

# 40MBAB

Air Handler Unit Ductless System  
Sizes 18 to 60



## Product Data

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Fig. 1 — Sizes 18 to 60

A220908

NOTE: Images are for illustration purposes only. Actual models may differ slightly.

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### INDUSTRY LEADING FEATURES / BENEFITS

#### A PERFECT BALANCE BETWEEN BUDGET LIMITS, ENERGY SAVINGS AND COMFORT

The 40MBAB series air handler unit ductless systems are a matched combination of an outdoor condensing unit and an indoor fan coil unit connected only by refrigerant tubing and wires. The fan coil is mounted in the ceiling.

This selection of fan coils permits creative solutions to design problems such as:

- Add-ons to current space (an office or family room addition)
- Special space requirements
- When changes in the load cannot be handled by the existing system
- Historical renovations or any application where preserving the look of the original structure is essential.

These compact indoor fan coil units take up very little space above the ceiling. Advanced system components incorporate innovative technology to provide reliable cooling performance at low sound levels.

## **LOW SOUND LEVELS**

When noise is a concern, the ductless systems are the answer. The indoor units are whisper quiet. There are no compressors indoors, either in the conditioned space or directly over it, and there is none of the noise usually generated by air being forced through ductwork.

## **SECURE OPERATION**

If security is an issue, outdoor and indoor units are connected only by refrigerant piping and wiring to prevent intruders from crawling through the ductwork. In addition, since outdoor units can be installed close to an outside wall, coils are protected from vandals and severe weather.

## **FAST INSTALLATION**

This compact ductless system is simple to install. A mounting bracket and duct work is needed for the indoor units, and only wire and piping need run between the indoor and outdoor units. These units are fast and easy to install ensuring minimal disruption to customers in the home or workplace. This makes the air handler systems the equipment of choice, especially in retrofit situations.

On all indoor units, service and maintenance expense is reduced due to easy accessible service panels. In addition, these air handler systems have extensive self-diagnostics to assist in troubleshooting.

## **BUILT-IN RELIABILITY**

The air handler ductless system indoor and outdoor units are designed to provide years of trouble-free operation.

The air handler indoor units include protection against freeze-up and high evaporator temperatures on heat pumps.

The condensing units on the heat pumps are protected by a three minute delay that provides over-current protection and high temperature protection prior to the start of the compressor.

## **ECONOMICAL OPERATION**

The air handler ductless system design allows individual or multi-room heating or cooling when required. There is no need to run large supply-air fans or chilled water pumps to handle a few spaces with unique load patterns.

## **EASY-TO-USE CONTROLS**

The air handler units have microprocessor-based controls to provide the ultimate in comfort and efficiency. The user-friendly control provides the interface between the user and the unit.

## **MULTI-POISE INSTALLATION**

Designed for maximum installation flexibility. The secondary drain built-in allows the unit to be mounted in an upflow, downflow, left or right installation depending on existing conditions.

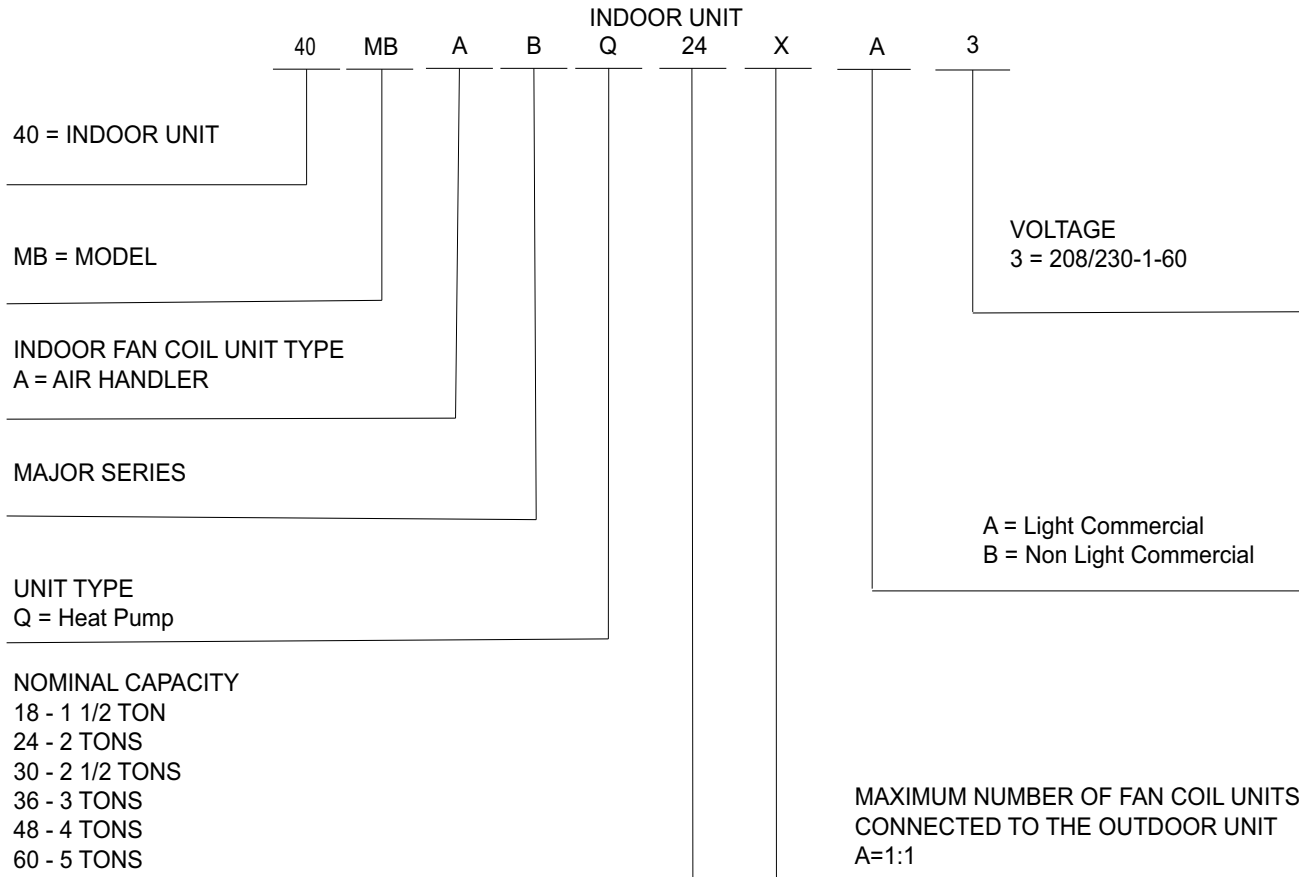
## **24V INTERFACE**

The built-in 24V Interface allows users to control the ductless system with a third party heatpump thermostat.

## **AGENCY LISTINGS**

All systems are listed with AHRI (Air Conditioning, Heating & Refrigeration Institute), UL/ETL and CSA.

# MODEL NUMBER NOMENCLATURE



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**Fig. 2 — Model Number Nomenclature**



Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program. For verification of certification for individual products, go to [www.ahridirectory.org](http://www.ahridirectory.org).



**Fig. 3 — AHRI Certified**

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## STANDARD FEATURES AND ACCESSORIES

**Table 1 — Standard Features**

| <b>EASE OF INSTALLATION</b>                                |   |
|--|---|
| Low Voltage Controls                                       | S |
| <b>COMFORT FEATURES</b>                                    |   |
| Microprocessor Controls                                    | S |
| 24V Interface built-in for third party thermostat controls | S |
| Wireless Remote Controller                                 | S |
| Wired Remote Controller                                    | S |
| Auto Restart Function                                      | S |
| Cold Blow Protection on Heat Pumps                         | S |
| Freeze Protection Mode on Heat Pumps                       | S |
| Turbo Mode   | S |
| Auto Changeover on Heat Pumps                              | S |
| <b>SAFETY AND RELIABILITY</b>                              |   |
| Indoor Coil Freeze Protection                              | S |
| Aluminum Hydrophilic pre-coated fins                       | S |
| Indoor Coil High Temp Protection in Heating Mode           | S |
| <b>EASE OF SERVICE AND MAINTENANCE</b>                     |   |
| Cleanable Filters  | S |
| Diagnostics  | S |
| <b>APPLICATION FLEXIBILITY</b>                             |   |
| Multi-poise Installation                                   | S |

### Legend

S - Standard

A - Accessory

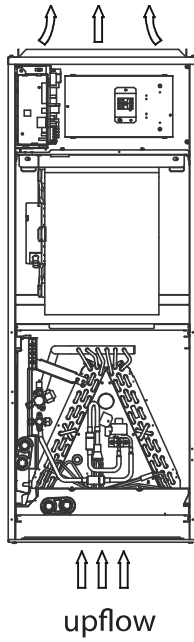
**Table 2 — Accessories**

| <b>ORDERING NO.</b> | <b>DESCRIPTION</b>               | <b>FOR MODELS</b>            |
|---------------------|----------------------------------|------------------------------|
| EHKMB05KN           | Electric Heater Kit 5kW          | 18K, 24K, 30K, 36K           |
| EHKMB08KN           | Electric Heater Kit 8kW          | 18K, 24K, 30K, 36K, 48K      |
| EHKMB10KN           | Electric Heater Kit 10kW         | 18K, 24K, 30K, 36K, 48K, 60K |
| EHKMB15KN           | Electric Heater Kit 15kW         | 24K, 30K, 36K, 48K, 60K      |
| EHKMB20KN           | Electric Heater Kit 20kW         | 36K, 48K, 60K                |
| EHKMB25KN           | Electric Heater Kit 25kW         | 60K                          |
| DGAPAXXX1620        | Infinity® Air Purifier Size 1620 | 18K, 24K                     |
| DGAPAXXX2020        | Infinity® Air Purifier Size 2020 | 30K, 36K, 48K                |
| DGAPAXXX2420        | Infinity® Air Purifier Size 2420 | 60K                          |

**NOTE: The unit is NOT equipped with a single point electrical connection for electric heater, air purifier or other peripherals. A separate power supply is required.**

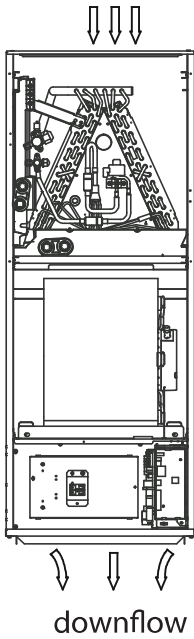
## MULTI-POISE INSTALLATION

Designed for maximum installation flexibility. The secondary drain built-in allows the unit to be mounted in an upflow, downflow, left or right installation depending on existing conditions.



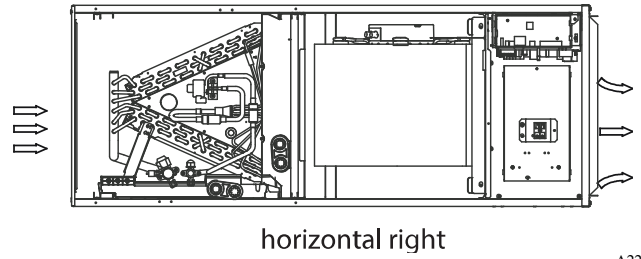
**Fig. 4 — Vertical Upflow Installation**

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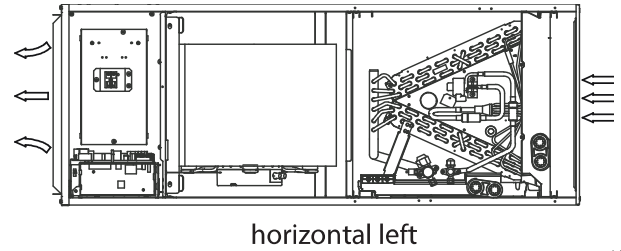
**Fig. 5 — Downflow Illustration**

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**Fig. 6 — Horizontal Right Installation**

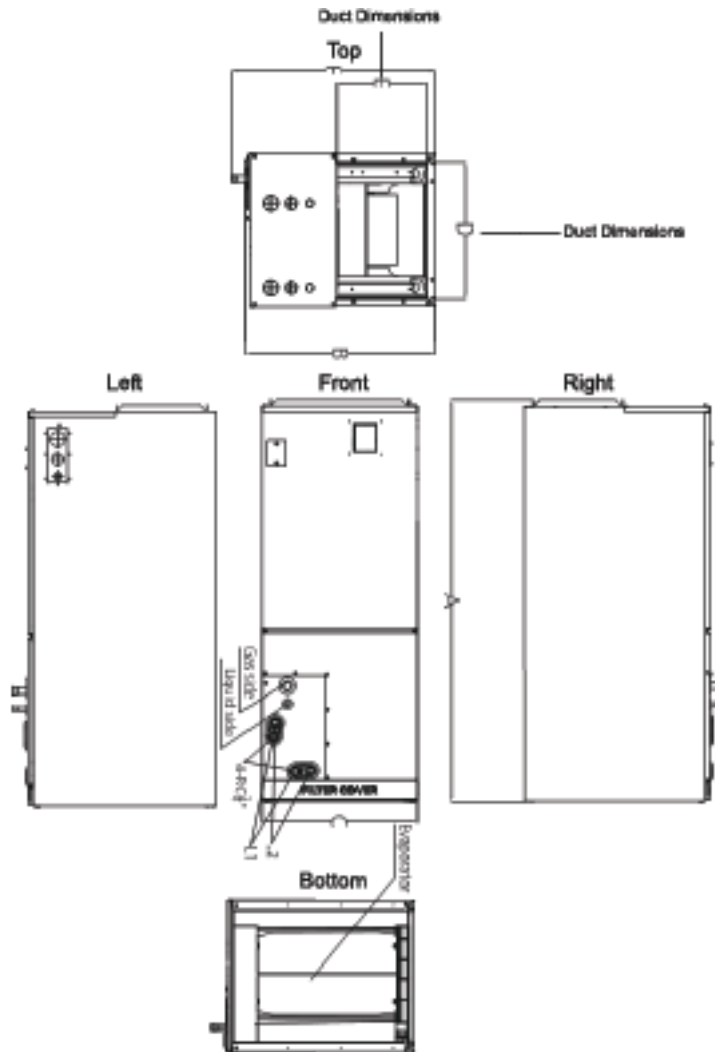
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**Fig. 7 — Horizontal Left installation**

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# DIMENSIONS



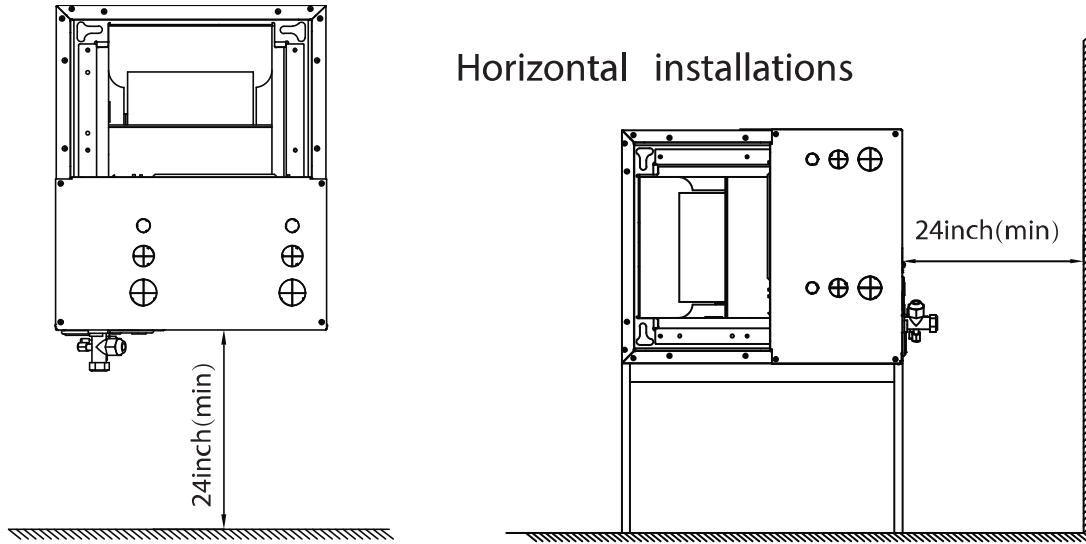
**Fig. 8 —Dimensions**

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**Table 3 — Indoor Unit Dimensions**

| MODEL   | DIMENSIONS |           |           |         |         |         |
|---------|------------|-----------|-----------|---------|---------|---------|
|         | A (HEIGHT) | B (DEPTH) | C (WIDTH) | D       | E       | F       |
| 18K-24K | 45in       | 21in      | 17.5in    | 15.75in | 10.25in | 23in    |
|         | (1143mm)   | (534mm)   | (445mm)   | (400mm) | (260mm) | (585mm) |
| 30K-48K | 49in       | 21in      | 21in      | 19.31in | 10.25in | 23in    |
|         | (1245mm)   | (534mm)   | (534mm)   | (490mm) | (260mm) | (585mm) |
| 60K     | 53in       | 21in      | 24.5in    | 22.88in | 10.25in | 23in    |
|         | (1346mm)   | (534mm)   | (622mm)   | (580mm) | (260mm) | (585mm) |

# CLEARANCES



**Fig. 9 — Clearances**

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# SPECIFICATIONS

**Table 4 — Specifications**

| System          | Size   |          | 18                                    | 24                  | 30                  | 36                | 36 (Light Commercial) | 48 (Light Commercial) | 60 (Light Commercial) |
|-----------------|--|----------|---------------------------------------|---------------------|---------------------|-------------------|-----------------------|-----------------------|-----------------------|
|                 | Indoor Model                                   |          | 40MBABQ18XB3                          | 40MBABQ24XB3        | 40MBABQ30XB3        | 40MBABQ36XB3      | 40MBABQ36XA3          | 40MBABQ48XA3          | 40MBABQ60XA3          |
| Electrical      | Voltage, Phase, Cycle                          | V/Ph/Hz  | 208/230-1-60                          | 208/230-1-60        | 208/230-1-60        | 208/230-1-60      | 208/230-1-60          | 208/230-1-60          | 208/230-1-60          |
|                 | Power Supply                                   |          | Indoor unit powered from outdoor unit |                     |                     |                   |                       |                       |                       |
|                 | MCA  | A.       | 3                                     | 4                   | 4.5                 | 5                 | 5                     | 7.5                   | 9                     |
| Controls        | Wireless Remote Controller (°F/°C Convertible) |          | Standard                              | Standard            | Standard            | Standard          | Standard              | Standard              | Standard              |
|                 | Wired Remote Controller (°F/°C Convertible)    |          | Standard                              | Standard            | Standard            | Standard          | Standard              | Standard              | Standard              |
| Operating Range | Cooling Indoor DB Min - Max                    | °F (°C)  | 62~90 (17~32)                         | 60~90 (16~32)       | 60~90 (16~32)       | 60~90 (16~32)     | 60~90 (16~32)         | 60~90 (16~32)         | 60~90 (16~32)         |
|                 | Heating Indoor DB Min - Max                    | °F (°C)  | 32~86 (0~30)                          | 32~86 (0~30)        | 32~86 (0~30)        | 32~86 (0~30)      | 32~86 (0~30)          | 32~86 (0~30)          | 32~86 (0~30)          |
| Piping          | Pipe Connection Size - Liquid                  | in (mm)  | 1/4 (6.35)                            | 3/8 (9.52)          | 3/8 (9.52)          | 3/8 (9.52)        | 3/8 (9.52)            | 3/8 (9.52)            | 3/8 (9.52)            |
|                 | Pipe Connection Size - Suction                 | in (mm)  | 1/2 (12.7)                            | 5/8 (16)            | 5/8 (16)            | 5/8 (16)          | 5/8 (16)              | 5/8 (16)              | 7/8 (22)              |
| Indoor Coil     | Face Area                                      | Sq. Ft.  | 3.0                                   | 3.0                 | 4.90                | 4.90              | 4.90                  | 4.90                  | 4.90                  |
|                 | No. Rows                                       |          | 3                                     | 3                   | 4                   | 4                 | 4                     | 4                     | 5                     |
|                 | Fins per inch                                  |          | 20                                    | 20                  | 20                  | 20                | 20                    | 20                    | 20                    |
|                 | Circuits                                       |          | 6                                     | 6                   | 10                  | 10                | 10                    | 10                    | 14                    |
| Indoor          | Unit Width                                     | in (mm)  | 17.5 (445)                            | 17.5 (445)          | 21 (534)            | 21 (534)          | 21 (534)              | 21 (534)              | 24.5 (622)            |
|                 | Unit Height                                    | in (mm)  | 45 (1143)                             | 45 (1143)           | 49 (1245)           | 49 (1245)         | 49 (1245)             | 49 (1245)             | 53 (1346)             |
|                 | Unit Depth                                     | in (mm)  | 21 (534)                              | 21 (534)            | 21 (534)            | 21 (534)          | 21 (534)              | 21 (534)              | 21 (534)              |
|                 | Net Weight                                     | lbs (kg) | 106.7 (48.4)                          | 106.7 (48.4)        | 129.63 (58.8)       | 129.63 (58.8)     | 129.63 (58.8)         | 132.5 (60.1)          | 164.02 (74.4)         |
|                 | Fan Speeds                                     |          | 4                                     | 4                   | 4                   | 4                 | 4                     | 4                     | 4                     |
|                 | Airflow (lowest to highest)                    | CFM      | 488/529/576/618                       | 629/694/759/824     | 712/806/894/1088    | 865/971/1082/1188 | 865/971/1082/1188     | 906/1094/1282/1471    | 1135/1359/1582/1806   |
|                 | Cooling Sound Pressure (low to high)           | dB(A)    | 35.2/35.7/36.4/37.2                   | 38.2/39.9/41.0/42.5 | 35.8/38.1/40.4/42.7 | 41.4/44.0/48.5    | 41.4/44.0/48.5        | 44.6/47.7/51.0/53.7   | 45.7/47.5/51.2/53.3   |
|                 | Heating Sound Pressure (low to high)           | dB(A)    | 28.9/30.5/33.6/34.2                   | 32.2/35.8/39.5/40.5 | 28.1/33.1/39.3/42.4 | 33.9/39.0/45.1    | 33.9/39.0/45.1        | 43.4/47.8/50.5/53.8   | 39.4/44.9/50.1/51.0   |
|                 | Max Static Pressure                            | In.WG.   | 0.80                                  | 0.80                | 0.80                | 0.80              | 0.80                  | 0.80                  | 0.80                  |
|                 | Field Drain Pipe Size O.D.                     | in (mm)  | 3/4 (19.1)                            | 3/4 (19.1)          | 3/4 (19.1)          | 3/4 (19.1)        | 3/4 (19.1)            | 3/4 (19.1)            | 3/4 (19.1)            |

\*Performance may vary based on the compatible outdoor units. See respective pages for performance data.

**NOTE: See the current compatibility charts for a list of the indoor unit and outdoor unit match ups.**

## APPLICATION DATA

### UNIT SELECTION

Select equipment to either match or that can handle slightly less than the anticipated peak load. This provides better humidity control, fewer unit cycles, and less part-load operation.

For units used in spaces with high sensible loads, base equipment selection on unit sensible load, not on a total anticipated load. Adjust for anticipated room wet bulb temperature to avoid undersizing equipment.

### UNIT MOUNTING (INDOOR)

Refer to the unit's installation instructions for further details.

**Unit leveling** - For reliable operation, units should be level in all planes.

**Clearance** - Provide adequate clearance for airflow (see Fig. 9 — on page 7).

**Unit location** - Select a location that provides the best air circulation for the space.

Do not install the indoor or outdoor units in a location with special environmental conditions. For those applications, contact your ductless representative.

### SUPPORT

Adequate support must be provided to support the weight of all fan coils. Refer to the "SPECIFICATIONS" on page 7 for fan coil weights. Refer to "DIMENSIONS" on page 6 for the base unit dimensional drawings which contain the location of the mounting brackets.

**Table 5 — System Operating Conditions**

|           | OPERATING RANGE<br>MIN/MAX °F (°C) |                  |
|-----------|------------------------------------|------------------|
|           | Cooling                            | Heating          |
| Indoor DB | 63 / 90 (17 / 32)                  | 32 / 86 (0 / 30) |
| Indoor WB | 59 / 84 (15 / 29)                  |                  |

**NOTE: Reference the unit's installation instructions for more information.**

### DRAIN CONNECTIONS

Install the drains in compliance with the local sanitation codes.

## WIRING

Size all wires per the NEC (National Electrical Code) or CEC (Canadian Electrical Code) and local codes. Use the electrical data from the outdoor unit (MCA - minimum circuit amps and MOCP - maximum over current protection), to correctly size the wires and the disconnect fuse or breakers respectively.

### SIZE 18 - 36K (NON-LIGHT COMMERCIAL MODELS) RECOMMENDED CONNECTION METHOD FOR POWER AND COMMUNICATION WIRING

**Power and Communication Wiring:** The main power is supplied to the outdoor unit. The field supplied 14/3 power/communication wiring, from the outdoor unit to the indoor unit, consists of four (4) wires and provides the power for the indoor unit. Two wires are high voltage AC power, one is communication wiring and the other is a ground wire.

**To minimize communication interference:** If installed in a high Electromagnetic field (EMF) area and communication issues arise, a 14/2 stranded shielded cable can be used to replace L(2) and (S) between the outdoor and indoor units - landing the shield onto the ground in the outdoor unit only.

**Table 6 — Wiring Size 18-36**

| CABLE            | CABLE SIZE | REMARKS  |
|------------------|------------|--|
| Connection Cable | 14AWG      | 3 wire + Ground 1 $\phi$ 208/230 V<br>(Stranded wire is recommended) |

### SIZES 36-60K (LIGHT COMMERCIAL MODELS) RECOMMENDED CONNECTION METHOD FOR POWER AND COMMUNICATION WIRING

**Power and Communication Wiring:** The main power is supplied to the outdoor unit. The field supplied power wiring from the outdoor unit to the indoor unit consists of three (3) wires and provides the power for the indoor unit. Two wires are high voltage AC power and one is a ground wire. To minimize voltage drop, the factory recommended wire size is 14/2 power stranded with a ground.

**Communication Wiring:** A separate 2-wire cable (stranded, shielded, copper conductor), with a 600 volt rating and double insulated copper wire, must be used as the communication wire from the outdoor unit to the indoor unit. Use a separate shielded 16AWG stranded control wire.

**Table 7 — Wiring Size 18-36**

| CABLE                  | CABLE SIZE | REMARKS                               |
|------------------------|------------|---------------------------------------|
| Power Connection Cable | 14AWG      | 2 wire + Ground 1 $\phi$ 208/230 V    |
| Communication Cable    | 16AWG      | 2 wire stranded shielded control wire |

**NOTE: The main power is supplied to the outdoor unit. When disconnecting the power to the outdoor unit, the indoor unit loses power. A disconnect switch may be required for the indoor unit (check local codes). A 3 pole disconnect may be used for extra protection between the indoor and outdoor unit. Separate power is required for an Auxiliary Electric Heater.**



## CAUTION

### EQUIPMENT DAMAGE HAZARD

Comply with local codes while running wire from the indoor unit to the outdoor unit. Every wire must be connected firmly. Loose wiring may cause the terminal to overheat or result in a unit malfunction. A fire hazard may also exist. Ensure all wiring is tightly connected.

No wire should touch the refrigerant tubing, compressor or any moving parts. Disconnecting means must be provided and located within sight and readily accessible from the system. Route the connecting cable with conduit through the hole in the conduit panel.



## CONTROL SYSTEM

The indoor unit is equipped with a microprocessor control to perform two functions:

1. Provide safety for the system
2. Control the system and provide optimum levels of comfort and efficiency.

The main microprocessor is located on the control board of the fan coil unit (outdoor units have a microprocessor also) with thermistors located in the fan coil air inlet and on the indoor coil. Heat pump units have a thermistor on the outdoor coil. These thermistors monitor the system's operation to keep the unit within acceptable parameters and control the operating mode.

## WIRELESS REMOTE CONTROLLER

A wireless remote controller is supplied.

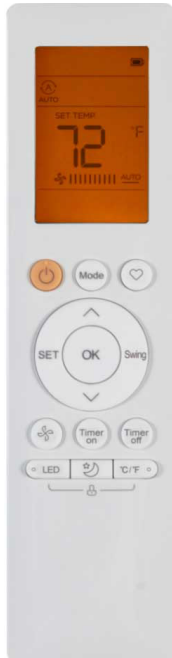


Fig. 10 — Wireless Remote Controller

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## WIRED REMOTE CONTROLLER



Fig. 11 — Wired Remote Controller

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A wired remote controller is supplied. The wired controller will also control the auxiliary heat (if installed) as either a supplementary or an emergency heating source.

**NOTE: The 40MBAB utilizes a constant air volume ECM motor that automatically adjusts to increases in static pressure to maintain 0.80" ESP. Therefore, there is no need to set airflow using either of the supplied remotes.**

## 24 VOLT INTERFACE

The indoor unit comes equipped with a 24V interface that provides further flexibility, functionality and control allowing it to be controlled by any 3rd party single-stage heat pump thermostat (field supplied).

**NOTE: If a third party thermostat is preferred, a heat pump thermostat must be utilized.**

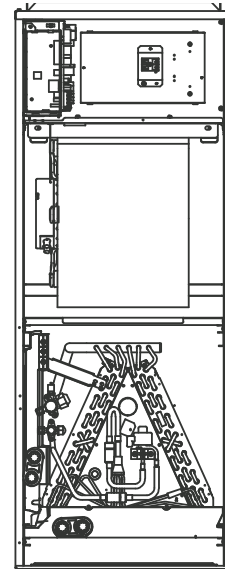


Fig. 12 — Air Handler

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## AIR FLOW DATA

**Table 8 — Air Flow Data**

| SYSTEM SIZE     |        | 18K        | 24K        | 30K        | 36K        | 48K        | 60K        |
|-----------------|--------|------------|------------|------------|------------|------------|------------|
|                 |        | (208/230V) | (208/230V) | (208/230V) | (208/230V) | (208/230V) | (208/230V) |
| Airflow** (CFM) | High   | 576        | 759        | 894        | 1,082      | 1,282      | 1,582      |
|                 | Medium | 529        | 694        | 806        | 971        | 1,094      | 1,359      |
|                 | Low    | 488        | 629        | 712        | 865        | 906        | 1,135      |
|                 | Turbo  | 618        | 824        | 1,088      | 1,188      | 1,471      | 1,806      |

Airflow values obtained at AHRI 210/240 rating conditions.

\*\*Measured at rates static pressure:

24K: 0.1 in. WG (25pa)

36K: 0.15 in. WG (37pa)

48K: 0.2 in. WG (50pa)

## SOUND PRESSURE

**Table 9 — Sound Pressure**

| AIR HANDLER                               |                                  | 18K         | 24K         | 30K         | 36K        | 48K         | 60K         |
|---|----------------------------------|-------------|-------------|-------------|------------|-------------|-------------|
|   |                                  | (208/230V)  | (208/230V)  | (208/230V)  | (208/230V) | (208/230V)  | (208/230V)  |
| **Cooling operation Indoor Sound Pressure | dBA at (Turbo/High/Med /Low CFM) | 37/36/36/35 | 43/41/40/38 | 43/40/38/36 | 49/44/41   | 54/51/48/45 | 53/51/48/46 |
| **Heating operation Indoor Sound Pressure | dBA at (Turbo/High/Med/Low CFM)  | 34/34/31/29 | 41/40/36/32 | 42/39/33/28 | 45/39/34   | 54/51/48/43 | 51/50/45/39 |

## SOUND PRESSURE IN OCTAVE BANDS

**Table 10 — Sound Pressure In Octave Bands**

| SIZE | Frequency (Hz) | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|------|----------------|----|-----|-----|-----|------|------|------|------|
| 18K  | Cooling dB(A)  | 43 | 38  | 35  | 33  | 31   | 28   | 26   | 25   |
|      | Heating dB(A)  | 43 | 38  | 34  | 28  | 29   | 25   | 23   | 18   |
| 24K  | Cooling dB(A)  | 44 | 44  | 40  | 36  | 36   | 33   | 31   | 28   |
|      | Heating dB(A)  | 46 | 44  | 40  | 33  | 35   | 32   | 29   | 23   |
| 30K  | Cooling dB(A)  | 51 | 49  | 34  | 35  | 34   | 33   | 30   | 27   |
|      | Heating dB(A)  | 50 | 52  | 33  | 32  | 31   | 31   | 28   | 22   |
| 36K  | Cooling dB(A)  | 54 | 48  | 47  | 43  | 43   | 41   | 40   | 36   |
|      | Heating dB(A)  | 49 | 44  | 44  | 38  | 40   | 38   | 36   | 32   |
| 48K  | Cooling dB(A)  | 52 | 53  | 50  | 43  | 46   | 44   | 42   | 39   |
|      | Heating dB(A)  | 52 | 50  | 50  | 43  | 46   | 43   | 41   | 37   |
| 60K  | Cooling dB(A)  | 64 | 56  | 45  | 47  | 47   | 42   | 42   | 36   |
|      | Heating dB(A)  | 60 | 56  | 46  | 43  | 46   | 42   | 41   | 35   |

# SOUND PRESSURE TESTING METHOD

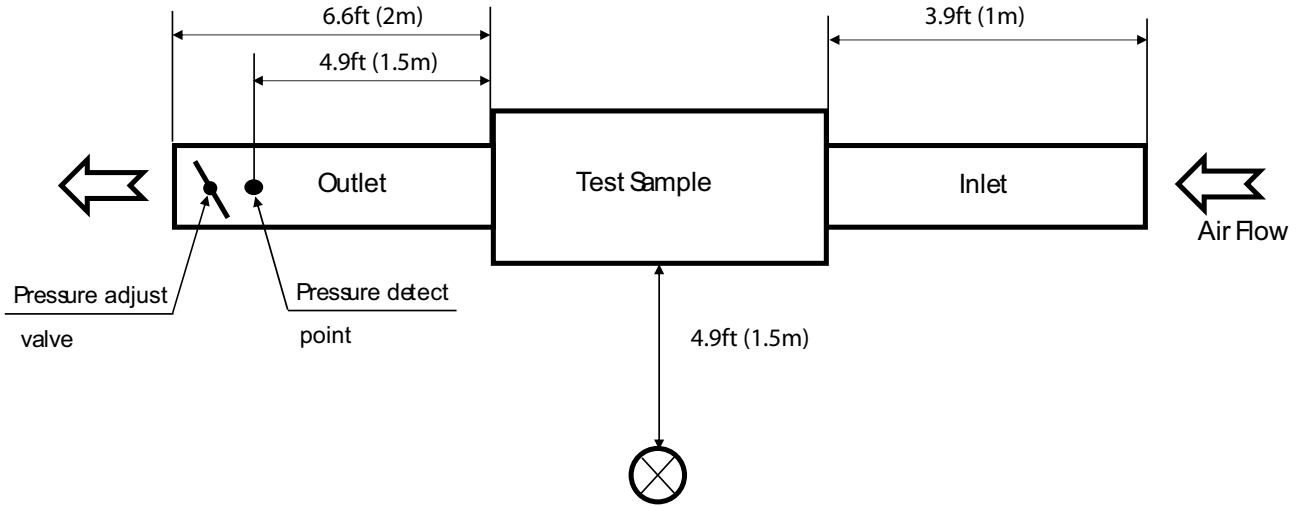


Fig. 13 —Sound Pressure Testing Method

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## FAN AND MOTOR SPECIFICATIONS

Table 11 — Fan and Motor Specifications

| SIZES            |                  | 18K                 | 24K          | 30K/36K        | 48K            | 60K            |  |
|------------------|------------------|---------------------|--------------|----------------|----------------|----------------|--|
| (208/230 V)      |                  |                     |              |                |                |                |  |
| INDOOR FAN       | Material         | Metal               |              |                |                |                |  |
|                  | Type             | ECM                 |              |                |                |                |  |
|                  | Diameter         | inch 10.63          | 10.63        | 11.1           | 11.1           | 10.98          |  |
|                  | Height           | inch 8.15           | 8.15         | 9.65           | 9.65           | 10.67          |  |
| INDOOR FAN MOTOR | Model            | ZKFD-250-8-1        | ZKFD-250-8-1 | ZKFD-375-8-1-1 | ZKFD-560-8-1-1 | ZKFD-750-8-1-1 |  |
|                  | Volts            | V 208/230           | 208/230      | 208/230        | 208/230        | 208/230        |  |
|                  | Type             | DC                  |              |                |                |                |  |
|                  | Phase            | 3                   |              |                |                |                |  |
|                  | FLA              | 2                   | 3            | 3.5            | 3.5            | 7              |  |
|                  | Insulation class | B                   | B            | B              | B              | B              |  |
|                  | Safe class       | IPX0                |              |                |                |                |  |
|                  | Input            | W 67.8              | 67.8         | 168            | 235            | 286.5          |  |
|                  | Output           | W 250               | 250          | 375            | 560            | 750            |  |
|                  | Range of current | Amps 0.66±15%       | 0.66±15%     | 1.4±15%        | 1.9±15%        | 2.26±15%       |  |
|                  | Rated current    | Amps 0.66           | 0.66         | 1.4            | 1.9            | 2.26           |  |
|                  | Capacitor        | µF                  | NA           |                |                |                |  |
|                  | Rated HP         | HP 1/3              | 1/3          | 1/2            | 3/4            | 1              |  |
|                  | Speed            | rev/min 550/510/450 | 550/510/450  | 685/620/560    | 780/685/580    | 820/720/615    |  |
| Rated RPM        | rev/min 550      | 550                 | 685          | 780            | 820            |                |  |
| Max. input       | W 67.8           | 67.8                | 168          | 235            | 286.5          |                |  |

**Table 12 — High, Medium, Low Air Volume Parameters**

| 18K                |                 |                  | 24K                |                 |                  | 30K                |                 |                  | 36K                |                 |                  | 48K                |                 |                  | 60K                |                 |                  |
|--------------------|-----------------|------------------|--------------------|-----------------|------------------|--------------------|-----------------|------------------|--------------------|-----------------|------------------|--------------------|-----------------|------------------|--------------------|-----------------|------------------|
| The PWM duty cycle | Static pressure | Air volume (CFM) | The PWM duty cycle | Static pressure | Air volume (CFM) | The PWM duty cycle | Static pressure | Air volume (CFM) | The PWM duty cycle | Static pressure | Air volume (CFM) | The PWM duty cycle | Static pressure | Air volume (CFM) | The PWM duty cycle | Static pressure | Air volume (CFM) |
| <b>Low</b>         | 0               | 489              | <b>Low</b>         | 0               | 598              | <b>Low</b>         | 0               | 422              | <b>Low</b>         | 0               | 879              | <b>Low</b>         | 0               | 946              | <b>Low</b>         | 0               | 1151             |
|                    | 0.10"           | 493              |                    | 0.10"           | 613              |                    | 0.10"           | 705              |                    | 0.10"           | 883              |                    | 0.10"           | 943              |                    | 0.10"           | 1133             |
|                    | 0.15"           | 490              |                    | 0.15"           | 625              |                    | 0.15"           | 713              |                    | 0.15"           | 888              |                    | 0.15"           | 942              |                    | 0.15"           | 1136             |
|                    | 0.20"           | 488              |                    | 0.20"           | 630              |                    | 0.20"           | 705              |                    | 0.20"           | 892              |                    | 0.20"           | 948              |                    | 0.20"           | 1132             |
|                    | 0.30"           | 501              |                    | 0.30"           | 632              |                    | 0.30"           | 708              |                    | 0.30"           | 893              |                    | 0.30"           | 947              |                    | 0.30"           | 1128             |
|                    | 0.40"           | 497              |                    | 0.40"           | 635              |                    | 0.40"           | 711              |                    | 0.40"           | 893              |                    | 0.40"           | 940              |                    | 0.40"           | 1134             |
|                    | 0.50"           | 495              |                    | 0.50"           | 631              |                    | 0.50"           | 707              |                    | 0.50"           | 892              |                    | 0.50"           | 940              |                    | 0.50"           | 1130             |
|                    | 0.60"           | 492              |                    | 0.60"           | 624              |                    | 0.60"           | 704              |                    | 0.60"           | 890              |                    | 0.60"           | 933              |                    | 0.60"           | 1133             |
|                    | 0.80"           | 489              |                    | 0.80"           | 614              |                    | 0.80"           | 702              |                    | 0.80"           | 873              |                    | 0.80"           | 925              |                    | 0.80"           | 1126             |
|                    | 1.00"           | 488              |                    | 1.00"           | 624              |                    | 1.00"           | 698              |                    | 1.00"           | 826              |                    | 1.00"           | 925              |                    | 1.00"           | 1118             |
| <b>Mid</b>         | 0               | 524              | <b>Mid</b>         | 0               | 692              | <b>Mid</b>         | 0               | 813              | <b>Mid</b>         | 0               | 1010             | <b>Mid</b>         | 0               | 1155             | <b>Mid</b>         | 0               | 1367             |
|                    | 0.10"           | 528              |                    | 0.10"           | 690              |                    | 0.10"           | 811              |                    | 0.10"           | 1001             |                    | 0.10"           | 1156             |                    | 0.10"           | 1358             |
|                    | 0.15"           | 532              |                    | 0.15"           | 685              |                    | 0.15"           | 813              |                    | 0.15"           | 1001             |                    | 0.15"           | 1154             |                    | 0.15"           | 1362             |
|                    | 0.20"           | 542              |                    | 0.20"           | 695              |                    | 0.20"           | 816              |                    | 0.20"           | 1000             |                    | 0.20"           | 1154             |                    | 0.20"           | 1361             |
|                    | 0.30"           | 523              |                    | 0.30"           | 693              |                    | 0.30"           | 815              |                    | 0.30"           | 995              |                    | 0.30"           | 1143             |                    | 0.30"           | 1360             |
|                    | 0.40"           | 524              |                    | 0.40"           | 692              |                    | 0.40"           | 811              |                    | 0.40"           | 995              |                    | 0.40"           | 1147             |                    | 0.40"           | 1352             |
|                    | 0.50"           | 533              |                    | 0.50"           | 688              |                    | 0.50"           | 809              |                    | 0.50"           | 996              |                    | 0.50"           | 1149             |                    | 0.50"           | 1353             |
|                    | 0.60"           | 523              |                    | 0.60"           | 684              |                    | 0.60"           | 801              |                    | 0.60"           | 983              |                    | 0.60"           | 1143             |                    | 0.60"           | 1348             |
|                    | 0.80"           | 521              |                    | 0.80"           | 670              |                    | 0.80"           | 807              |                    | 0.80"           | 996              |                    | 0.80"           | 1140             |                    | 0.80"           | 1340             |
|                    | 1.00"           | 519              |                    | 1.00"           | 654              |                    | 1.00"           | 801              |                    | 1.00"           | 969              |                    | 1.00"           | 1113             |                    | 1.00"           | 1316             |
| <b>High</b>        | 0               | 573              | <b>High</b>        | 0               | 752              | <b>High</b>        | 0               | 899              | <b>High</b>        | 0               | 1137             | <b>High</b>        | 0               | 1325             | <b>High</b>        | 0               | 1608             |
|                    | 0.10"           | 577              |                    | 0.10"           | 746              |                    | 0.10"           | 895              |                    | 0.10"           | 1123             |                    | 0.10"           | 1328             |                    | 0.10"           | 1590             |
|                    | 0.15"           | 580              |                    | 0.15"           | 750              |                    | 0.15"           | 902              |                    | 0.15"           | 1119             |                    | 0.15"           | 1337             |                    | 0.15"           | 1586             |
|                    | 0.20"           | 576              |                    | 0.20"           | 756              |                    | 0.20"           | 898              |                    | 0.20"           | 1120             |                    | 0.20"           | 1337             |                    | 0.20"           | 1560             |
|                    | 0.30"           | 579              |                    | 0.30"           | 750              |                    | 0.30"           | 900              |                    | 0.30"           | 1112             |                    | 0.30"           | 1330             |                    | 0.30"           | 1561             |
|                    | 0.40"           | 574              |                    | 0.40"           | 746              |                    | 0.40"           | 909              |                    | 0.40"           | 1111             |                    | 0.40"           | 1333             |                    | 0.40"           | 1554             |
|                    | 0.50"           | 573              |                    | 0.50"           | 741              |                    | 0.50"           | 901              |                    | 0.50"           | 1113             |                    | 0.50"           | 1338             |                    | 0.50"           | 1549             |
|                    | 0.60"           | 576              |                    | 0.60"           | 745              |                    | 0.60"           | 908              |                    | 0.60"           | 1101             |                    | 0.60"           | 1335             |                    | 0.60"           | 1545             |
|                    | 0.80"           | 577              |                    | 0.80"           | 735              |                    | 0.80"           | 905              |                    | 0.80"           | 1094             |                    | 0.80"           | 1321             |                    | 0.80"           | 1543             |
|                    | 1.00"           | 574              |                    | 1.00"           | 714              |                    | 1.00"           | 899              |                    | 1.00"           | 1088             |                    | 1.00"           | 1321             |                    | 1.00"           | 1548             |
| <b>Turbo</b>       | 0               | 611              | <b>Turbo</b>       | 0               | 820              | <b>Turbo</b>       | 0               | 986              | <b>Turbo</b>       | 0               | 1179             | <b>Turbo</b>       | 0               | 1465             | <b>Turbo</b>       | 0               | 1799             |
|                    | 0.10"           | 616              |                    | 0.10"           | 826              |                    | 0.10"           | 983              |                    | 0.10"           | 1181             |                    | 0.10"           | 1468             |                    | 0.10"           | 1801             |
|                    | 0.15"           | 617              |                    | 0.15"           | 822              |                    | 0.15"           | 982              |                    | 0.15"           | 1188             |                    | 0.15"           | 1479             |                    | 0.15"           | 1798             |
|                    | 0.20"           | 614              |                    | 0.20"           | 821              |                    | 0.20"           | 980              |                    | 0.20"           | 1180             |                    | 0.20"           | 1469             |                    | 0.20"           | 1792             |
|                    | 0.30"           | 612              |                    | 0.30"           | 826              |                    | 0.30"           | 988              |                    | 0.30"           | 1182             |                    | 0.30"           | 1466             |                    | 0.30"           | 1800             |
|                    | 0.40"           | 618              |                    | 0.40"           | 822              |                    | 0.40"           | 989              |                    | 0.40"           | 1191             |                    | 0.40"           | 1476             |                    | 0.40"           | 1808             |
|                    | 0.50"           | 622              |                    | 0.50"           | 828              |                    | 0.50"           | 986              |                    | 0.50"           | 1180             |                    | 0.50"           | 1468             |                    | 0.50"           | 1796             |
|                    | 0.60"           | 610              |                    | 0.60"           | 818              |                    | 0.60"           | 993              |                    | 0.60"           | 1190             |                    | 0.60"           | 1478             |                    | 0.60"           | 1798             |
|                    | 0.70"           | 613              |                    | 0.70"           | 824              |                    | 0.70"           | 990              |                    | 0.70"           | 1198             |                    | 0.70"           | 1471             |                    | 0.70"           | 1812             |
|                    | 0.80"           | 618              |                    | 0.80"           | 823              |                    | 0.80"           | 988              |                    | 0.80"           | 1188             |                    | 0.80"           | 1472             |                    | 0.80"           | 1806             |

# WIRING DIAGRAMS

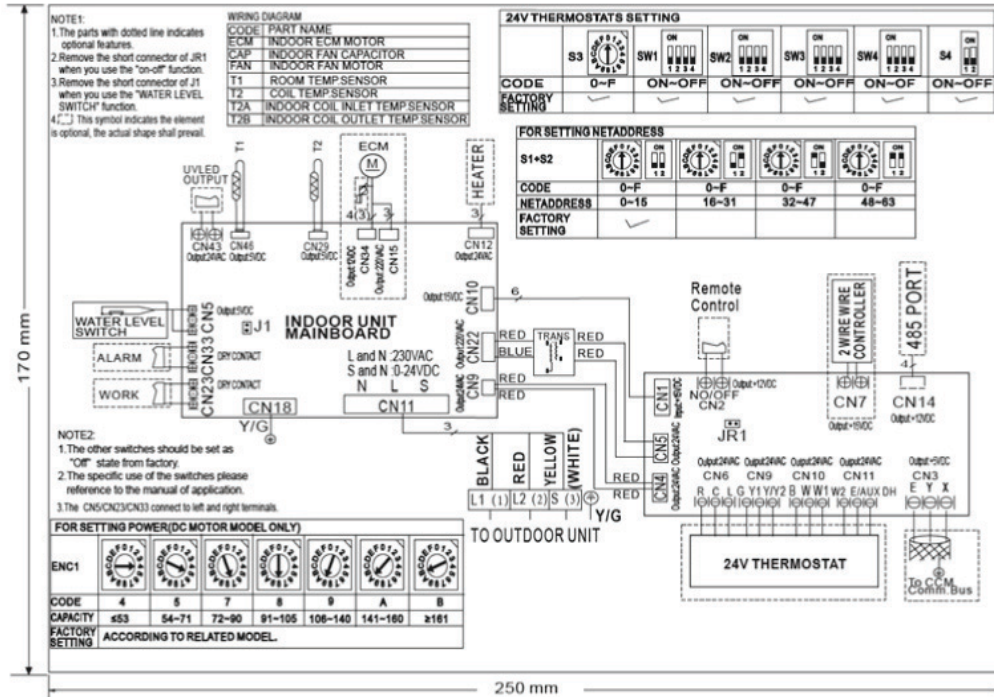


Fig. 14 — Wiring Diagram Sizes 18K/24K/30K/36K - Non Light-Commercial Models

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Table 13 — Wiring Diagram Sizes 18K/24K/30K/36K - Non Light-Commercial Models

| CODE | CODE2 | INDOOR UNIT MAINBOARD CONNECTION                 |
|------|-------|--|
| CN5  | 5     | output: 0-5VDC for water level switch connection |
| CN6  | 6     | output: 5VDC for T2A, T2B (Temperature sensor)   |
| CN9  | 9     | output: 24VAC for 24V Interface                  |
| CN10 | 10    | communication: 15VDC for 24V Interface           |
| CN11 | 11    | input: 230VAC High voltage                       |
| CN12 | 12    | output: 24VAC for Heaters                        |
| CN15 | 15    | output: 220VAC for ECM motor (fan)               |
| CN18 | 18    | output: 0V connection to ground                  |
| CN20 | 20    | communication: 230VAC High voltage               |
| CN22 | 22    | output: 220VAC High voltage to transformer       |
| CN29 | 29    | output: 5VDC for T2 (Temperature sensor)         |
| CN33 | 33    | output: 0V for alarm                             |
| CN34 | 34    | output: 12VDC for ECM motor control              |
| CN36 | 36    | output: 0V for work                              |
| CN46 | 46    | output: 5VDC for T1 (Temperature sensor)         |

Table 14 — Wiring Diagrams Size 24K Models

| CODE   | CODE2 | 24 VOLT INTERFACE CONNECTION         |
|--------|-------|--------------------------------------|
| CN1    | 1     | communication: 15VDC from main board |
| CN2    | 2     | output: 12VDC for remote controller  |
| CN3    | 3     | communication: 5VDC for comm. Bus    |
| CN4    | 4     | input: 24VDC from main board         |
| CN5    | 5     | input: 24VDC from transformer        |
| CN6    | 6     | output: 24VDC for thermostat         |
| CN7    | 7     | output: 15VDC for wired controller   |
| CN9-11 | 9     | output: 24VDC for thermostat         |
| CN14   | 14    | output: 12VDC for 485 Port           |

# WIRING DIAGRAMS (CONT)

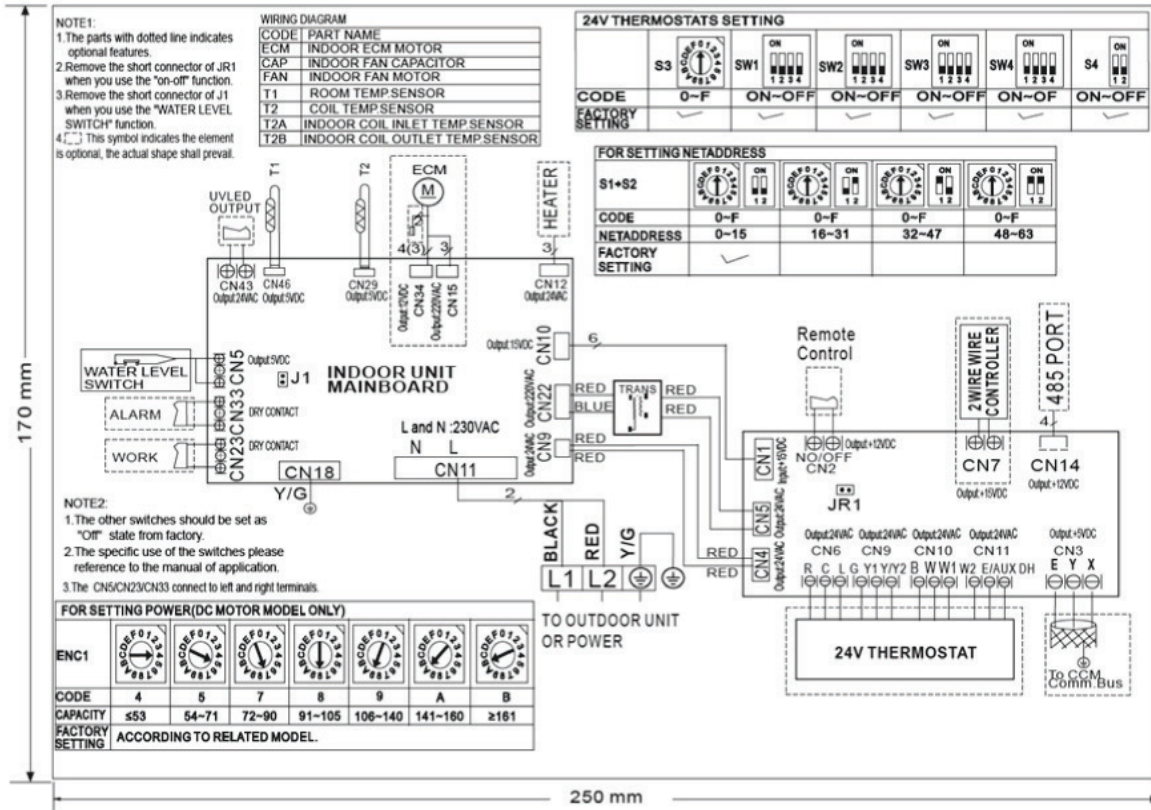


Fig. 15 — Wiring Diagram Sizes 36K - 60K Light Commercial Models

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Table 15 — Wiring Diagram Sizes 36K - 60K Light Commercial Models

| CODE   | INDOOR UNIT MAINBOARD CONNECTION                 |
|--------|--|
| CN5    | output: 0-5VDC for water level switch connection |
| CN6    | output: 5VDC for T2A, T2B (Temperature sensor)   |
| CN7    | output: 24VAC for 24V Interface                  |
| CN10   | communication: 15VDC for 24V Interface           |
| CN11   | input: 230VAC High voltage                       |
| CN12   | output: 24VAC for Heaters                        |
| CN15   | output: 220VAC for ECM motor (fan)               |
| CN18   | output: 0V connection to ground                  |
| CN20   | communication: 230VAC High voltage               |
| CN22   | output: 220VAC High voltage to transformer       |
| CN29   | output: 5VDC for T2 (Temperature sensor)         |
| CN33   | output: 0V for alarm                             |
| CN34   | output: 12VDC for ECM motor control              |
| CN36   | output: 0V for work                              |
| CN46   | output: 5VDC for T1 (Temperature sensor)         |
| CODE   | 24 VOLT INTERFACE CONNECTION                     |
| CN1    | communication: 15VDC from main board             |
| CN2    | output: 12VDC for remote controller              |
| CN3    | communication: 5VDC for comm. Bus                |
| CN4    | input: 24VDC from main board                     |
| CN5    | input: 24VDC from transformer                    |
| CN6    | output: 24VDC for thermostat                     |
| CN7    | output: 15VDC for wired controller               |
| CN9-11 | output: 24VDC for thermostat                     |
| CN14   | output: 12VDC for 485 Port                       |

# GUIDE SPECIFICATIONS

## INDOOR AIR HANDLER DUCTLESS SYSTEMS

Size Range: 1.5 to 5 Ton Nominal Cooling and Heating Capacity Model  
Number: **40MBAB**

### Part 1 - GENERAL

#### 1.01 System Description

Indoor, air handler, direct-expansion fan coils are matched with a heat pump outdoor unit.

#### 1.02 Agency Listings

Unit is rated per AHRI Standards 210/240 and listed in the AHRI directory as a matched system.

#### 1.03 Delivery, Storage, And Handling

Units are stored and handled per the unit manufacturer's recommendations.

#### 1.04 Warranty (For Inclusion By Specifying Engineer)

### Part 2 - PRODUCTS

#### 2.01 Equipment

##### **A. General:**

Indoor, direct-expansion, ceiling-mounted fan coil. The unit is complete with cooling/heating coil, fan, fan motor, piping connectors, electrical controls, microprocessor control system, and integral temperature sensing.

##### **B. Unit Cabinet:**

Unit cabinet is constructed of galvanized steel. The cabinet is fully insulated for improved thermal and acoustic performance.

##### **C. Fans:**

The fan is the tangential direct-drive blower type with air intake at the rear or bottom of the unit and discharge at the front.

##### **D. Coil:**

The coil is a copper tube with aluminum fins and galvanized steel tube sheets. The fins are bonded to the tubes by mechanical expansion and specially hydrophilic pre-coated for enhanced wet-ability. A drip pan under the coil has a drain connection for piping attachment to remove condensate.

##### **E. Motors:**

The motors have an open drip-proof, permanently lubricated ball bearing with inherent overload protection. Fan motors are 4-speed.

##### **F. Controls:**

The controls consist of a microprocessor-based control system which controls the space temperature, determines optimum fan speed, and runs self diagnostics.

#### **The unit has the following functions (at a minimum):**

1. An automatic restart, after a power failure, which sets the unit back to the same operating conditions it operated under at time of failure.
2. A timer function to provide a minimum 24-hour timer cycle for system Auto Start/Stop.
3. Automatic airflow technology - fan maintains set CFM range at up to 0.80" W.C. ESP
4. Temperature-sensing controls sense return air temperature.
5. Indoor coil freeze protection.
6. Wired remote controller to enter set points and operating conditions.
7. **DEHUMIDIFICATION** mode provides increased latent removal capability by modulating system operation and set point temperature. Applicable **only** with third party thermostats that have the dehumidification option.
8. **FAN-ONLY** operation to provide room air circulation when cooling is not required.
9. Diagnostics provide continuous checks of unit operation and warns of possible malfunctions. Error messages appear on the unit.
10. The fan speed control is user-selectable: high, medium, low, or microprocessor controlled automatic operation during all operating modes.
11. Automatic heating-to-cooling changeover in the **HEAT** pump mode. The control includes deadband to prevent rapid mode cycling between heating and cooling.
12. Indoor coil high temperature protection is provided to detect an excessive indoor discharge temperature when the unit is in the **HEAT** pump mode.

#### **G. Electrical Requirements:**

The indoor fan motor operates on 208-230V. Power is supplied from the outdoor unit.

#### **H. Operating Characteristics:**

The air handler system has a minimum SEER (Seasonal Energy Efficiency Ratio) and HSPF at AHRI conditions, as listed on the specifications table.

#### **I. Refrigerant Lines:**

All units have refrigerant lines that can be oriented to connect from the side of the unit. Both refrigerant lines must be insulated.

