the electrical supply is compatible with the characteristics of the Quantum M to be installed. Never handle units by using the water pipe connections, flexibles, valves, cables ….

Disconnect the power supply to the unit before carrying out any work on parts of the unit identified by the sign 
Any work carried out must be in accordance with the local regulations in force, where eye protection, work gloves, no-inflammable clothes when welding, provide a fire extinguisher nearby.
The units are not designed for installation in explosive, acid or alkaline environments. The Copper/aluminium coils and other internal components would risk irreversible damage.

TABLE OF CONTENTS

1. INTRODUCTION

The Quantum M compact air conditioning module is available in two sizes for conditioning rooms from 12 to 25 m². Quantum M has been designed for very low noise performance in order to meet today's new comfort standards. This Module is ideal for air conditioning commercial buildings and high specification residential buildings. The overall height of 224 mm of allows an integration of very weak false ceiling voids met in buildings in restoration or buildings of which the overall height is of primary importance.

Quantum M units supply and return air spigots positions may be adapted to specific building requirements. The installation of this unit will be generally made with the top of the false ceiling of space conditioning, near the supply and return air diffusers whose connection will be carried out by thermally and acoustically (if necessary) insulate flexible ducts.

The available static pressure and staged fan speeds, provide for multiple installation possibilities; simplified and reduced maintenance, ease of access to all components, are essential attributes for an intelligent air conditioning system.
In the standard version, Quantum M is provided with a multi speed fan allowing the fan speed to be set appropriately to the specific thermal loads in each space; the wall thermostat or user interface of a communicating controller complements the system.

Quantum M is available in all the configurations demanded by the market, i.e. 2 Pipe Change/Over, 2 Pipe/2Wire and 4 Pipe. The On/Off type water flow control valves associated with electronic controls, offer a perfect control of the space temperature. The electric heaters used in the 2P/2W application, are equipped as standard with a manual reset thermostat, reset by switching off the power, and thermo fusible link

The electronic communicating controller mounted on each Quantum M module, is linked to a Building Management System, and therefore is accessible at any time to the building supervisor for modification of the operating parameters.

2. DATA

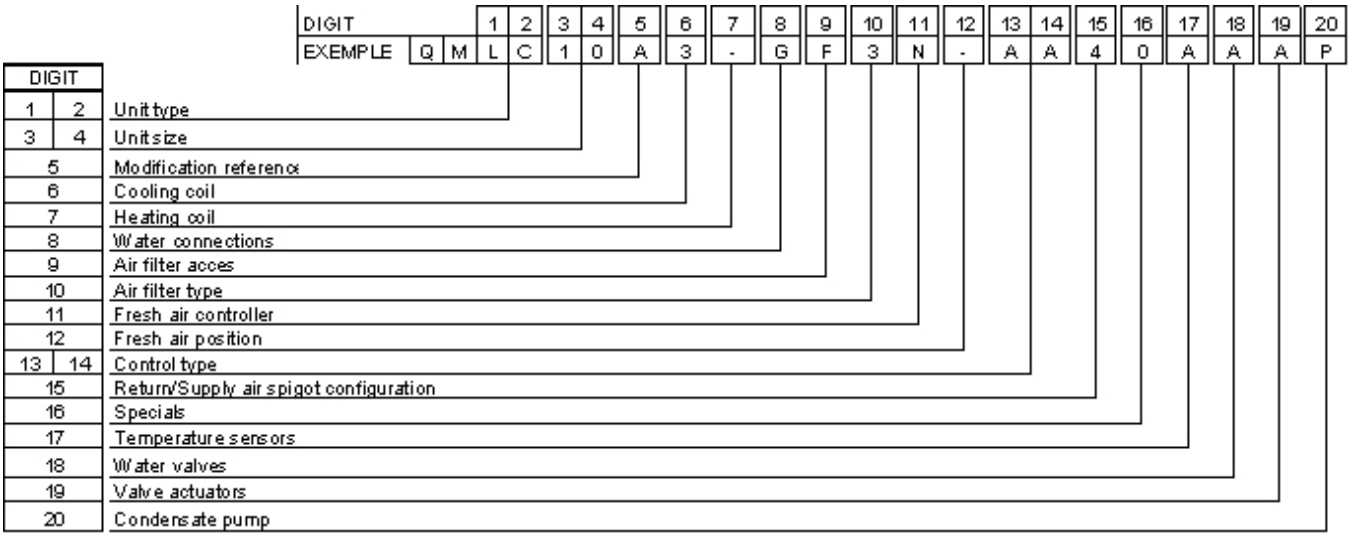
2.1 Physical and electrical data

Quantum M		**Size 10**	**Size 20**	**Size 30**
Nominal air flow	L/sec	133	205	236
Available static pressure	Pa	80	80	80
Total cooling capacity	kW	4,02 (1)	6,11 (1)	7,46 (1)
Sensible cooling capacity	kW	2,66 (1)	4,05 (1)	4,87 (1)
Heating capacity	kW	4,21 (2)	6,44 (2)	7,68 (2)
Electrical supply		single phase - 50Hz - 230 V+/- 10%		
Fan		Forward action simple wheel	Forward action double wheel	Forward action double wheel
Air flow at max speed	L/sec	183	269	301
Avaible static pressure	Pa	30	30	30
Fan number	n	1	2	2
Motor		asynchronus type 230 V-1-50 Hz 2 pole with internal averload protection, permanent capacitor winding insulation class B, varnish class F, IP20		
Maximum absorbed power	W	158	316	316
Nominal current	A	0,72	1,44	1,44
Starting current	A	3	6	6
Water coil				
3/8" copper tubes, aluminium fins,		5 row/2 pipe	5 row/3 pipe	5 row/3 pipe
Water content	L	1,522	2,122	2,862
Operating pressure	kPa	16	16	16
Test pressure	kPa	24	24	24
Electric heater				
Electrical supply		"UDH" bare wire resistive type, single phase - 50 Hz - 230 V +/- 10%		
Protections		manaul reset thermostat (reset by switching off the power) trigger temperature 75°C thermo fusible link; breaks at 152°C		
Power (+5%/-10%) not including fan	W	800	800 1500	800 1500
		1500	1600 3000	1600 3000
Minimum air flow	L/sec	92	92 / fan	92 / fan
Air filter		95% gravimetric efficiency (G3 following EN 779), throwaway type, M1 fire rating, metal wire frame		
Dimensions	mm	540 x 215x 10	840 x 215x 10	1140 x 215x 10
Weight and dimensions				
Lenght x width x height	mm	1101 x 786 x 231	1101 x 1086 x 231	1101 x 1386 x 231
Weight	kg	24	37	45

(1) base sur une température d'entrée d'eau de 7°C et une différence de température d'eau de 5° aux conditions nominales, d'air de 27°C bulbe sec, 50% d'humidité relative

(2) *basé sur une température d'entrée d'eau de 50°C et une différence de température d'eau de 10° aux conditions nominales, d'air de 20°C*

2.2 Codification



DIGIT	CODIF	DESIGNATION
1 & 2		**Unit type**
	PA	Fan Coil
3 & 4		**Unit size**
	10	Size 10
	20	Size 20
	30	Size 30
5		**Modification reference**
	A	
6		**Cooling coil or C/O**
	3	3 row
	4	4 row
	5	5 row
7		**Heating coil**
	W	Without coil (2 pipe C/O, 2 pipe/2 wire application
	1	Water, 1 row (4 pipe application)
	G	Electric 800 Watts (2 pipe/2 wire application)
	P	Electric 1500 Watts (2 pipe/2 wire application)
8		**Water connections**
	G	Left
	D	Right
9		**Filter access**
	F	Bottom
	W	Without filter
10		**Filter type**
	3	G3
	4	G4
	W	Without
11		**Fresh air controller**
	W	Without (no spigot, fresh air is introduced outside the unit)
	A	Spigot ext. dia 124 mm (inside diameter 114 mm, without controller)
	B	30 m3/h constant air flow regulator mounted (spigot ext. dia. 99 mm)
	C	Spigot ext. dia 99 mm (inside diameter 74 mm, without controller)
	D	60 m3/h constant air flow regulator mounted (spigot ext. dia. 124 mm)

DIGIT	CODIF	DESIGNATION
12		**Fresh air position**
	W	Without
	G	Left (always on opposite to supply/return spigots)
	D	Right (always on opposite to supply/return spigots)
	E	End
13 & 14		**Controls type**
	AA	Terminal block
	BA	Honeywell Excel 10
	CA	Siemens ACC86
	CM	Siemens RXC
	DA	Peter & Kiebach
	GA	Johnson Controls
	HA	Sauter
	JA	TAC
	KA	Trane ZN 523
	SA	Satchwell
	VA	Trend IQL
15		**Supply/return air spigot configuration**
	1	dia. 200 opposite side to coil connection
	2	dia. 200 same side as coil connection
	3	dia. 200 on end
	4	dia. 250 opposite side to coil connection
	5	dia. 20 same side as coil connection
	6	dia. 250 on end
	7	2 sipots dia 200 on each end
	8	Rectangular inlet and outlet on each end
16		**Specials**
	W	Standard
	0-9	Special product
17		**Temperature sensors**
	A	Supply
	B	Return
	C	Water
	D	Change Over thermostat
	E	Supply + Return
	F	Supply + Return + Water
	G	Supply + Return + Change Over thermostat
	H	Supply + Water
	J	Supply + Change Over thermostat
	K	Return + Water
	L	Return + Change Over thermostat
	W	Without

DIGIT	CODIF	DESIGNATION
18		**Water valves**
	A	HONEYWELL Valve 2 way Kvs 1
	B	HONEYWELL Valve 2 way Kvs 1,6
	C	HONEYWELL Valve 3 way Kvs 1
	D	HONEYWELL Valve 3 way Kvs 1,6
	E	SIEMENS Valve 2 way Kvs 1
	F	SIEMENS Valve 2 way Kvs 1,6
	G	SIEMENS Valve 3 way Kvs 1
	H	SIEMENS Valve 3 way Kvs 1,6
	J	JOHNSON CONTROL Valve 2 way Kvs 1
	K	JOHNSON CONTROL Valve 2 way Kvs 1,6
	L	JOHNSON CONTROL Valve 3 way Kvs 1
	M	JOHNSON CONTROL Valve 3 way Kvs 1,6
	N	SAUTER Valve 2 way Kvs 1
	P	SAUTER Valve 2 way Kvs 1,6
	Q	SAUTER Valve 3 way Kvs 1
	R	SAUTER Valve 3 way Kvs 1,6
	W	Without
19		**Valve actuator**
	A	24 V thermo actuator NO
	B	24 V thermo actuator NC
	C	230 V thermo actuator NO
	D	230 V thermo actuator NC
	E	24 V PROPORTIONNAL
	F	230 V PROPORTIONNAL
	G	BELPARTS 24 V thermo actuator NC
	H	BELPARTS 230 V thermo actuator NC
	W	Without
20		**Condensate pump**
	P	Sauerman condensate pump
	W	Without

***NOTA NOTE** : spigot configuration is defined when viewing Quantum M looking in the direction of the air flow inside the unit*

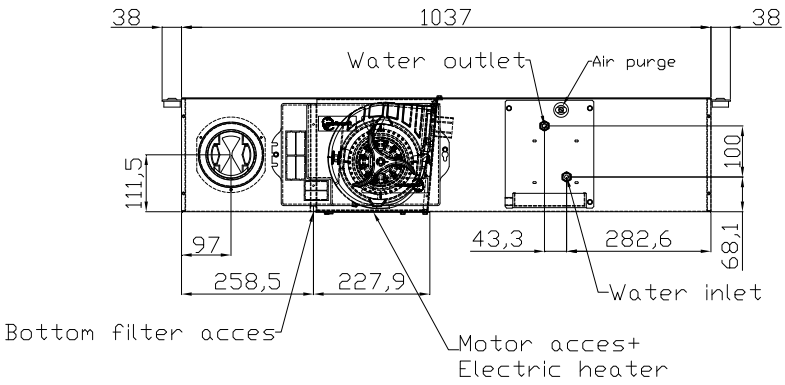
2.3 Packaging

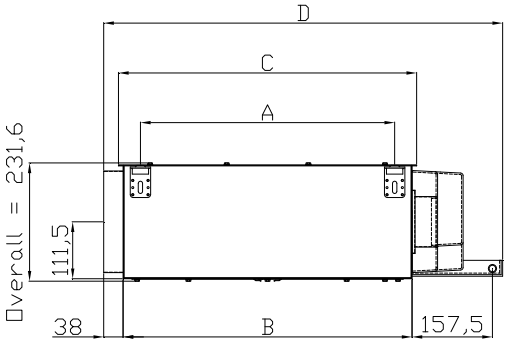
Quantum M units are packed on palettes in multiples of 12 units, film-wrapped; a maintenance and storage precautions notice is fixed to each palette.
The palette dimensions are as follows:

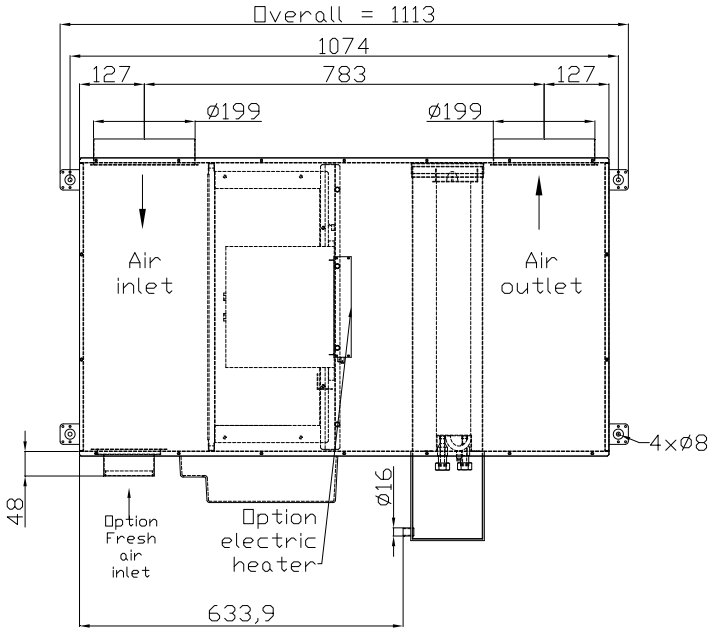
- Length 1500 mm or 800 mm
- Width 1200 mm or 1250 mm
- Height 1500 mm

2.4 Dimensional drawings

2.4.1 Quantum M with coil 4 row, type « U », Right hand configuration

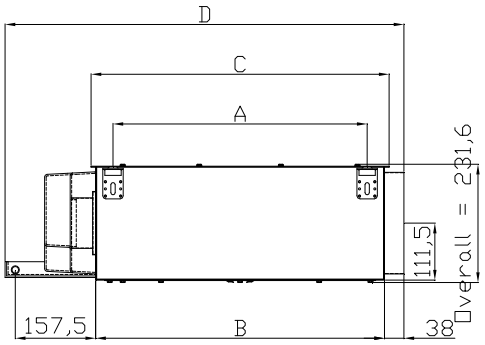


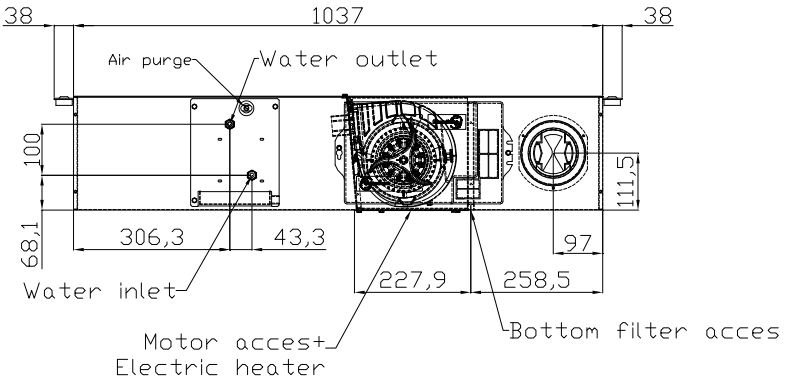


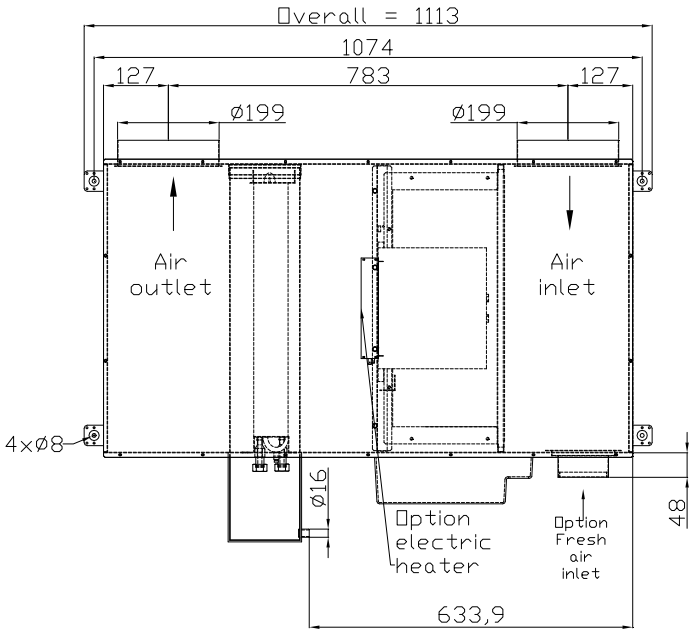


Size	A	B	C	D
10	498	566	584	781,5
20	798	866	884	1081,5
30	1098	1166	1184	1381,5

2.4.2 Quantum M with coil 4 row, type « U », Left hand configuration

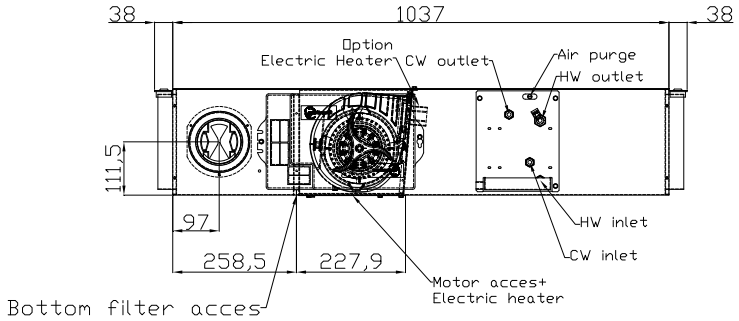


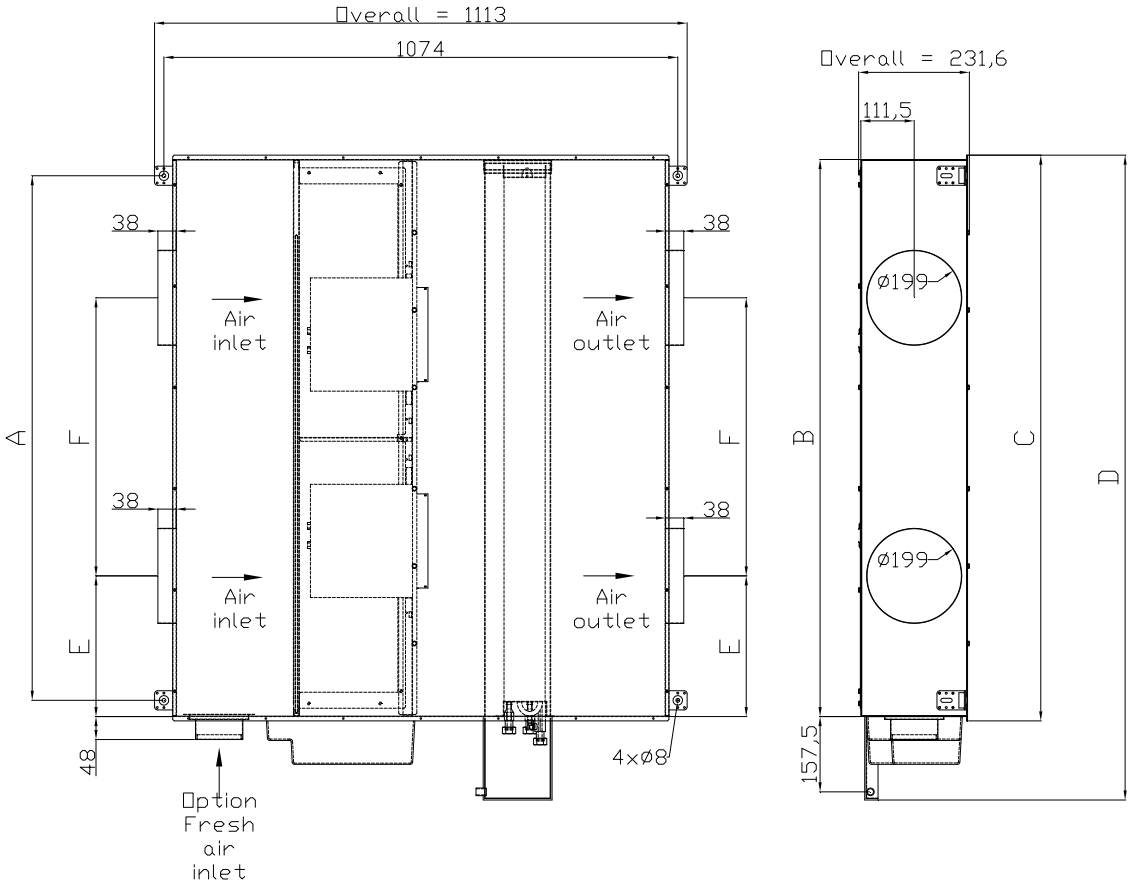




Size	A	B	C	D
10	498	566	584	781,5
20	798	866	884	1081,5
30	1098	1166	1184	1381,5

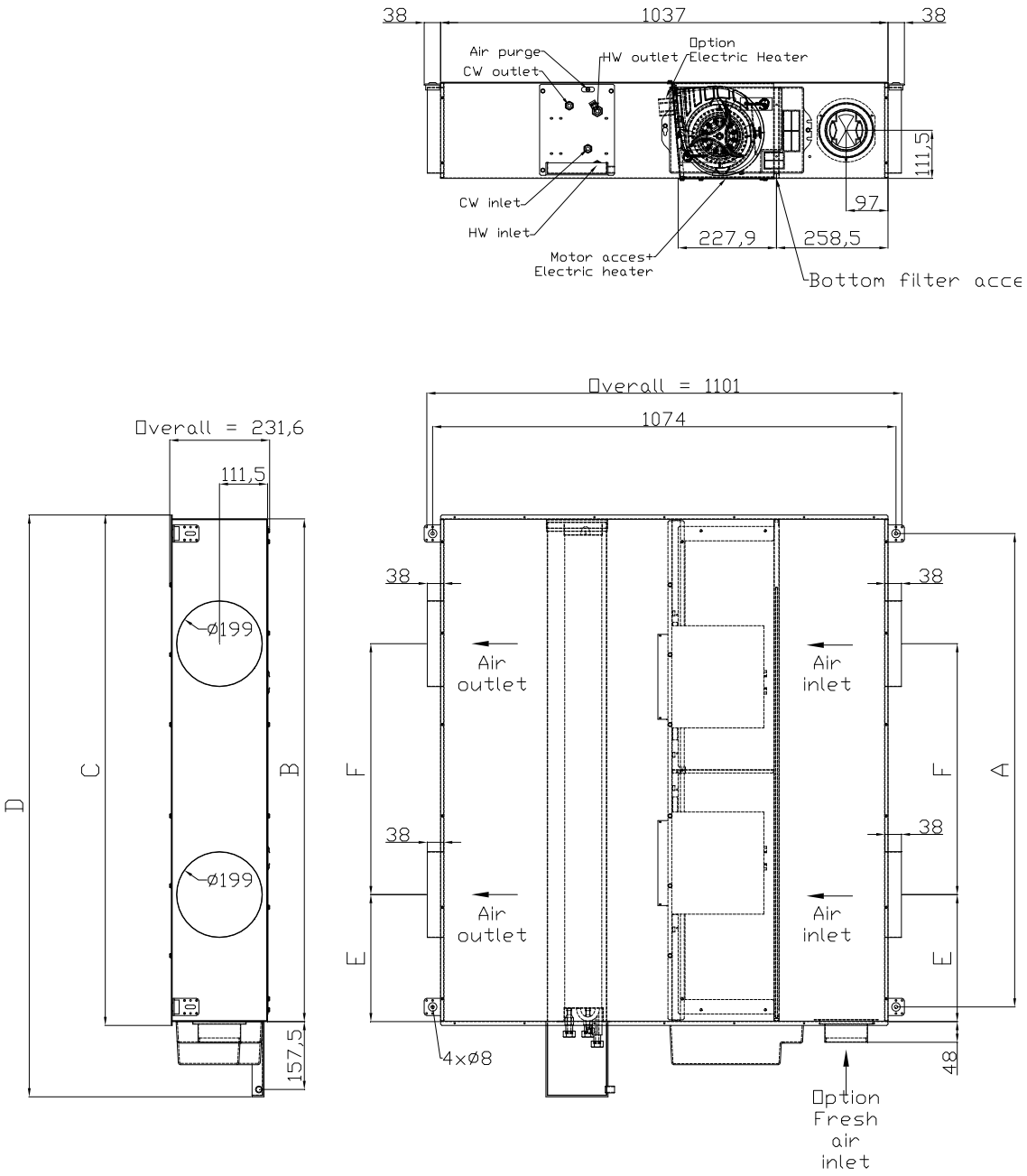
2.4.3 Quantum M with coil 3+1 row, type « L », Right hand configuration





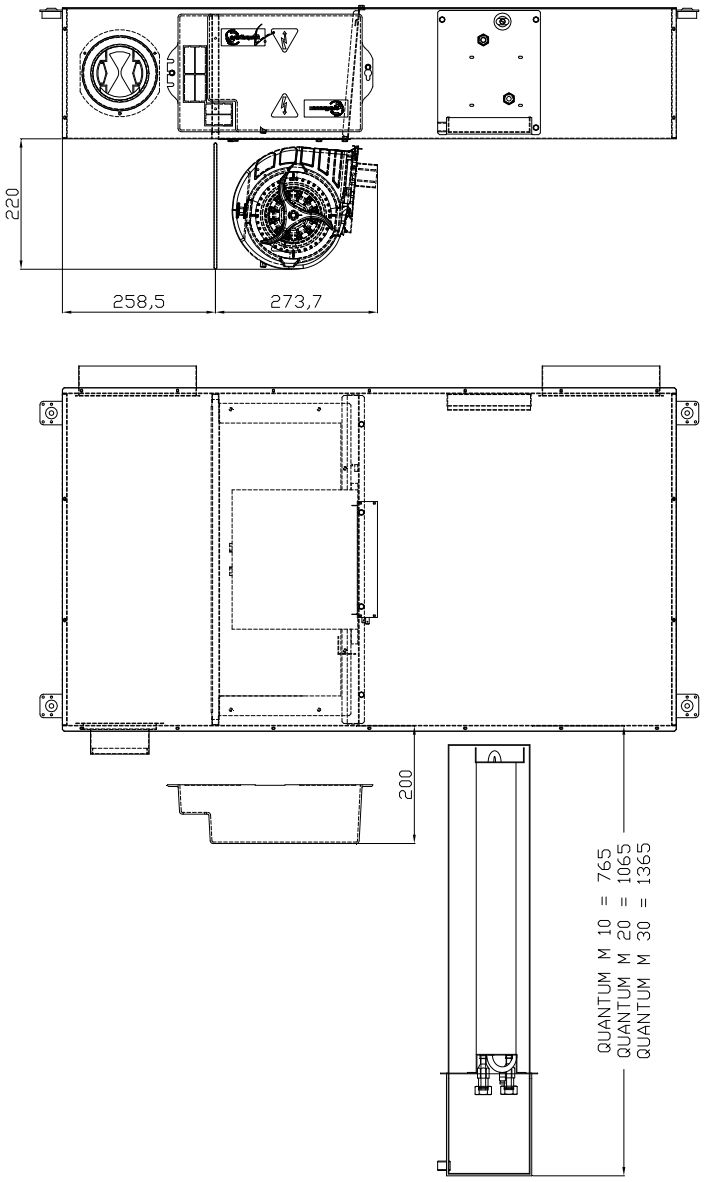
Size	A	B	C	D	E	F	Nb max spigot
10	498	566	584	749,5	283	-	1
20	798	866	884	1049,5	214	432	2
30	1098	1166	1184	1349,5	294,5	582	2

2.4.4 Quantum M with coil 3+1 row, type « L », Left hand configuration

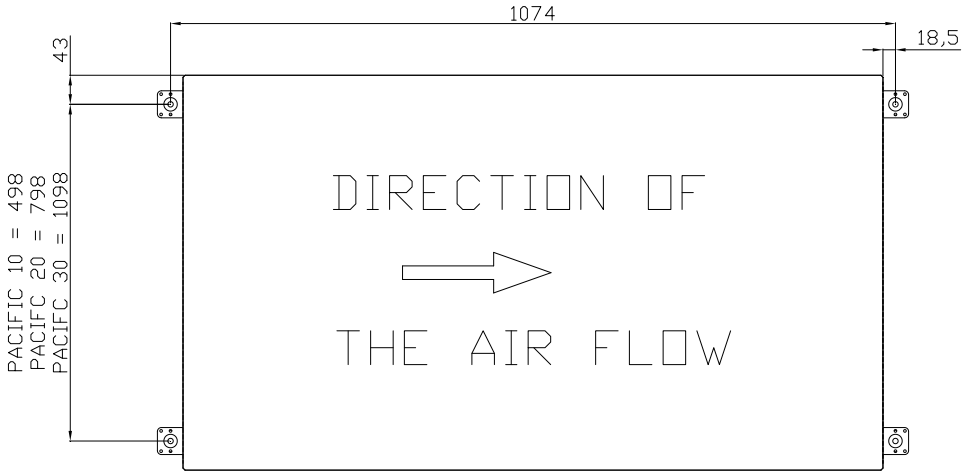


Size	A	B	C	D	E	F	Nb max spigot
10	498	566	584	749,5	283	-	1
20	798	866	884	1049,5	214	432	2
30	1098	1166	1184	1349,5	294,5	582	2

2.5 Maintenance access requirements



2.6 Template for positioning threaded hangers

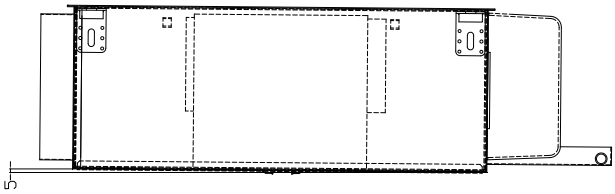


3. INSTALLATION METHOD

3.1 Coordination between the unit and its position

Before starting the installation process, it is advisable to study a Quantum M prototype to help facilitate the mounting of the unit. For the plan, it is recommended a mounting template be obtained, contact your local representative or Lennox directly.

It is recommended that Quantum M units are installed in false ceilings and movement zones such as corridors.



3.2 Installation procedure

3.2.1 Installation precautions

- During the installation of the unit, make sure all construction debris, that could damage the unit, has been removed from the ducts or equipment.

- Before starting the installation process, fit all the accessories (if necessary) to the unit according to the instructions provided in the kit.

- Determine the false ceiling type in order to define the type of threaded hangers to be used and make sure that the surface can support the weight of the unit

.

3.2.2 False ceiling installation

- A lift and ladder will make the task easier.

- Position the unit on the ground under the position where it will be placed in the false ceiling.

- Confirm that the clearances around unit are sufficient to allow for unrestricted maintenance access. Refer to the drawing showing maintenance access requirements on page 11.

- Use the drilling template to mark the ceiling fixing positions.

- Drill 4 holes for the anchor fixings

- Raise the unit, align the threaded hangers with the unit and fit the nuts.

- Incline the unit by 5 mm towards the condensate outlet to ensure that the condensate flow is adequate.

3.2.3 Condensate drain pipe

It is recommended to use a 16 mm inside diameter clear tube, preferably reinforced, with a fall of 2 cm/m, over the whole horizontal pipe run. Install a 5 cm (minimum) siphon at the outlet to prevent gas or odours flowing back from the drain.

When connecting multiple units to the same collector, use a tube with an inside diameter of 16 mm to connect the drain pan to the collector, a fall of 2 cm/m is recommended.

The condensate drain pipe is fixed to the drain pan using a collar; this is not supplied by Lennox.

Note: In order to avoid the risk of any leaks, pour 1 to 2 litres of water in to the auxiliary drain pan and check that it drains correctly. Should the water fail to drain correctly, check the fall of the drain pipe and investigate the potential causes of the problem.

3.2.Connection on the flexible water pipes

When the installation is ready, i.e. the Quantum M fixed to the ceiling, the water manifolds are in position with stop valves fitted, electrical installation prepared, connect the flexibles water pipes (not supplied by Lennox).
Each flexible has a ½'' gas screw connecter.

Warning: Don't forget to install the gasket between the screw connecter and the stop valve (gasket not supplied by Lennox).

3.2.5 Purging the circuits

When all the Quantum M units have been installed, check that the control valves are open, pressurize and then purge the circuits.
To purge the coils, using a multi grip pliers for the heating circuit and a screwdriver for the cooling circuit, gently unscrew the bleed screw located on the upper coil header.

3.2.6 Electrical connections

- All the power, control and connection cables must be supplied and fitted by the installer(s).

Always respect the IEE wiring regulations and also the national regulations during installation of the wiring.

- All wiring must be sized accordingly with the fuses recommended for a given unit.
- If required, install a circuit breaker within reach of the unit inside; always connect the equipment to earth.

<u>Warning</u>: Do not apply power to the unit until all the electrical connections have been made.

The installation can now be run.

3.3 Removal procedure

DISCONNECT THE POWER SUPPLY BEFORE CARRYING OUT ANY WORK ON THE QUANTUM M.

- Switch of the power supply to the Quantum M at the isolator provided for this purpose during installation (isolator not supplied by Lennox).
- Disconnect the power supply cables from the quick connect terminal block using a flat-ended screwdriver (2.5 maximum) the earth wire is provided with a flat connecter.

For special regulations, refer to the documentation attached to this manual.

- Remove the diffuser from the unit (see page XX)
- Shut the isolating valves located on the collectors.
- Disconnect the flexible water pipes by unscrewing the connectors (G ½'' gas).
- Disconnect the flexible condensate drain pipe, empty the siphon into a container.
- Gently raise the QUANTUM M unit a little, unscrew the 4 nuts on the threaded hangers then lower the unit.

4. FAN MOTOR ASSEMBLY

4.1 Description

Quantum M unit is equipped with a single wheel double inlet centrifugal forward curved fan.

4.2 Removal procedure

DISCONNECT THE POWER SUPPLY BEFORE CARRYING OUT ANY WORK ON THE QUANTUM M.

If the fan motor assembly developes a fault, the whole assembly must be removed and replaced.

- Remove the filter (see « replacement of the filter ») and remove the motor cover fixed by six 8mm AF hexagonal head screws.

- Disconnect the quick connector power cable to the fan motor assembly.

- The fan motor assembly is fixed to a panel. Release the panel fixed by one 8mm AF hexagonal head screw, disengage the panel from the lugs by a sideways movement followed by an upward movement.

- If an electric heater has been installed, this is mounted on the panel and is removed at the same time as the fan motor assembly (see « removal of the electric heater »).

BE CAREFUL TO AVOID CAUSING DAMAGE DURING REMOVAL

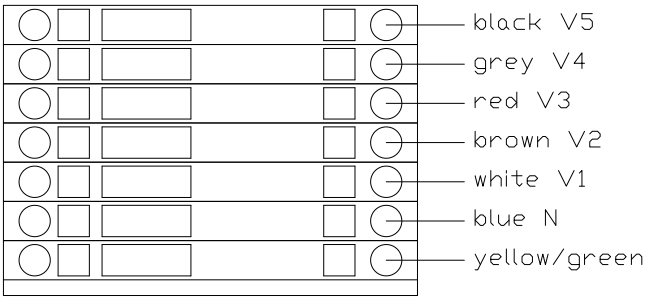
- The fan motor assembly is removed from the panel by removing the two 8mm AF hexagonal head screws, and then freeing it from the lugs.

- Replace the fan motor assembly and apply the procedure in reverse to complete the installation.

4.3 Motor speed wiring

DISCONNECT THE POWER SUPPLY BEFORE CARRYING OUT ANY WORK ON THE QUANTUM M.

Le The fan motor has 5 speeds, all are connected the quick connect terminal block.
To wire the speeds, connect the wires for the selected speeds.
The standard speeds are represented in the diagram shown below.



4.4 Capacitor replacement procedure

DISCONNECT THE POWER SUPPLY BEFORE CARRYING OUT ANY WORK ON THE QUANTUM M.

- Remove the fan motor assembly (see« fan motor removal procedure »).

- Disconnect the capacitor by removing the spade connecters from the back of the capacitor, then using a wrench of 13, to unscrew the nut which maintenance the condenser.

- Replace the capacitor and apply the procedure in reverse to complete the installation.

5. WATER COIL

5.1 Description

The right position of the coil provides a maximum heat exchanger surface for a minimum of space, thus giving to Quantum M a very interesting ration height/performance.
Available for 2 pipe or 4 pipe applications, the finned block is common offering an increased heat exchanger surface area.
The aluminium fins are mechanically bonded to 3/8'' diameter copper tubes.
The inlet and outlet connections are each provided with a 1/2'' G internal diameter threaded nut to facilitate the connection of the flat seal valve connection. The purge screws are accessible from the outside and opened with a tool.
The coils are available in the following configurations:
3, 4 or 5 rows for 2 pipe/change over or 2 pipe/2 wire applications and 3, 4 or 5 rows cooling and 1 row heating for 4 pipe applications.

5.2 Removal procedure

DISCONNECT THE POWER SUPPLY BEFORE CARRYING OUT ANY WORK ON THE QUANTUM M.

- Close the isolating valves located on the headers.

- Disconnect the flexible water pipes by unscrewing the connectors (G ½'' gas).

- Remove the valve motor(s) being careful not to damage them.

- Remove the body of the water control valve(s). Depending on the QUANTUM M configuration, do not remove the coupling associated with the valve.

- Disconnect the flexible condensate drain pipe, empty the siphon into a container.

- Remove the water coil / condensate drain pan assembly, this assembly is fixed by four 8mm AF hexagonal head screws, by pulling the assembly to the side of the QUANTUM M unit.

- Free the coil from the condensate drain pan.

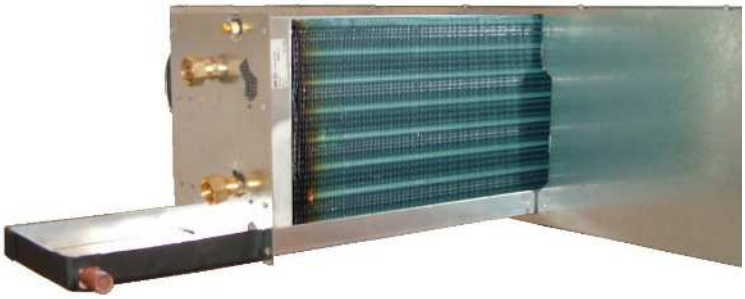
- Replace the water coil and apply the procedure in reverse to complete the installation.
Ensure that all the gasket joints are correctly remade.

- Purge the new water coil when it is refilled with water.

5.3 Water coil maintenance

For optimum performance of the water coil, the air filter should be replaced regularly. This maintenance avoids the accumulation of dust between the fins, which would significantly reduce the performance of the coil.

It is also recommended that the water coil is removed and cleaned using a compressed air jet between the fins to remove any possible accumulation of dust.



6. ELECTRIC HEATER

6.1 Description

The electric heater is of the bare wire resistive type installed in the fan discharge air stream, assuring optimum coverage and maximum heat exchange.
Available as standard with a capacity of 800 or 1500 W, the
230 V/1/50 Hz power supply is provided directly from the regulator or via a relay and a fuse.
The heater is provided with 2 levels of safety:

A manual reset thermostat, which is reset is by switching off the power, and has a trigger temperature 75°C; whilst this is off a PTC coefficient resistance with a separate supply prevents the automatic reset of the coil whilst it remains under voltage.
This safety thermostat protects the unit from over heating due to the absence of airflow.

A fusible link, rated at a temperature of 152 °C (± 16 °C). Replacement of heater assembly will be required if this blows, after establishing the cause of the fault.

6.2 Replacement

DISCONNECT THE POWER SUPPLY BEFORE CARRYING OUT ANY WORK ON THE QUANTUM M.

- Remove the complete fan motor assembly (see« removal of the fan motor assembly »).

- Withdraw the electric heater from its support by tilting it to facilitate its removal.

- Replace the electric heater and apply the procedure in reverse to complete the installation.

7. AIR FILTER

7.1 Description

Quantum M is available as standard with a G4 efficiency throwaway filter, 15 mm thick, which is accessible from the underside of the unit.
Fire classification M1.

The filter dimensions are:

➔ **540 x 215 mm**
➔ **840 x 215 mm**
➔ **1140 x 215 mm**

7.2 Filter replacement

It is important that the filter is changed regularly. The filter life depends upon the clogging rate, which varies with the environmental conditions.

If the filter is not changed or cleaned, its pressure drop will increase and dust particles may be may introduced into the fan and the water coil and degrade the performance of the QUANTUM M.

To access the filter, move the latches towards the interior to release them from the holding catches, the clip should be left suspended from the unit

Remove the filter by pulling on the tab, replacement is the procedure in reverse.

8. REPLACEMENT PARTS

If a replacement part is required for a QUANTUM M unit, contact your local representative or Lennox to obtain a detailed and coded list of the following components :

➔ **Fan motor assembly**
➔ **Water coil**
➔ **Electric heater**
➔ **Filter**

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