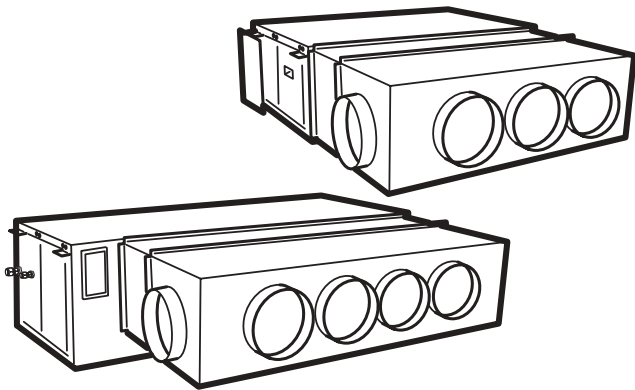


INSTALLATION & OWNER'S MANUAL

HIGH STATIC DUCTED

ELECTRIC HEATER WITH PLENUM



Models

MBC-MBH 25-65E



SAFETY

Installation and maintenance of this air conditioning system should only be carried out by trained and qualified personnel.

Regular maintenance operations such as cleaning the coils and air filters must be performed to keep the units in proper operating condition.

CAUTION

Before undertaking any work on the unit, make sure that the power supply has been disconnected.

ELECTRICAL CONNECTIONS

All electrical wiring and connections must comply with local standards.

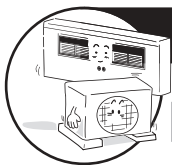
Disconnecting device must have a contact separation of at least 3 mm with all pole disconnected.

GENERAL PRECAUTIONS

Check that the power supply available agrees with nameplate voltage.

Use adequate line protection.

The unit must be grounded.



INDOOR & OUTDOOR UNITS

INDOOR UNITS

Each unit is shipped with the following items:

- an indoor unit ready for connection to the condensing unit.
- a mounting bracket set.
- a technical guide.
- a control user guide.

OUTDOOR UNITS

The units are shipped complete with a charge of R22/ R407C refrigerant sufficient for a piping length of 5 meters.



TECHNICAL SPECIFICATIONS

R-22

High Static Duct Type (MBC-MBH "P" with Heater) – 50 Hz

Models		Indoor Unit		MBC-MBH							
		25	35	45		50	55	65			
		Outdoor Unit		MOC-MOH							
		25	35	45		50	55	65			
Electric Heater		kW	5/2.5	N/A	5/2.5	N/A	9/4.5	N/A	9/4.5	9/4.5	
Power Supply		V/Ph/Hz	220-240/1/50 or 380-415/3/50								
		Ph	1	1	3	1	3	1	3	3	
Power Consumption		kW	3.067	3.188	3.118	4.04	3.794	5.214	6.11	6.66	
Running Current		A	16.0	16.78	8.98	20.76	10.06	12.26	15.45	16.33	
Refrigerant Type			R-22								
Refrigerant Charge (MOC/MOH)		gr	1,670/1,750	1,750	2,600		3,000	3,800	5,500		
Indoor Unit		V/Ph/Hz	220-240/1/50								
		Ph	1	1	1	1	1	1	1	1	
Fan		Air flow	m ³ /h	1,620	1,980		3,060		3,060	3,240	3,780
		Input Power	kW	0.357	0.478	0.478	0.6	0.6	0.6	0.68	0.81
		Running Current	A	3.18	3.96	3.96	4.00	4.00	4.00	5.09	4.97
Dimension		Height	mm	400	400	400	400	400	400	400	400
		Width	mm	718	924	924	1,204	1,204	1,204	1,204	1,404
		Depth	mm	616	616	616	616	616	616	616	616
Weight (Unit + Heater)		kg	48	55		61		65	67	92	
System Operation Control			Wired Control with LCD Display								
Heater		Height	mm	400	N/A	400	400	N/A	400	400	
		Width	mm	710	N/A	924	N/A	1018	N/A	1404	
		Depth	mm	220	N/A	220	N/A	220	N/A	220	
Outdoor Unit		V/Ph/Hz	220-240/1/50 or 380-415/3/50								
		Ph	1	1	3	1	3	1	3	3	
Compressor		Qty	1	1	1	1	1	1	1	1	
		Compressor Type	Reciprocating	Reciprocating	Reciprocating	Scroll	Reciprocating	Reciprocating	Reciprocating	Scroll	
Dimension		Height	mm	590	696	696	900	900	1,142	1,142	1,142
		Width	mm	820	850	850	850	850	1,060	1,060	1,060
		Depth	mm	280	287	287	285	285	285	345	345
Weight		kg	64	68	85	85	90	109	112	112	
Piping		Type	Flare + Nuts								
		Pipe Size	Suction	inch	5/8	5/8	5/8	3/4	3/4	3/4	3/4
			Liquid	inch	3/8	3/8	3/8	3/8	3/8	3/8	3/8

R-407C

High Static Duct Type (MBC-MBH "P" with Heater) – 50 Hz

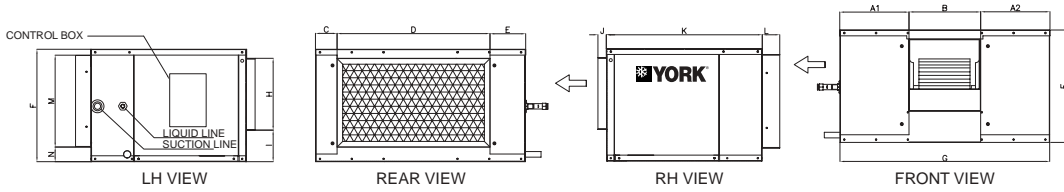
Models		Indoor Unit		MBC-MBH							
		25G	35G	45G		50G	55G	65G			
		Outdoor Unit		MOC-MOH							
		25G	35G	45G		50G	55G	65G			
Electric Heater		kW	5/2.5	5/2.5	9/4.5		N/A	9/4.5	9/4.5		
Power Supply		V/Ph/Hz	220/240-1-50 or 380-415/3/50								
		Ph	1	3	3		3	3	3		
Power Consumption		kW	5.7	7	9.7		10.5	11.70	13.20		
Running Current		A	27.4	22.8	20.1		22.2	24.2	29.7		
Refrigerant Type			R-407								
Refrigerant Charge (MOC/MOH)		gr	2,100	3,000	4,000		3,900	4,000	5,400		
Indoor Unit		V/Ph/Hz	220/240-1-50								
		Ph	1	1	1		1	1	1		
Fan		Air flow	m ³ /h	1,620	1,980	3,060		3,060	3,240	3,780	
		Input Power	W	3000	3800	5100		5100	5800	7300	
		Running Current	A	14.6	16.6	11.8		11.8	12.8	18.3	
Dimension		Height	mm	400	400	400		400	400	400	
		Width	mm	710	924	1018		1204	1204	1404	
		Depth	mm	661	661	661		661	661	661	
Weight (Unit + Heater)		kg	48	55	61		65	67	92		
System Operation Control			Wired Control with LCD Display								
Heater		Height	mm	400	400	400		N/A	400	400	
		Width	mm	710	924	1018		N/A	1204	1404	
		Depth	mm	220	220	220		N/A	220	220	
Outdoor Unit		V/Ph/Hz	220-240/1/50 or 380-415/3/50								
		Ph	1	3	3		3	3	3		
Compressor		Qty	1	1	1		1	1	1		
		Compressor Type	Reciprocating								
Dimension		Height	mm	696	900	1,142		1,142	1,142	1,142	
		Width	mm	850	850	850		1,060	1,060	1,060	
		Depth	mm	287	285	285		345	345	345	
Weight		kg	68	85	90		109	112	112		
Piping		Type	Flare + Nuts								
		Pipe Size	Suction	inch	5/8	5/8	3/4		3/4	3/4	
			Liquid	inch	3/8	3/8	3/8		3/8	3/8	



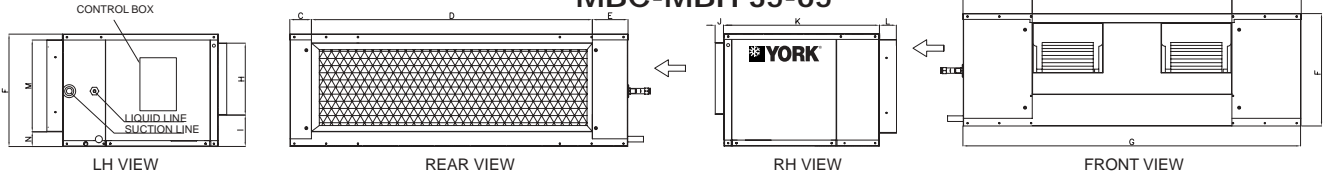
DIMENSIONS

INDOOR UNIT

MBC-MBH 25

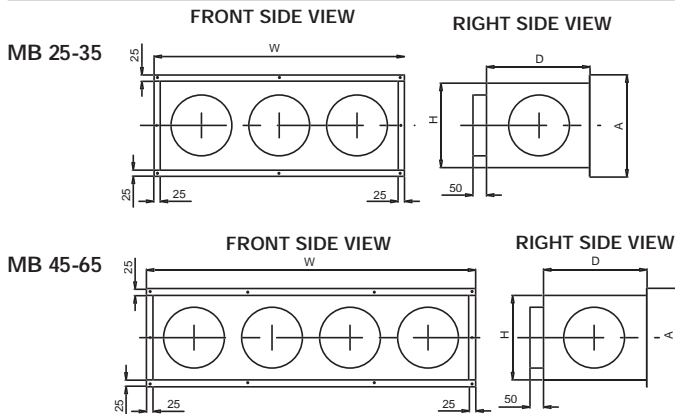


MBC-MBH 35-65



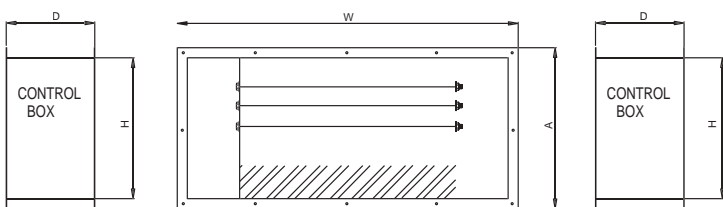
Model	A1	A2	B	C	D	E	F	G	H	I	J	K	L	M	N
MBC-MBH 25	234.5	234.5	239	73	512	123	400	710	264	98	30	556	75	327	50
MBC-MBH 35	307.5	307.5	307	73	723	123	400	924	264	98	30	556	75	327	50
MBC-MBH 45	148	148	720	73	821	123	400	1018	250	95	30	556	75	327	50
MBC-MBH 50	241	241	720	73	1006	123	400	1204	250	95	30	556	75	327	50
MBC-MBH 55	241	241	720	73	1006	123	400	1204	250	95	30	556	75	327	50
MBC-MBH 65	341	341	720	73	1206	123	400	1404	304	73	30	556	75	332	50

PLENUM DIMENSIONS



Model	A (mm.)	H (mm.)	W (mm.)	D (mm.)
MBC-MBH25	400	350	710	300
MBC-MBH35	400	350	924	300
MBC-MBH45	400	350	1018	300
MBC-MBH50-55	400	350	1204	300
MBC-MBH65	400	350	1404	300

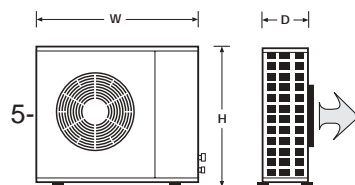
ELECTRIC HEATER DIMENSIONS



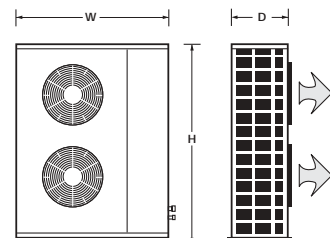
Model	A (mm.)	H (mm.)	W (mm.)	D (mm.)
MBC-MBH25	400	300	710	220
MBC-MBH35	400	300	924	220
MBC-MBH45	400	300	1080	220
MBC-MBH50-55	400	300	1204	220
MBC-MBH65	400	300	1404	220

OUTDOOR UNIT

MOC/MOH 25-35



MOC/MOH 45-65



Outdoor unit dimensions are shown in the Technical Specifications table.



INSTALLATION

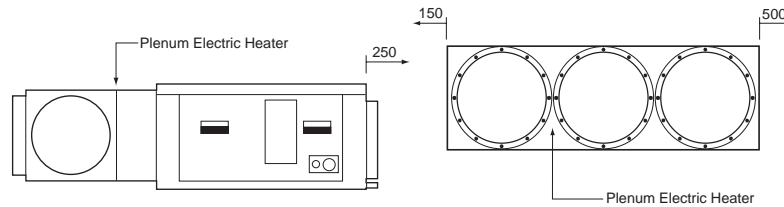
Unit installation details:

- unit mounting plenum electric heater installation
- condensate water drainage connections
- refrigerant piping connections
- unit wiring connection

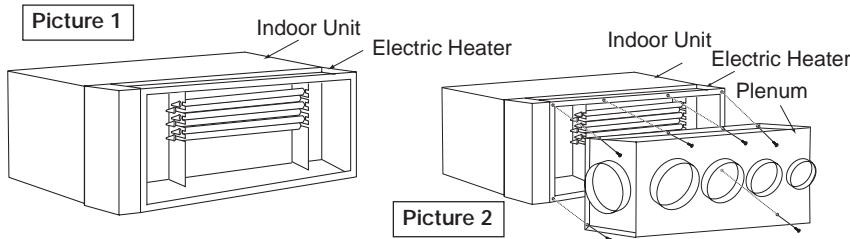
UNIT CLEARANCES

A minimum of clearance is necessary around the units to ensure proper air circulation and easy access for maintenance.

CLEARANCE REQUIRED FOR INDOOR UNITS



PLENUM AND ELECTRIC HEATER INSTALLATION



1. The electric heater is installed by factory. (Picture 1)
2. Fixed the plenum with electric heater. (Picture 2)
3. Connected wiring see at the diagram. (Item 10 wiring diagram)

CLEARANCE REQUIRED FOR OUTDOOR UNITS

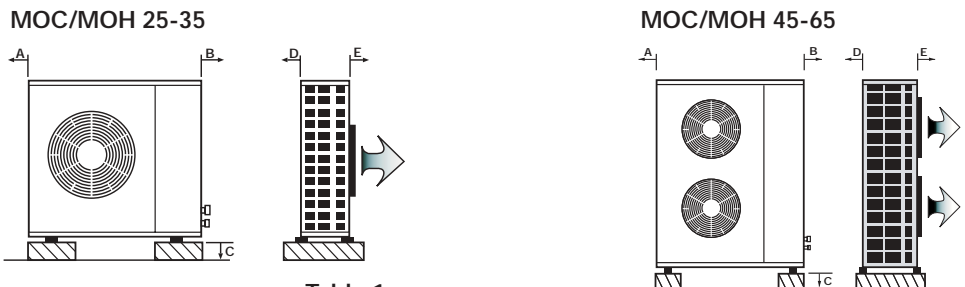
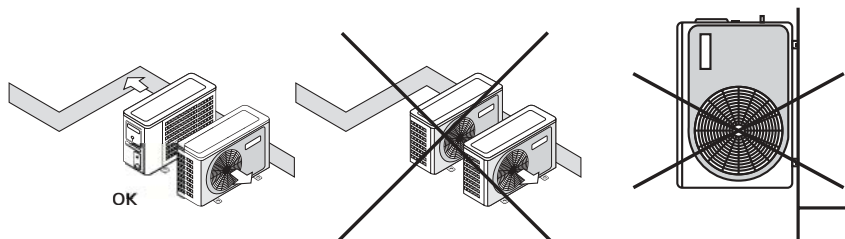


Table 1

Unit	MOC - MOH				
	25	35	45	55	65
A	400	400	400	400	400
B	200	200	200	200	200
C	100	100	100	100	100
D	300	300	300	300	300
E	600	800	800	800	800

OUTDOOR UNIT INSTALLATION





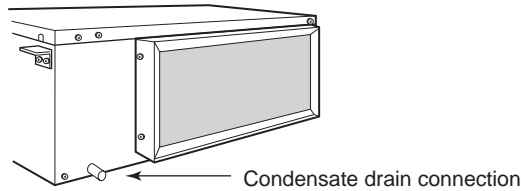
CONDENSATE DRAINAGE

Condensate drainage is provided on the unit. The connection is located at the rear. Use a 19 mm diameter plastic tube.

To ensure correct condensate drainage, the drain line must be installed with a gradient of at least 2% (2 cm per meter) and without any upward slopes.

An elbow trap at least 50 mm in height must also be provided.

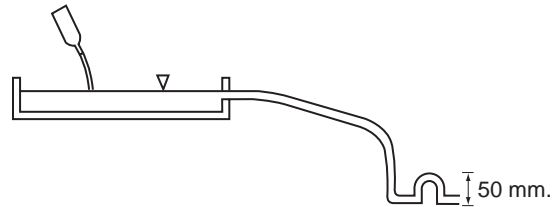
If possible, install a U bend fitted with an inspection cap.



Where the condensate lines from several units are joined together, each individual outlet must be fitted with an elbow trap.

After routing and connecting condensate lines, pour water into the collecting pan and check that it drains correctly.

An auxiliary condensate pump could be installed in cases where drain lines cannot be routed the correct gradient.

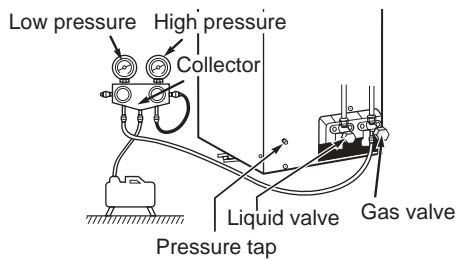


REFRIGERANT PIPING CONNECTIONS

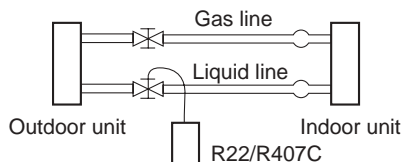
Prefabricated refrigerant piping is available as an accessory. If this is used, piping and insulating materials employed must be compatible with this type of installation.

The pre-charged outdoor unit does not require charging if piping length is 5 m or less. However, the interconnecting piping and the indoor unit must be pumped down before releasing R22/R407C refrigerant into them from the outdoor unit.

- 1 - Remove the cap from the service valve.
- 2 - Connect the line to a vacuum pump and down to 5 pa.
- 3 - When pump down is finished, wait 15 minutes to detect potential circuit leakage. Open service valves on the outdoor unit.



If piping length exceeds 5 meters, add 10 g of refrigerant R22/R407C per extra meter.



NOTE

The expansion device is located in the outdoor unit.

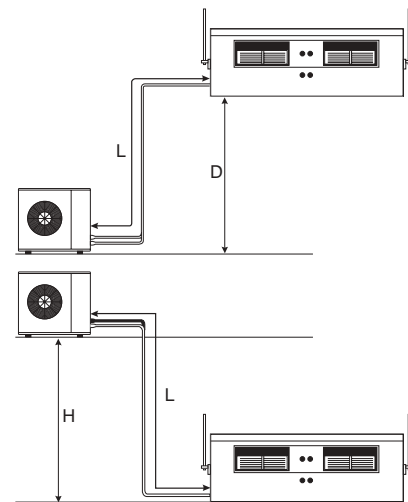


Table 2 - Maximum piping lengths

Unit size	25	35	45	55	65
D (m)	20	20	24	24	24
L (m)	25	25	30	30	30
H (m)	22	22	26	26	26

NOTE

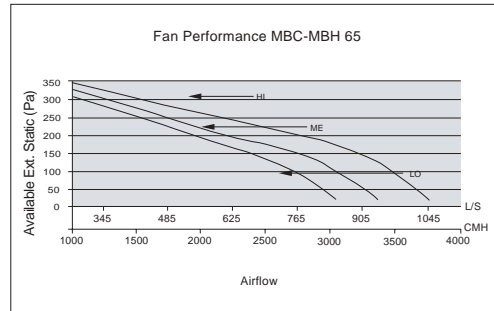
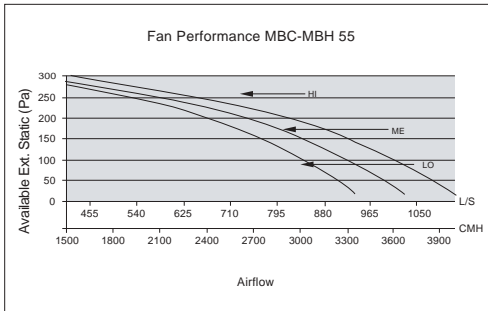
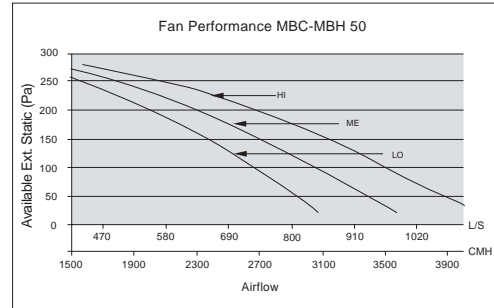
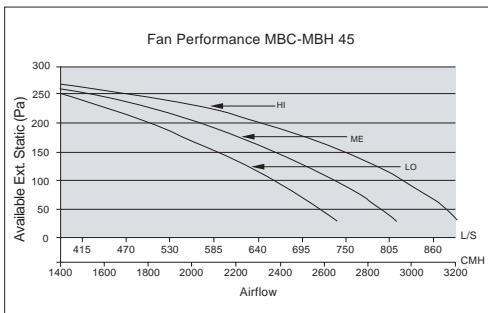
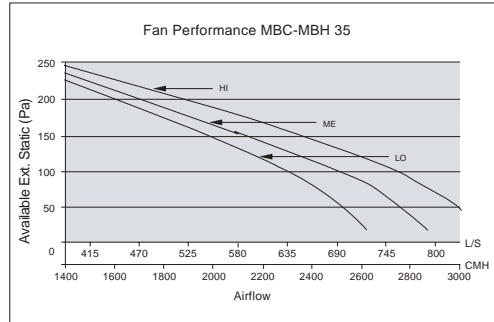
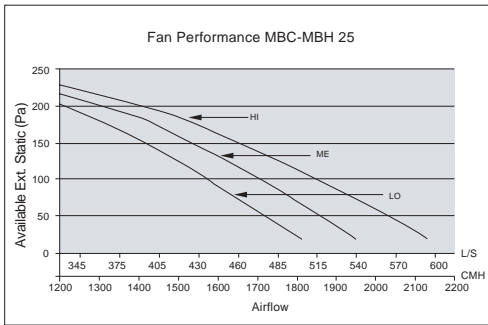
Where the difference in elevation is greater than 5 meters, install an oil trap every 5 meters.



FAN SPEEDS

For ducted installations, check airflow and static pressure against values shown in the following diagrams. Insufficient airflow can cause operating problems such as icing which may damage the compressor in the outdoor unit.

FAN CURVES : High Static Blower (50Hz)





UNIT CONTROLLER OPERATION

EMERGENCY OPERATION

Units are equipped with a switch to run in emergency operation mode.

The switch is on the infrared receiver board where the LED lights are located, or in the case of wall mount units it can be accessed by opening the front grill. This switch is used for manual operation upon expiration of service life of remote control batteries, or upon occurrence of a problem. Pushing the emergency switch first turns it on; pushing it again turns it off (toggle action). During emergency operation, the remote controller cannot be used and the power LED light will flash in intervals, while the other LED lights will indicate the operation of the Diagnostic Codes.

In Emergency Operation in cool mode, the temperature will be set at 24°C and the fan on Auto. In heating the unit will switch to auto mode at a temperature set point of 24°C and the fan will run on auto mode.

AUTO RESTART FUNCTION

Upon suspension of electrical power supply during operation for any reason, when supply of power resumes the unit operation will restart automatically according to all parameters set before the suspension of power.

ANTI-ICE AND ANTI OVERHEATING

This feature is used to prevent the evaporator unit from freezing during cool or dry operation. During execution of anti-ice operation and anti-overheating, the compressor will stop operating and the fan will continue to run until the coil temperature reaches predetermined set points, at which time the unit will resume normal operation.

LOW VOLTAGE

The feature is used to protect against any damage to the unit caused by fluctuation of voltage. If voltage is lower than the lower limit for approximately 10 seconds or longer, compressor operation will be temporarily stopped. Normal operation will resume when the voltage returns above the set limit for a minimum of 10 seconds.

If the time elapsed is less than 3 minutes then the compressor start up will be delayed until 3 minutes has passed.

SYSTEM OPERATION MODE SELECTION

There are five different operating modes;

Cool Only and Heat Pump Units

Cooling mode

- Dry mode
- Fan mode (only on Cooling units)

Electric Heating Units Only

- Automatic mode
- Heating mode

The required mode can be selected by pressing the **SYSTEM button** until the corresponding mode symbol appears on the display. In automatic mode the unit operates automatically between Cool and Heat modes based on the change in the room temperature and the temperature set point entered on the control.

ROOM TEMPERATURE SETTING

Press the **TEMP button** up or down to change the setting to the desired room temperature. The setting range is from 18°C to 32°C. Operating the unit below 18°C may result in the coil freezing.

FAN SPEED AND LOUVER POSITION SETTING

Low - Medium - High speeds are available. Press the **FAN button** for the desired airflow. The **FAN** symbol shows the speed that has been selected.

Automatic fan speed is available in Cooling and Heat modes only.

When the dehumidification mode is used, the fan speed is set automatically.

The **SWEEP button** is used to control the movement of the air louvers.

By pressing the button, the louver can be set in either the fixed position or by pressing again, it will move in a sweeping motion to distribute the air in the room. Applicable only for units with air sweep.

FILTER CARE AND FILTER ALARM

To keep your air conditioning unit in peak condition, the filters should be cleaned regularly, i.e. once a month, or more frequently depending on conditions. To do this;

- Remove the filters from the unit.
- Wash them in soapy water (do not use detergent).
- Dry the filters and put them back in place on the unit.

To clean the unit casing, use a damp cloth.

The control is equipped with a filter Alarm; based on the hours of operation, and indicated by all of the lights flashing (see the Diagnostic Chart for details), to remind you to change the filter. To reset the alarm press the **FILTER button** on the remote control. If you fail to press the **RESET button** the alarm will automatically reset after 6 hours of operation.

CLOCK AND TIMER FUNCTIONS

To set the clock press the **CLOCK button** for at least 5 seconds, until the **CLOCK** symbol flashes. Then use the **TIMER buttons** to set the desired time. Finally, press the **CLOCK button** again to enter the time that has been set. The control is equipped with a timer that can set both start and stop times for the unit. The operational settings that have been entered on the control will be the ones that the control follows when it starts.

To use the timer function follow these steps;

START

1. Turn the unit on.
2. Press the **START button**
3. Adjust the clock display to the desired start time
4. Press Enter

The **START** symbol will be shown on the display, indicating that a start time has been programmed.

STOP

1. With the unit on.
2. Press the **STOP button**
3. Adjust the clock display to the desired stop time
4. Press Enter

The **STOP** symbol will be shown on the display, indicating that a stop time has been programmed. Lights will indicate that the unit timer has been set.

After the unit has either been started or stopped by the timer, the set time will remain in the program, however the **START** or **STOP button** must be pressed again to reset the timer function.

To cancel either the Start or Stop Timer setting press the **CANCEL button**. To check the time that has been entered either for starting or stopping the unit, press the appropriate **START - STOP button** and the time will be displayed. Press the button again to go back to the clock display.

SLEEP TIMER FUNCTION

Sleep mode, which can be used in Cool and Heat modes is a program in the control which is designed to give a comfortable room environment during sleeping hours.

At the start of sleep mode the unit will operate in cooling or heating mode continuously until the temperature set point is reached. It will then run for a further 1 hour period at this setting. After this, the temperature set point will automatically be raised + 1°C every hour (cooling) or lowered – 1°C every hour (heating) until the sleep (shut off) time is reached. At this time the unit will shut off.

Sleep mode is set by pressing the **SLEEP button** which will set the shut off time in 30 minute increments, starting from the time shown on the clock when the **SLEEP button** is first pressed.

In sleep mode the unit will follow the settings that were entered at the time that Sleep mode was started. Sleep mode can be cancelled by pressing the **CANCEL button** at any time.

DIAGNOSTIC INFORMATION FUNCTION

The control is equipped with a diagnostic information system to report operation of the unit as well as operational failures. If your remote control does not operate properly first check the polarity of the batteries and that they are in good working condition. Also make sure that the control is pointed directly at the air conditioning unit when you are using it, that the distance is a maximum of 10 meters, and that there are no obstacles between the remote control and the air conditioning unit.

The Diagnostic Information is reported via different flashing patterns of the 3 indicator lights on the unit.

The chart below shows the light patterns for the various operational, protection and failure modes.

This feature is intended to provide information to the consumer as well as for service of the units.

Status	Power	Timer	Operation	Mode	
OFF (with power on)	O	O	O	Normal Operation	
ON (temperature satisfied)	X	O	O	Normal Operation	
Waiting for delay	X	F-1	O	Normal Operation	
Compressor started	X	O	X	Normal Operation	
Sleep mode	X	X	X/O	Normal Operation	
Start timer set	X	F-2	X/O	Normal Operation	
Stop timer set	X	F-3	X/O	Normal Operation	
Low HP temp < 20°C	X	O	F-1	Protection	
Coil temp > 40°C (cooling)	X	O	F-2	Protection	
Overheat > 62°C (heating)	X	F-1	F-1	Protection	
Anti Freeze	X	F-2	F-2	Protection	
Low voltage	F-2	O	O	Protection	
Sensor fail	F-1	O	F-1	Reset-Call Service Technician	X = ON, O = OFF, F-1 = ON : 0.5 sec, OFF : 0.5 sec
Cooling fail	F-2	O	F-2	Reset-Call Service Technician	
Heating fail	F-3	O	F-3	Reset-Call Service Technician	
Emergency operation	F-3	Note 1	Note 1	Operational	F-2 = ON : 1.5 sec, OFF : 0.5 sec
Test operation	F-1	F-1	F-1	Operational	OFF : 0.5 sec
Filter	F-3	F-3	F-3	Protection	F-3 = ON : 0.5 sec, OFF : 1.5 sec

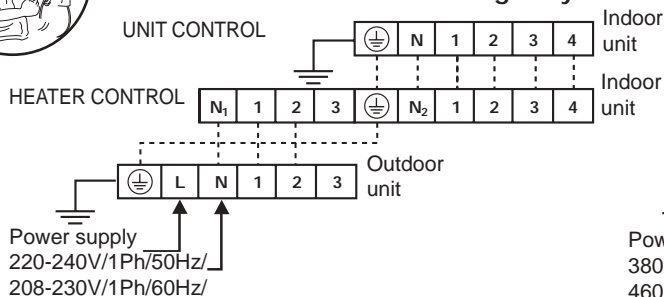
NOTES

1. In emergency mode, the Power light will flash and the other lights will indicate the operation as above.
2. Lights will flash during the time that the units is held off, due to Low Voltage. If the voltage has passed through the reset voltage and the unit is waiting for the time delay, the lights will go to normal operation.
3. The lights will show the LED Diagnostic Code even when the unit is off.

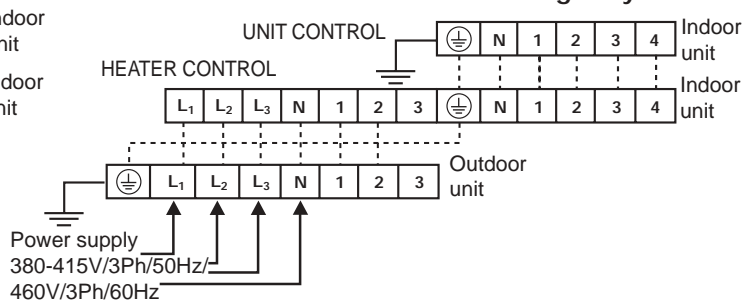


WIRING DIAGRAM

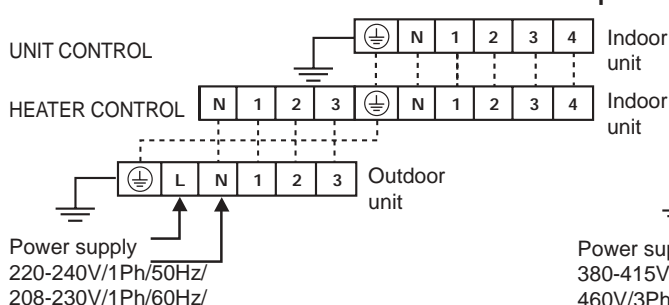
MBC 25E/MOC 25 Cooling Only



MBC 35-65E/MOC 35-65 Cooling Only



MBH 25E/MOH 25 Heat Pump



MBH 35-66E/MOH 35-65 Heat Pump

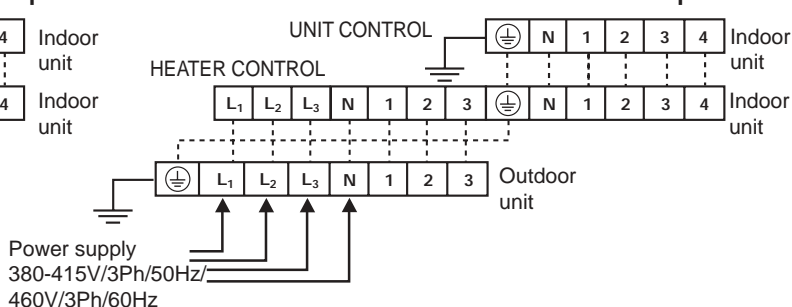


Table 3 - Wiring sizes

Unit size		25	35	45	55	65
Power supply	mm ²	3x4	5x2.5		5x4	
Interconnection (Indoor/Outdoor)	Cooling mm ²	3x2.5				
	Heating mm ²	4x2.5				
Fuse (slow-blow)	A	20	10	16		

For details of indoor unit and outdoor unit wiring, see the diagram supplied inside the units. Start the unit and check operation both in cooling and heating mode.



SERVICE AND MAINTENANCE

The units are designed to operate for long periods of time with a minimum of maintenance. However, the following operations must be performed regularly.

COMPONENT	MAINTENANCE OPERATIONS	RECOMMENDED FREQUENCY
Air filter	<ol style="list-style-type: none"> 1 - Clean with a vacuum cleaner or tap gently then wash in warm water (40°C) with a mild detergent. 2 - Rinse and dry before replacing on unit. 3 - Never use petrol, alcohol or any other chemical product. 	Every month or more often if necessary.
Unit casing	<ol style="list-style-type: none"> 1 - Remove dust from the front panel with a soft duster or wipe a damp cloth with a mild soap solution. 2 - Never use petrol, alcohol or any other chemical product. 	Every month or more often if necessary.
Drain pan and evacuation piping	<ol style="list-style-type: none"> 1 - Clean and check for obstructions. 	Each season before start up.
Indoor / Outdoor coils	<ol style="list-style-type: none"> 1 - Check condition and remove dust from between coil fins. 	Each season before start up.
Compressor	<ol style="list-style-type: none"> 1 - No maintenance required. 	



TECHNICAL APPENDIX

Unit Capacity

Total cooling capacity can be determined by using correction factors C1, C2 and C3.

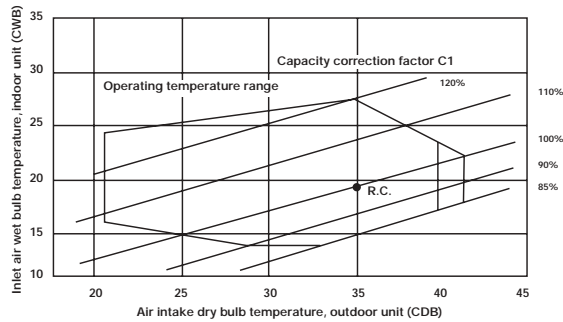
Given cooling capacity = Cooling capacity at standard rating conditions x C1 x C2 x C3.

C1 = Capacity correction factor for temperature

C2 = Capacity correction for piping length

C3 = Capacity correction for indoor unit fan speed

Capacity correction factor for temperature



Capacity correction factor for piping length (C2)

Piping length (m)	Indoor unit	
	5	10
Correction factor C2	1.00	0.98

Capacity correction factor for indoor fan speed (C3)

Fan speed	Indoor unit		
	High	Medium	Low
Correction factor C3	1	0.90	0.75

Operating temperature limits

	Maximum	Minimum
Cooling mode	+ 46°C	+ 19°C
Heating mode	+ 28°C (heat pump mode)	(- 5 with low ambient kit) - 8°C

R.C. = Standard rating conditions :
Indoor 27°C DB / 19.5°C WB
Outdoor 35°C DB / 24°C WB

DECLARATION OF CONFORMITY

DE - COMMISSIONING DISMANTLING & DISPOSAL

This product contains refrigerant under pressure, rotating parts, and electrical connections which may be a danger and cause injury!
All work must only be carried out by competent persons using suitable protective clothing and safety precautions.



Read the Manual



Risk of electric shock



Unit is remotely controlled and may start without warning

1. Isolate all sources of electrical supply to the unit including any control system supplies switched by the unit. Ensure that all points of electrical and gas isolation are secured in the OFF position. The supply cables and gas pipework may then be disconnected and removed. For points of connection refer to unit installation instructions.
2. Remove all refrigerant from each system of the unit into a suitable container using a refrigerant reclaim or recovery unit. This refrigerant may then be reused, if appropriate, or returned to the manufacturer for disposal. **Under No circumstances should refrigerant be vented to atmosphere.** Where appropriate, drain the refrigerant oil from each system into a suitable container and dispose of according to local laws and regulations governing disposal of oily wastes.
3. Packaged unit can generally be removed in one piece after disconnection as above. Any fixing down bolts should be removed and then unit lifted from position using the points provided and equipment of adequate lifting capacity. Reference MUST be made to the unit installation instructions for unit weight and correct methods of lifting. Note that any residual or spilt refrigerant oil should be mopped up and disposed of as described above.
4. After removal from position the unit parts may be disposed of according to local laws and regulations.



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