

BAR CASE# _____
(OFFICE USE ONLY)

ADDRESS OF PROJECT: _____

DISTRICT: ☐ Old & Historic Alexandria ☐ Parker – Gray ☐ 100 Year Old Building

TAX MAP AND PARCEL: _____ ZONING: _____

APPLICATION FOR: *(Please check all that apply)*

☐ CERTIFICATE OF APPROPRIATENESS

☐ PERMIT TO MOVE, REMOVE, ENCAPSULATE OR DEMOLISH
(Required if more than 25 square feet of a structure is to be demolished/impacted)

☐ WAIVER OF VISION CLEARANCE REQUIREMENT and/or YARD REQUIREMENTS IN A VISION
CLEARANCE AREA (Section 7-802, Alexandria 1992 Zoning Ordinance)

☐ WAIVER OF ROOFTOP HVAC SCREENING REQUIREMENT
(Section 6-403(B)(3), Alexandria 1992 Zoning Ordinance)

Applicant: ☐ Property Owner ☐ Business *(Please provide business name & contact person)*

Name: _____

Address: _____

City: _____ State: _____

Phone: _____ E-mail: _____

Authorized Agent *(if applicable)*: ☐ Attorney ☐ Architect ☐ _____

Name: _____ Phone: _____

E-mail: _____

Legal Property Owner:

Name: _____

Address: _____

City: _____ State: _____

Phone: _____ E-mail: _____

BAR CASE# _____

(OFFICE USE ONLY)

NATURE OF PROPOSED WORK: *Please check all that apply*

☐ NEW CONSTRUCTION

☒ EXTERIOR ALTERATION: *Please check all that apply.*

☐ awning

☐ fence, gate or garden wall

☒ HVAC equipment

☐ shutters

☐ doors

☐ windows

☐ siding

☐ shed

☐ lighting

☐ pergola/trellis

☐ painting unpainted masonry

☒ other _____

☐ ADDITION

☐ DEMOLITION/ENCAPSULATION

☐ SIGNAGE

DESCRIPTION OF PROPOSED WORK: *Please describe the proposed work in detail (Additional pages may be attached).*

SUBMITTAL REQUIREMENTS:

☐ Check this box if there is a homeowner's association for this property. If so, you must attach a copy of the letter approving the project.

Items listed below comprise the **minimum supporting materials** for BAR applications. Staff may request additional information during application review. Please refer to the relevant section of the *Design Guidelines* for further information on appropriate treatments.

Applicants must use the checklist below to ensure the application is complete. Include all information and material that are necessary to thoroughly describe the project. Incomplete applications will delay the docketing of the application for review. Pre-application meetings are required for all proposed additions. All applicants are encouraged to meet with staff prior to submission of a completed application.

Demolition/Encapsulation : *All applicants requesting 25 square feet or more of demolition/encapsulation must complete this section. Check N/A if an item in this section does not apply to your project.*

N/A

- ☐ ☒ Survey plat showing the extent of the proposed demolition/encapsulation.
- ☐ ☒ Existing elevation drawings clearly showing all elements proposed for demolition/encapsulation.
- ☐ ☒ Clear and labeled photographs of all elevations of the building if the entire structure is proposed to be demolished.
- ☐ ☒ Description of the reason for demolition/encapsulation.
- ☐ ☒ Description of the alternatives to demolition/encapsulation and why such alternatives are not considered feasible.

Additions & New Construction: *Drawings must be to scale and should not exceed 11" x 17" unless approved by staff. Check N/A if an item in this section does not apply to your project.*

- ☐ ☒ ^{N/A} Scaled survey plat showing dimensions of lot and location of existing building and other structures on the lot, location of proposed structure or addition, dimensions of existing structure(s), proposed addition or new construction, and all exterior, ground and roof mounted equipment.
- ☐ ☒ FAR & Open Space calculation form.
- ☐ ☒ Clear and labeled photographs of the site, surrounding properties and existing structures, if applicable.
- ☐ ☒ Existing elevations must be scaled and include dimensions.
- ☐ ☒ Proposed elevations must be scaled and include dimensions. Include the relationship to adjacent structures in plan and elevations.
- ☐ ☒ Materials and colors to be used must be specified and delineated on the drawings. Actual samples may be provided or required.
- ☐ ☒ Manufacturer's specifications for materials to include, but not limited to: roofing, siding, windows, doors, lighting, fencing, HVAC equipment and walls.
- ☐ ☒ For development site plan projects, a model showing mass relationships to adjacent properties and structures.

Signs & Awnings: *One sign per building under one square foot does not require BAR approval unless illuminated. All other signs including window signs require BAR approval. Check N/A if an item in this section does not apply to your project.*

- ☐ ☒ ^{N/A} Linear feet of building: Front: _____ Secondary front (if corner lot): _____.
- ☐ ☒ Square feet of existing signs to remain: _____.
- ☐ ☒ Photograph of building showing existing conditions.
- ☐ ☒ Dimensioned drawings of proposed sign identifying materials, color, lettering style and text.
- ☐ ☒ Location of sign (show exact location on building including the height above sidewalk).
- ☐ ☒ Means of attachment (drawing or manufacturer's cut sheet of bracket if applicable).
- ☐ ☒ Description of lighting (if applicable). Include manufacturer's cut sheet for any new lighting fixtures and information detailing how it will be attached to the building's facade.

Alterations: *Check N/A if an item in this section does not apply to your project.*

- ☒ ☐ ^{N/A} Clear and labeled photographs of the site, especially the area being impacted by the alterations, all sides of the building and any pertinent details.
- ☒ ☐ Manufacturer's specifications for materials to include, but not limited to: roofing, siding, windows, doors, lighting, fencing, HVAC equipment and walls.
- ☒ ☐ Drawings accurately representing the changes to the proposed structure, including materials and overall dimensions. Drawings must be to scale.
- ☐ ☒ An official survey plat showing the proposed locations of HVAC units, fences, and sheds.
- ☐ ☒ Historic elevations or photographs should accompany any request to return a structure to an earlier appearance.

BAR CASE# _____

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ALL APPLICATIONS: *Please read and check that you have read and understand the following items:*

- ☒ I understand that after reviewing the proposed alterations, BAR staff will invoice the appropriate filing fee in APEX. The application will not be processed until the fee is paid online.
- ☒ I understand the notice requirements and will return a copy of the three respective notice forms to BAR staff at least five days prior to the hearing. If I am unsure to whom I should send notice I will contact Planning and Zoning staff for assistance in identifying adjacent parcels.
- ☒ I, the applicant, or an authorized representative will be present at the public hearing.
- ☒ I understand that any revisions to this initial application submission (including applications deferred for restudy) must be accompanied by the BAR Supplemental form and revised materials.

The undersigned hereby attests that all of the information herein provided including the site plan, building elevations, prospective drawings of the project, and written descriptive information are true, correct and accurate. The undersigned further understands that, should such information be found incorrect, any action taken by the Board based on such information may be invalidated. The undersigned also hereby grants the City of Alexandria permission to post placard notice as required by Article XI, Division A, Section 11-301(B) of the 1992 Alexandria City Zoning Ordinance, on the property which is the subject of this application. The undersigned also hereby authorizes the City staff and members of the BAR to inspect this site as necessary in the course of research and evaluating the application. The applicant, if other than the property owner, also attests that he/she has obtained permission from the property owner to make this application.

APPLICANT OR AUTHORIZED AGENT:

Signature: _____

Printed Name: _____

Date: _____

OWNERSHIP AND DISCLOSURE STATEMENT

Use additional sheets if necessary

1. Applicant. State the name, address and percent of ownership of any person or entity owning an interest in the applicant, unless the entity is a corporation or partnership, in which case identify each owner of more than three percent. The term ownership interest shall include any legal or equitable interest held at the time of the application in the real property which is the subject of the application.

Name	Address	Percent of Ownership
1.		
2.		
3.		

2. Property. State the name, address and percent of ownership of any person or entity owning an interest in the property located at _____ (address), unless the entity is a corporation or partnership, in which case identify each owner of more than three percent. The term ownership interest shall include any legal or equitable interest held at the time of the application in the real property which is the subject of the application.

Name	Address	Percent of Ownership
1.		
2.		
3.		

3. Business or Financial Relationships. Each person or entity listed above (1 and 2), with an ownership interest in the applicant or in the subject property is required to disclose **any** business or financial relationship, as defined by Section 11-350 of the Zoning Ordinance, existing at the time of this application, or within the 12-month period prior to the submission of this application with any member of the Alexandria City Council, Planning Commission, Board of Zoning Appeals or either Boards of Architectural Review.

Name of person or entity	Relationship as defined by Section 11-350 of the Zoning Ordinance	Member of the Approving Body (i.e. City Council, Planning Commission, etc.)
1.		
2.		
3.		

NOTE: Business or financial relationships of the type described in Sec. 11-350 that arise after the filing of this application and before each public hearing must be disclosed prior to the public hearings.

As the applicant or the applicant's authorized agent, I hereby attest to the best of my ability that the information provided above is true and correct.

Date

Printed Name

Signature

Construction drawings submitted shall be in full conformance with all plans approved by the Planning Commission, the Boards of Zoning Appeals and/or the Architectural Review. Planning and Zoning approval of a building permit does not constitute of any changes, additions or amendments to such plans unless they are specifically identified by the applicant and approved by staff.

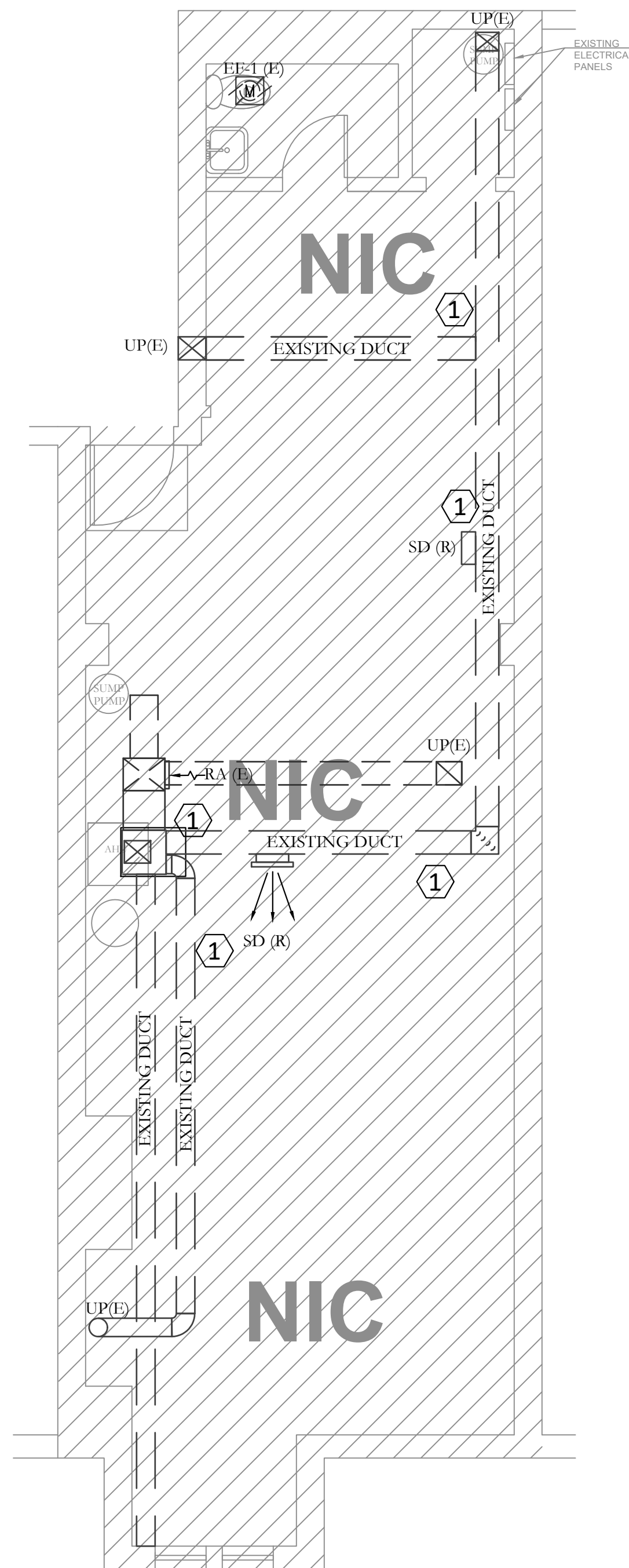


EXISTING
CONDENSING UNIT-A

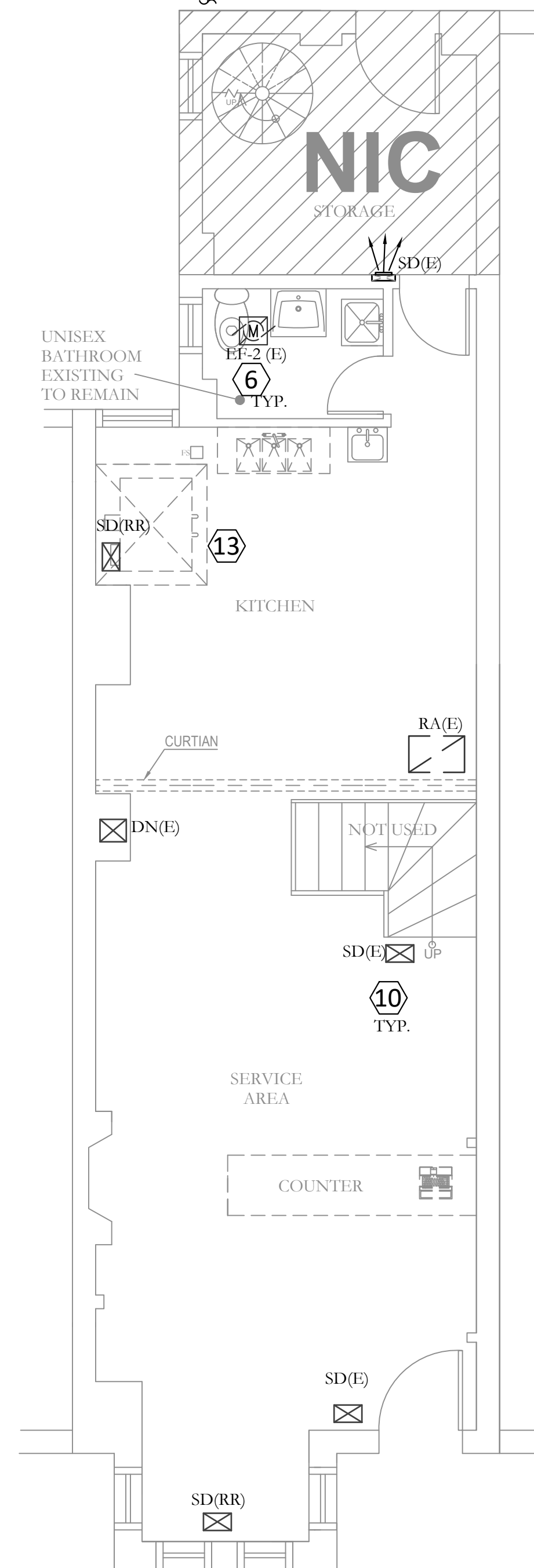


OPENING IN THE BACK

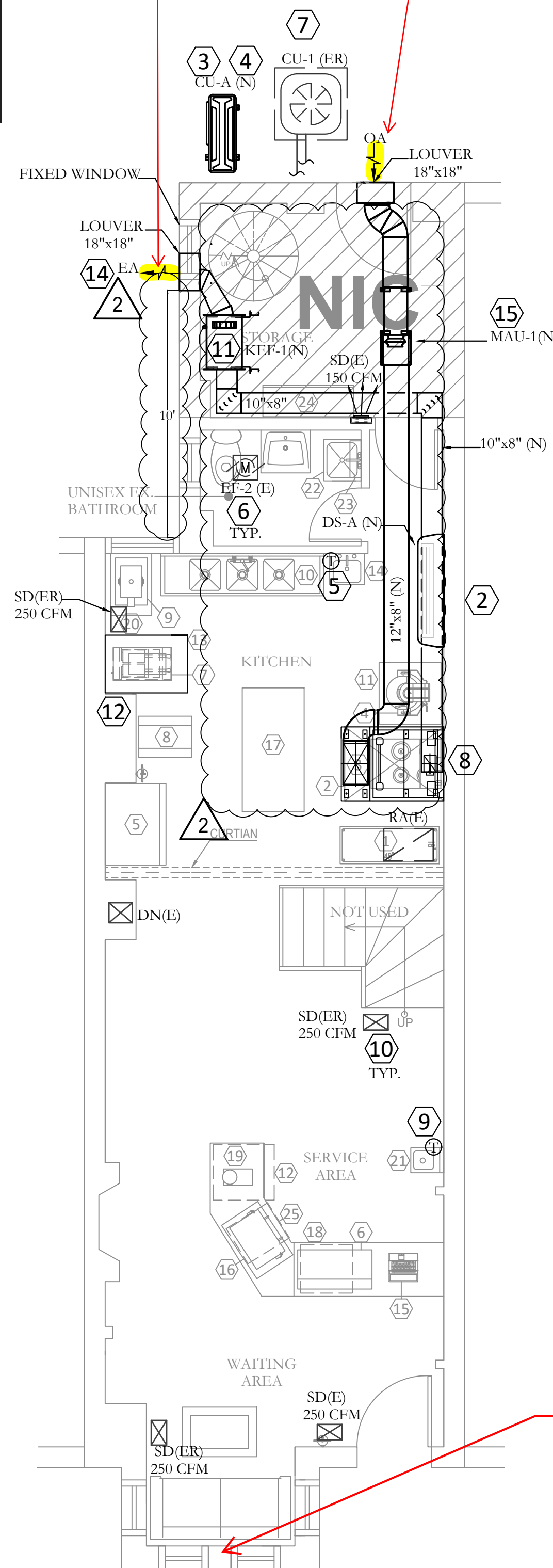
OPENING IN THE BACK



1 EXISTING BASEMENT FLOOR PLAN
SCALE: 1/4"=1'-0"



2 EXISTING/DEMO FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



NO
CHANGES
TO THE
FRONT



ENGINEERS LLC
Design - Consultants - Management - Permit
ADDRESS: 8318 LIBERIA AVE. MANASSAS VA, 20110
E : KHALID@LAMAENGINEERS.COM
LAMAENGINEERS@OUTLOOK.COM
TEL : 571-833-8357

[illegible]

**CHURROK'S
CUPCAKE**
(CHANGE OF OWNERSHIP)

1022 KING ST,
ALEXANDRIA VA

Project number	K036
Date	06/12/2025
Drawn by	S
Checked by	K

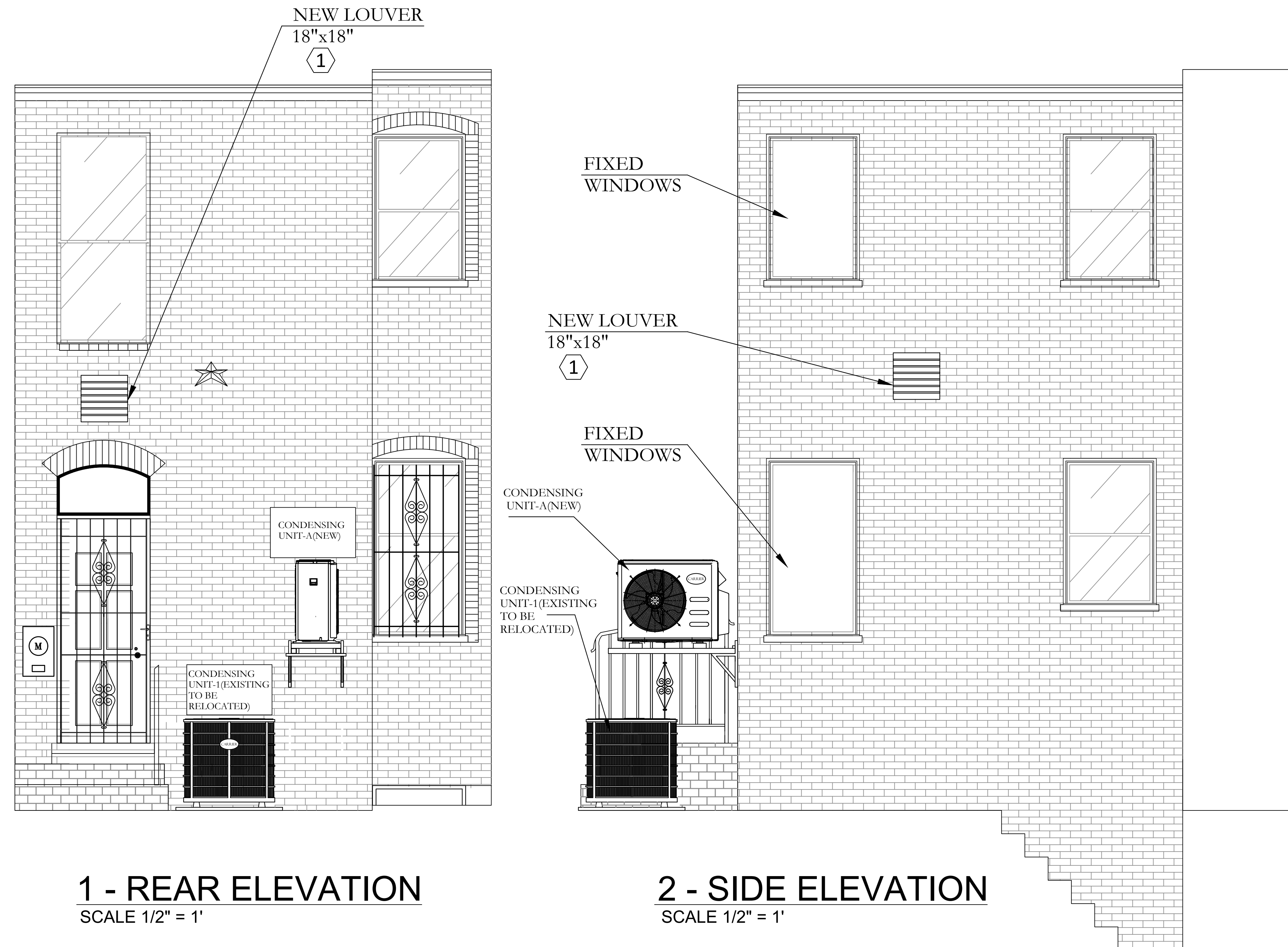
FLOOR PLANS

M200

Scale	1/4" = 1'-0"
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1 CONTRACTOR TO PAINT LOUVER SAME COLOR
AS EXTERIOR WALL.

GREENHECK, MODEL: ESD-635, 18"x18".

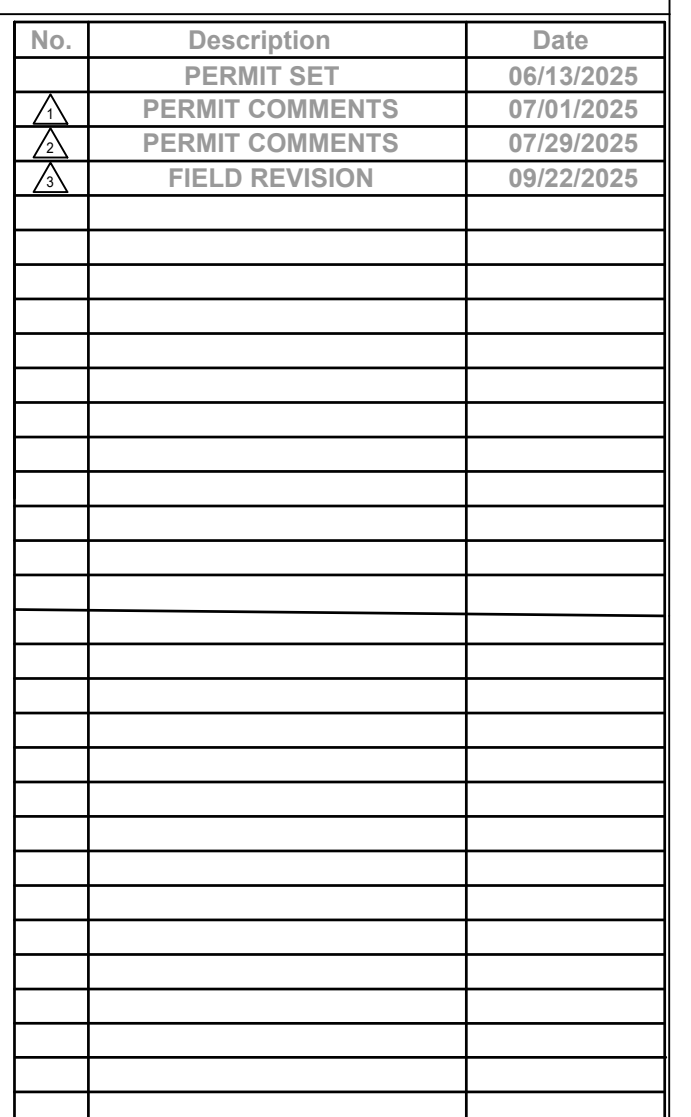


1 - REAR ELEVATION

SCALE 1/2" = 1'

2 - SIDE ELEVATION

SCALE 1/2" = 1'



**CHURROK'S
CUPCAKE**
(CHANGE OF OWNERSHIP)

1022 KING ST,
ALEXANDRIA VA

Project number	K036
Date	06/12/2025
Drawn by	S
Checked by	K

ELEVATION

Scale	1/4" = 1'-0"
-------	--------------

RE: 1022 king st

Hello Veronica,

Regarding Note 2: There is no equipment on the roof. The only equipment will be installed at the rear of the space.

Regarding Note 3: Both elevations below show the new condensing unit mounted on the wall at the back of the space.



Regards,

High Wall Heat Pump Ductless System



Indoor Model: **40MAHBQ24XA3**

Submittal Data

Job Data: Location:

Buyer: Buyer P.O. #: Carrier #:

Unit Number: Model Number:

Performance Data Certified By: Date:



Performance
SERIES

STANDARD FEATURES

- Modes: Cool, Heat, Dry, Fan, Auto
- Turbo Mode
- Four fan speeds
- Sleep Mode
- Relative Humidity Sensor
- Intelligent Eye (Occupancy Sensor)
- ECO Mode
- Up-Down Louver control (fixed or swing)
- Follow Me (senses temperature at handheld remote)
- Heating Setback (46° F Heating Mode)
- Quiet indoor operation
- Aluminum Golden Hydrophilic pre-coated fins

CONTROLS:

- Wireless Remote Controller included with indoor unit

LIMITED WARRANTY*

- 10 year limited to original purchaser on compressor and parts upon timely registration, otherwise 5 years
- *For residential applications. See warranty for full details.

System	Size		24
	Indoor Model		40MAHBQ24XA3
Electrical	Voltage, Phase, Cycle		V/Ph/Hz 208/230-1-60
	Power Supply		Indoor unit powered by outdoor unit
	MCA	A.	0.625
Controls	Wireless Remote Controller (°F/°C Convertible)		Standard
	Wired Remote Controller (°F/°C Convertible)		Optional
Operating Range	Cooling Indoor DB Min -Max	°F(°C)	63~90 (17~32)
	Heating Indoor DB Min -Max	°F(°C)	32~86 (0~30)
Piping	Pipe Connection Size - Liquid	in (mm)	3/8 (9.52)
	Pipe Connection Size - Suction	in (mm)	5/8 (16)

Indoor Coil	Face Area	Sq. Ft.	3.60
	No. Rows		3
	Fins per inch		20
	Circuits		7
Indoor	Unit Width	in (mm)	44.88 (1140)
	Unit Height	in (mm)	14.57 (370)
	Unit Depth	in (mm)	10.83 (275)
	Net Weight	lbs (kg)	43.65 (19.8)
	Number of Fan Speeds		4
	Airflow (lowest to highest)	CFM	319/414/611/719
	Sound Pressure (lowest to highest)	dB(A)	37/39/44/52
	Air throw Data	ft (m)	31.5 (9.6)
	Moisture removal	Pint/h (L/h)	0.108(0.052)
	Field Drain Pipe Size O.D.	in (mm)	0.625 (16)

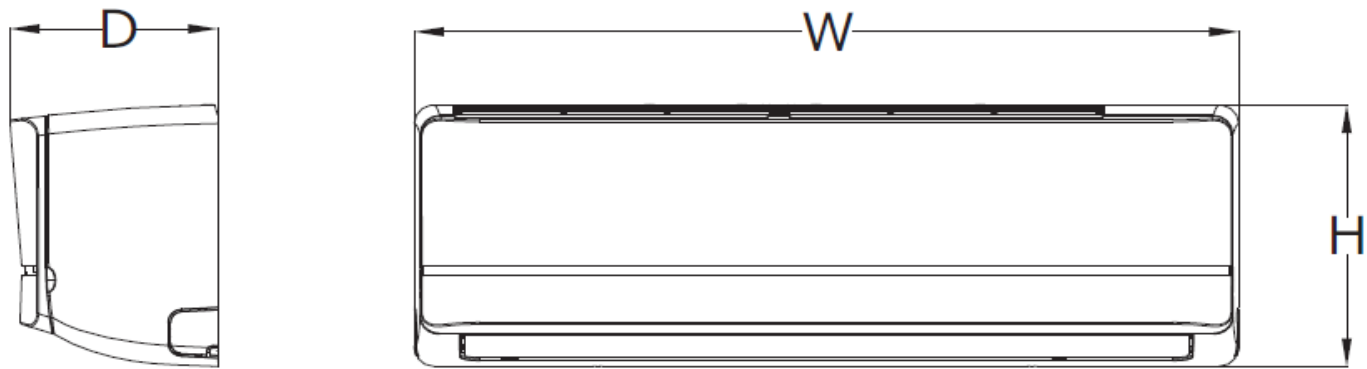
Performance may vary based on the outdoor unit matched to. See compatible outdoor units pages for Performance Data.
For Compatibility See Product Data

Accessories

KSACN0801AAA	Wired Remote Control 7 Day Programmable
KSAIF0601AAA	Wi-Fi™ Kit High Wall Mid-Tier
KSAIC0301230	24V Interface Kit 230V

Construction View

Indoor Model: 40MAHBQ24XA3



Unit Width	in (mm)	44.88 (1140)
Unit Height	in (mm)	14.57 (370)
Unit Depth	in (mm)	10.83 (275)
Net Weight	lbs (kg)	43.65 (19.8)



38MGR

Multi-zone Heat Pump Outdoor Unit Ductless System

Sizes 18, 24, 30, 36 and 48



Turn to the experts

Product Data

INDUSTRY LEADING FEATURES / BENEFITS

A competitively priced and creative solution to design problems.

The **38MGR** ductless inverter driven multi-zone system provides individual comfort control for up to 5 separate zones. Match two, three, four or even five space-saving **High Wall**, **Cassette**, **Slim Ducted** or **Floor Console** fan coils with one outdoor heat pump. The indoor fan coils are connected to the outdoor unit by refrigerant tubing and wires.

Mount different indoor unit styles in several locations to accommodate the application. This selection of fan coils permits inexpensive and creative solutions to design problems such as:

- Adding air conditioning to spaces that are heated by hydronic or electric heat and have no ductwork
- Historical renovations or any application where preserving the look of the original structure is essential
- Commercial add-on jobs where the existing air conditioning system cannot be stretched.

These compact indoor fan coil units take up very little space in the room and do not obstruct windows. The fan coils are attractively styled to blend with most room decors. Advanced system components incorporate innovative technology to provide reliable cooling and heating performance at low sound levels.

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Fig. 1 — Size 18K



Fig. 2 — Sizes 24K and 30K



Fig. 3 — Sizes 36K and 48K

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

Inverter Technology

The inverter driven compressor is designed to run at various input power frequencies (Hz) which controls the compressor's motor speed.

Even Temperature – The control package, including the inverter, monitors the outdoor and indoor temperatures as they relate to the selected indoor set point and adjusts the compressor speed to match the load and keep the system operating continuously rather than cycling and creating temperature swings. This translates to higher comfort levels for the occupants.

Rapid Pull Down/Warm-Up – Comfort is increased by the inverter system's ability to ramp up the compressor speed enabling the system to reach the user selected room temperature set point quicker.

Humidity Control – Running the system for longer periods and continuously changing the compressor speed enhances the humidity control.

Individual Room Comfort

Maximum comfort is provided because each space can be controlled individually based on the usage pattern.

Low Sound Levels

When noise is a concern, 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 the ductwork.

When sound ordinances and proximity to neighbors demand quiet operation, the 38MGR unit is the right choice. With the inverter technology, these units run at lower speeds, most of the time resulting in reduced sound levels.

Inverter Technology – Enhanced Economical Operation

Ductless systems are inherently economical to operate. Individual rooms are heated or cooled only when required, and since the air is delivered directly to the space, there is no need to use additional energy to move the air in the ductwork. This economical operation is enhanced further when the inverter system output matches the load resulting in a more efficient system.

Easy-To-Use Controls

The multi-zone systems have microprocessor-based controls to provide the ultimate in comfort and efficiency. The user friendly wired and wireless remote controls provide an interface between the user and the unit.

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 ductwork or wall openings. Since the **38MGR** 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 is included with the indoor units and only wires and piping need to run between the indoor and outdoor units. These units are fast and easy to install ensuring minimal disruption to customers in homes or the workplace. This makes 38MGR systems the equipment of choice for retrofit applications.

Simple Servicing and Maintenance

Removing the top panel of the outdoor unit provides immediate access to the control compartment, providing the service technician access to the diagnostic LEDs to facilitate the troubleshooting process. In addition, the draw-thru design of the outdoor unit means that dirt accumulates on the outside surface of the coil. Coils can be cleaned quickly from the inside using a pressure hose and detergent.

On the indoor units, service and maintenance expense is reduced due to the permanent easy to clean filters. Also, error codes appear on the front panel to alert the user to certain system malfunctions.

Built-in Reliability

Ductless system indoor and outdoor units are designed to provide years of trouble-free operation. Both the indoor and outdoor units are well protected. Whenever the microprocessor detects abnormal conditions, the unit stops and an error code appears.

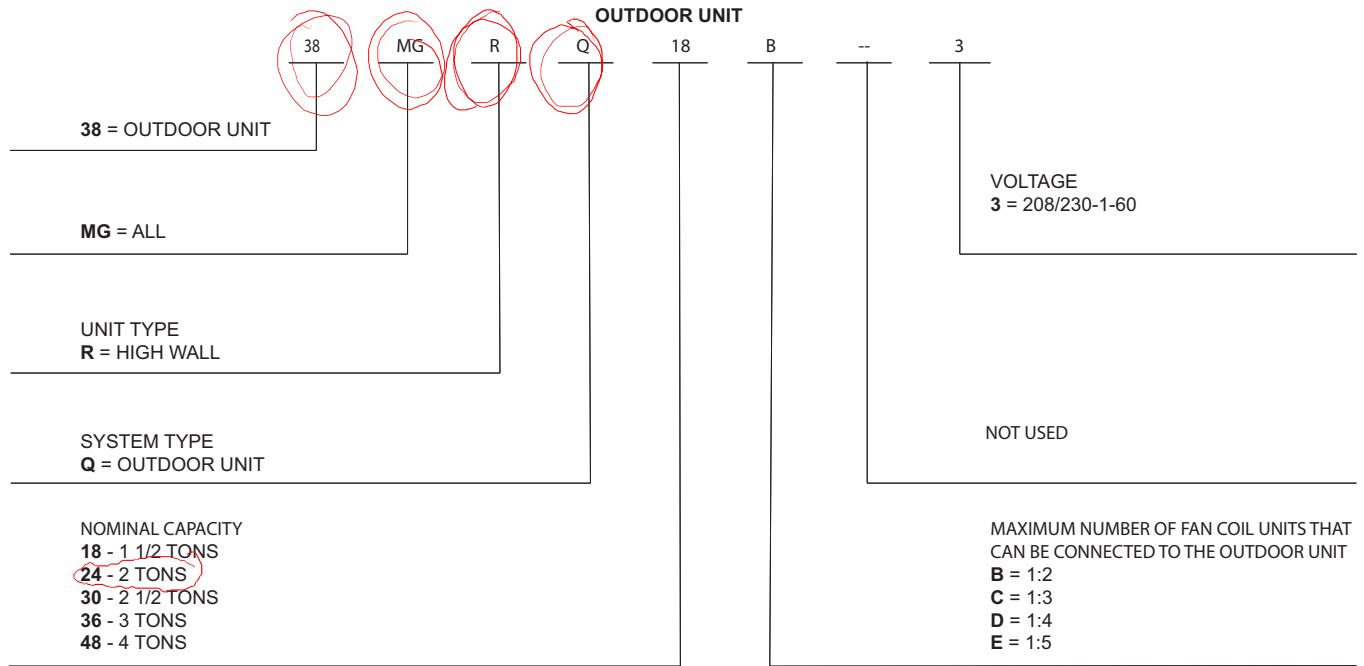
Inverter systems provide additional reliability due to the soft start.

This refers to the ability of the inverter to start the compressor motor using reduced voltage and reduced current. This feature is beneficial from an electrical standpoint (eliminates current spikes) as well as an overall reliability standpoint due to reduced stress on all associated system components.

Agency Listings

All systems are listed with AHRI (Air conditioning, Heating, and Refrigeration Institute) and are ETL certified per UL 1995 standard.

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.



STANDARD FEATURES AND ACCESSORIES

Table 1 — Features

Ease Of Installation	
Low Voltage Controls	S
Comfort Features	
Microprocessor Control	S
Auto Restart Function	S
Auto Changeover	S
Low Ambient Cooling	S
Low Ambient Heating	S
Energy Saving Features	
Inverter Driven Compressor	S
46° F Heating Mode (Heating Setback)	S
Safety And Reliability	
3 Minute Time Delay For Compressor	S
High Compressor Discharge Temperature	S
Low Voltage Protection	S
Compressor Overload Protection	S
Compressor Over Current Protection	S
IPM Module Protection	S
Aluminum Hydrophilic pre-coated fins	S
Ease Of Service And Maintenance	
Diagnostics	S
Error Messages Displayed On Front Panel	S
Application Flexibility	
Crankcase Heater	S
Base pan Heater	S

Legend

S - Standard

A - Accessory

ACCESSORIES

Table 2 — Accessories

Outdoor Unit Model Number	Base Pan Base Rubber Plugs RCD Part No.	Quantity per Unit
38MGRQ18B--3	12600801A00077	25
38MGRQ24C--3 38MGRQ30D--3	12600801A00117	5
38MGRQ36D--3 38MGRQ48E--3	12600801A00118	5

NOTE: The basepan is built in with multiple holes for proper draining during defrost. For applications where it is required to seal these holes, and re-direct the condensate drain, rubber plugs are available through RCD.

Outdoor Units

Crankcase Heater

The crankcase heater is standard on all unit sizes. Heater clamps must be placed around the compressor oil stump.

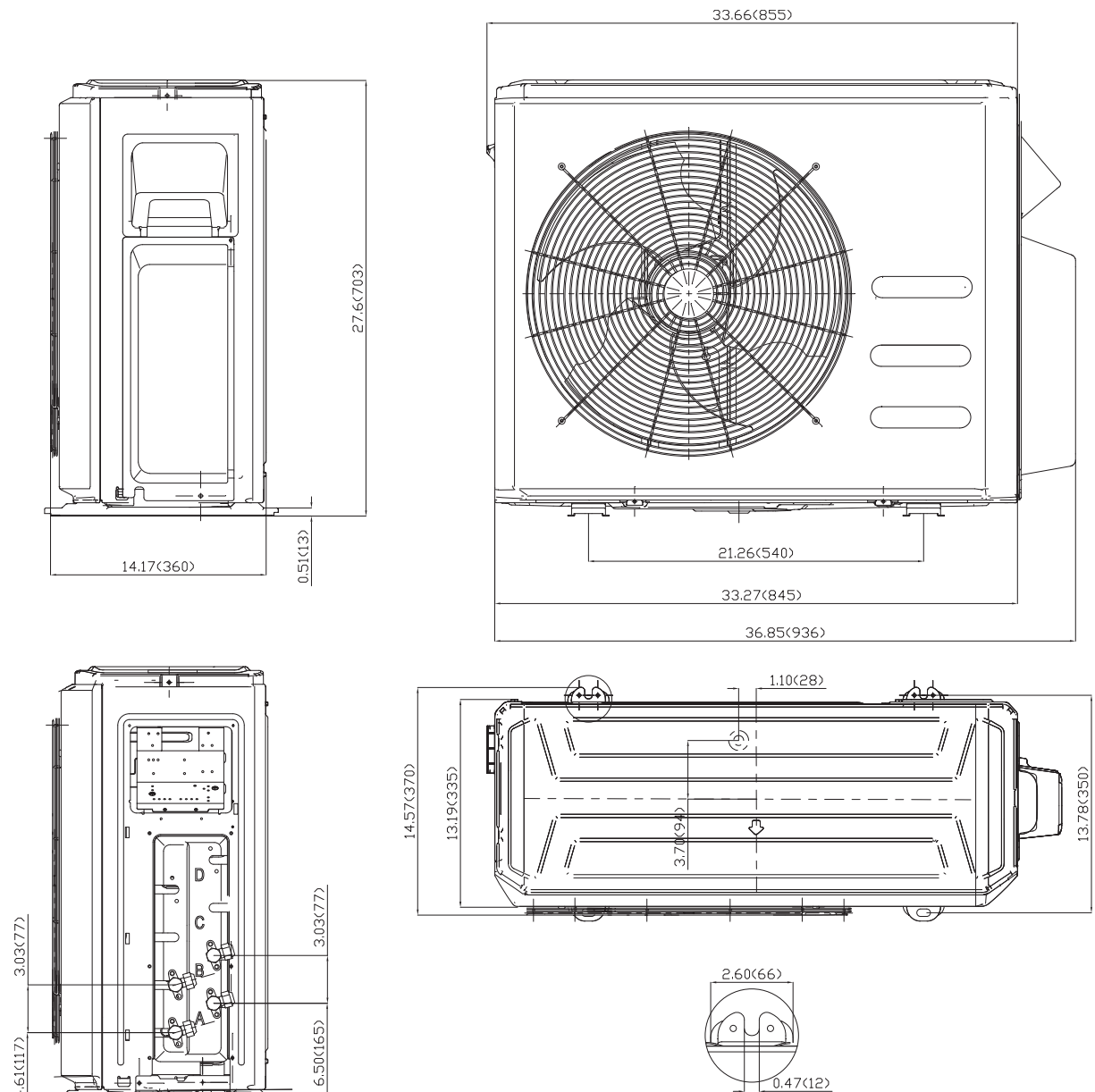
Base pan Heater

The base pan heater is standard on all unit sizes.

DIMENSIONS

Table 3 — Dimensions

UNIT SIZE		18K	24K	30K	36K	48K
Height	in (mm)	27.6 (703)	31.89 (810)	31.89 (810)	52.48 (1333)	52.48 (1333)
Width	in (mm)	33.27 (845)	37.24 (946)	37.24 (946)	41.14 (1045)	41.14 (1045)
Depth	in (mm)	13.19 (335)	15.20 (386)	15.20 (386)	14.96 (380)	14.96 (380)
Operating Weight	lbs (kg)	105.8 (48)	149.9 (68)	156.5 (71)	223.8 (101.5)	223.8 (101.5)
Shipping Weight	lbs (kg)	114.6 (52)	160.9 (73)	167.5 (76)	255.1 (115.7)	255.1 (115.7)
Shipping Height	in (mm)	29.72 (755)	34.06 (865)	34.06 (865)	58.27 (1480)	58.27 (1480)
Shipping Width	in (mm)	37.99 (965)	42.91 (1090)	42.91 (1090)	43.11 (1095)	43.11 (1095)
Shipping Depth	in (mm)	15.55 (395)	19.69 (500)	19.69 (500)	19.49 (495)	19.49 (495)

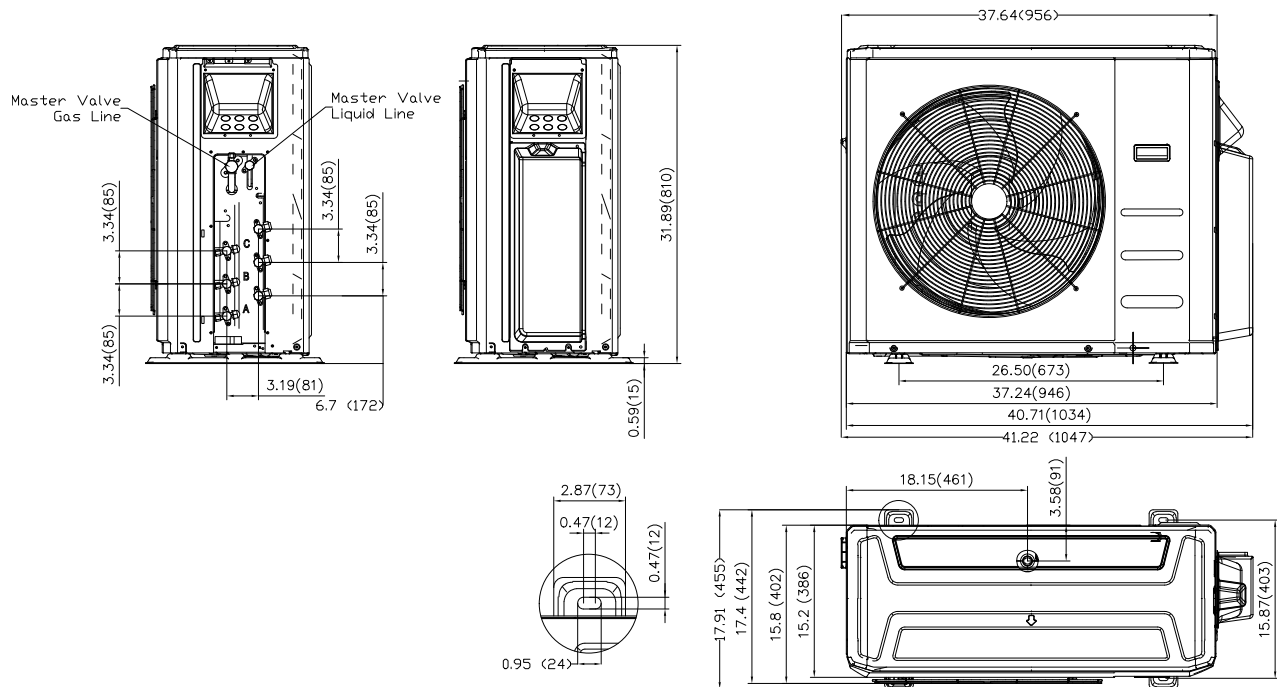


NOTE: ALL DIMENSIONS IN INCH (MM)

Fig. 4 — Outdoor Dimensions Size 18K

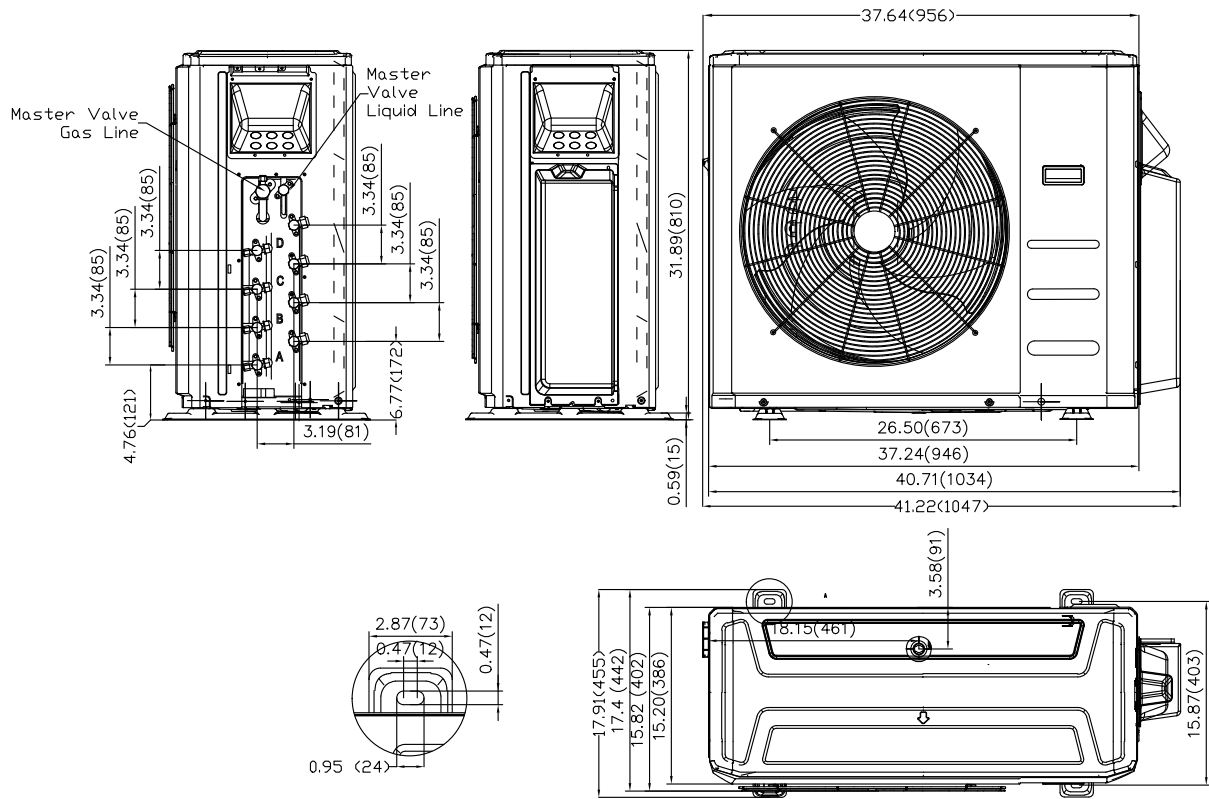
NOTE: Master valves are not available on the 18K unit.

DIMENSIONS (CONT)



NOTE: ALL DIMENSIONS IN INCH (MM)

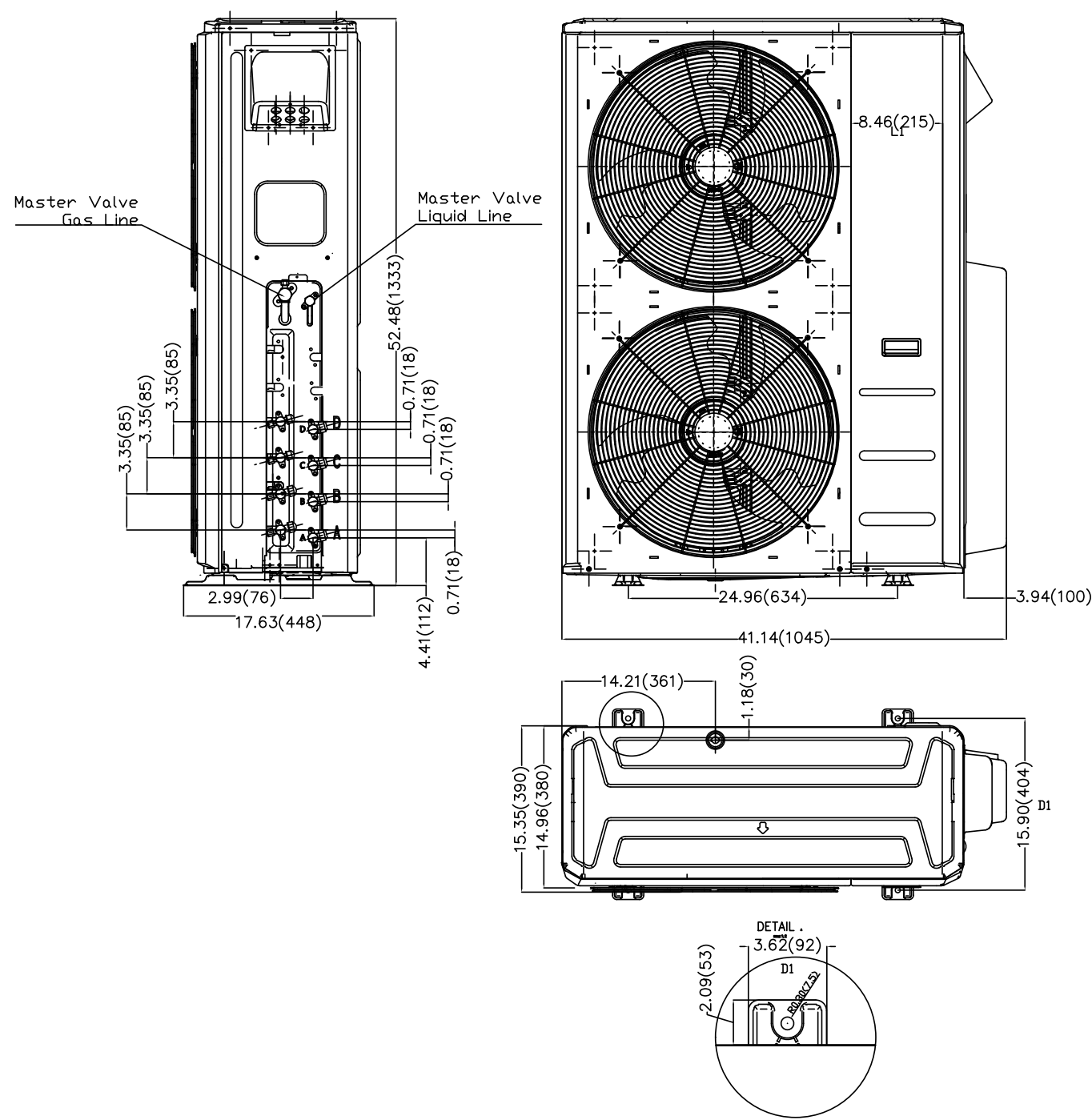
Fig. 5 — Outdoor Dimensions Size 24K



NOTE: ALL DIMENSIONS IN INCH (MM)

Fig. 6 — Outdoor Dimensions Size 30K

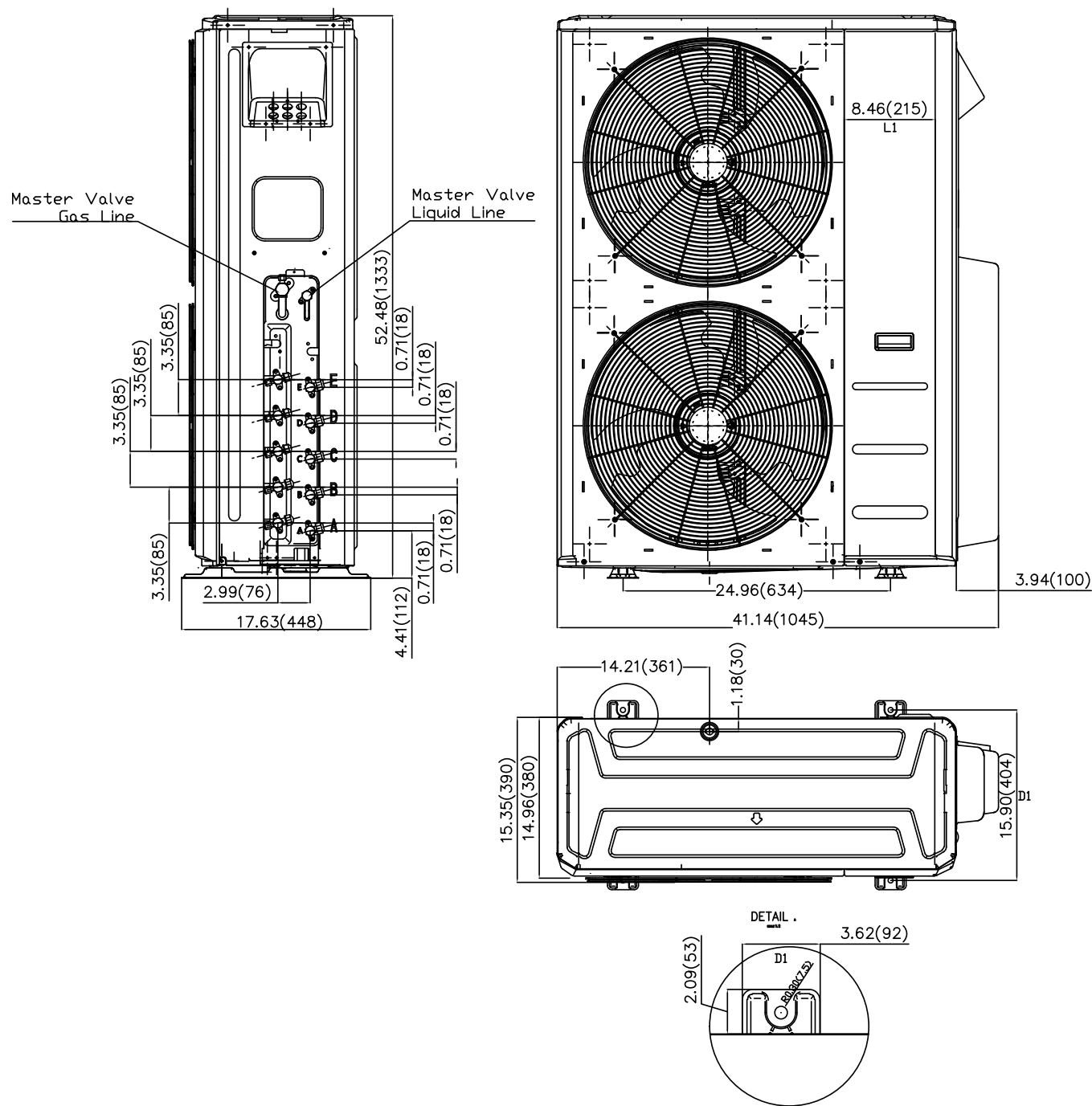
DIMENSIONS (CONT)



NOTE: ALL DIMENSIONS IN INCH (MM)

Fig. 7 — Outdoor Dimensions Size 36K

DIMENSIONS (CONT)



NOTE: ALL DIMENSIONS IN INCH (MM)

Fig. 8 — Outdoor Dimensions Size 48K

CLEARANCES

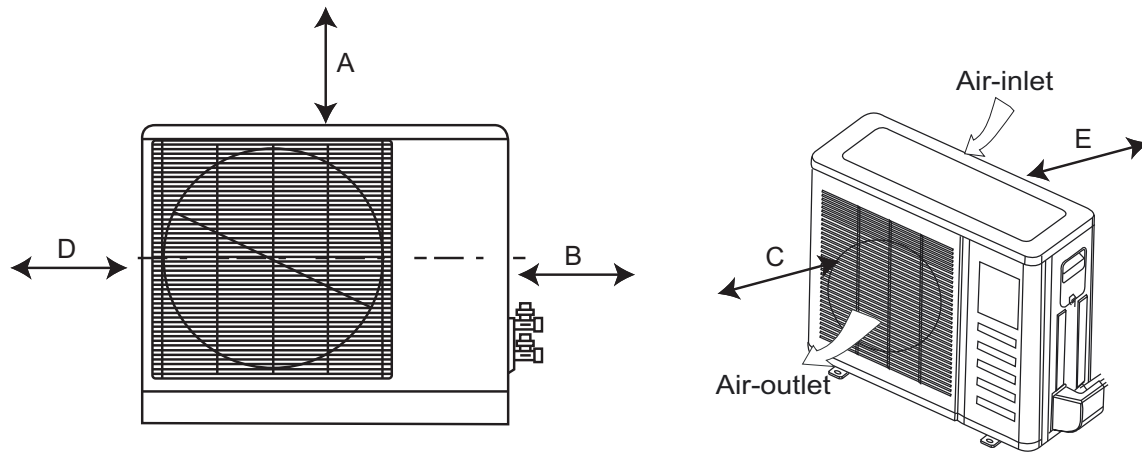


Fig. 9 — Clearances

Table 4 — Clearances

UNIT	MINIMUM VALUE in. (mm)
A	24 (609)
B	24 (609)
C	24 (609)
D	4 (101)
E	6 (152)

NOTE: The outdoor unit must be mounted at least 2in (50mm) above the maximum anticipated snow depth.

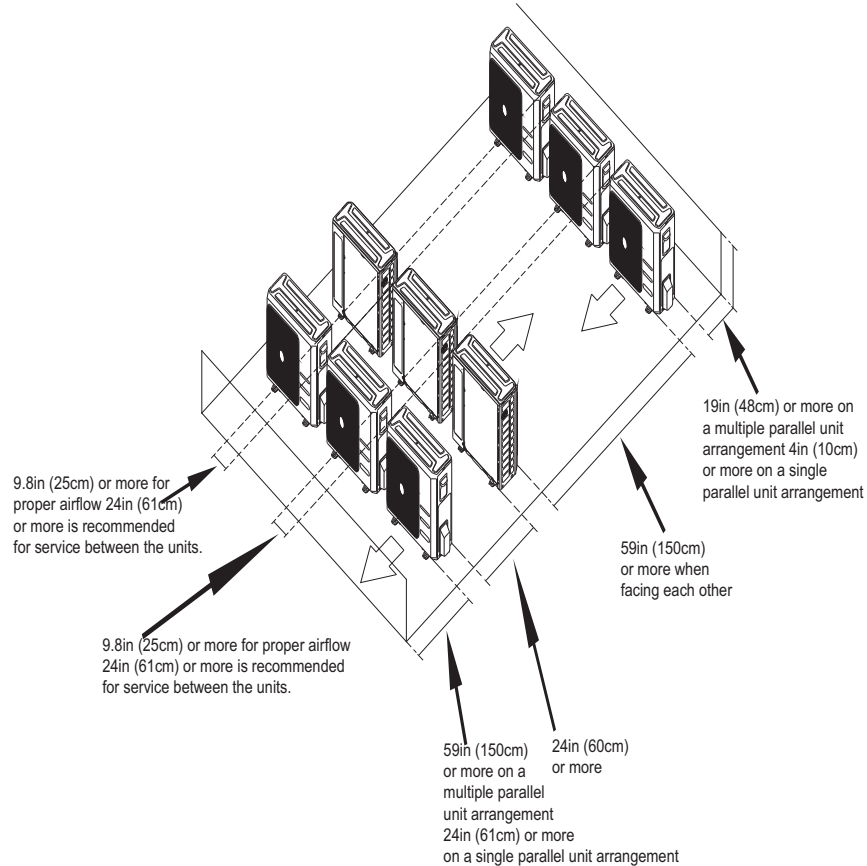


Fig. 10 — Clearances for multiple units

PHYSICAL DATA

Table 5 — Physical Data

	SIZE		18	24	30	36	48
	OUTDOOR MODEL		38MGRQ18B--3	38MGRQ24C--3	38MGRQ30D--3	38MGRQ36D--3	38MGRQ48E--3
OPERATING RANGE	Cooling Outdoor DB Min - Max	F°(C°)	-13~122 (-25~50)	-13~122 (-25~50)	-13~122-25~50)	-13~122 (-25~50)	-13~122 (-25~50)
	Heating Outdoor DB Min - Max	F°(C°)	-22~86 (-30~30)	-22~86 (-30~30)	-22~86 (-30~30)	-22~86 (-30~30)	-22~86 (-30~30)
PIPING	Total Piping Length	ft (m)	131 (40)	197 (60)	263 (80)	328 (100)	328 (100)
	Piping to furthest FCU	ft (m)	82 (25)	98 (30)	115 (35)	115 (35)	115 (35)
	Drop (OD above ID)	ft (m)	49 (15)	49 (15)	49 (15)	65 (20)	65 (20)
	Life (OD below ID)	ft (m)	49 (15)	49 (15)	49 (15)	65 (20)	65 (20)
	Pipe Connection Size - Liquid	in (mm)	1/4*2 (6.35*2)	1/4*3 (6.35*3)	1/4*4 (6.35*4)	1/4*4 (6.35*4)	1/4*5 (6.35*5)
	Pipe Connection Size - Suction	in (mm)	3/8*2 (9.52*2)	3/8*3 (9.52*3)	1/2*1+3/8*3 (12.7*1+9.52*3)	1/2*2+3/8*2 (12.7*2+9.52*2)	1/2*2+3/8*3 (12.7*2+9.52*3)
REFRIGERANT	Type		R410A	R410A	R410A	R410A	R410A
	Charge	lbs (kg)	4.41 (2.0)	6.17(2.8)	6.61 (3.0)	10.13 (4.6)	10.13 (4.6)
	Metering Device		EEV	EEV	EEV	EEV	EEV
OUTDOOR COIL	Face Area	Sq. Ft.	6.0	8.8	8.8	14.4	14.4
	No. Rows		2	2	2	2	2
	Fins per inch		18	20	20	18	18
	Circuits		4	6	6	8	8
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
	Power Supply		Indoor unit powered from outdoor unit				
	MCA	A.	18	25	30	35	35
	Recommended Fuse/Breaker Size	A.	20	25	30	35	35
	MOCP - Max Fuse	A.	25	35	45	50	50
COMPRESSOR	Type		Rotary Inverter	Rotary Inverter	Rotary Inverter	Rotary Inverter	Rotary Inverter
	Model		ATM150D23UFZ	ATF235D22UMT	ATF310D43UMT	ATQ360D1UMU	ATQ360D1UMU
	Oil Type		ESTER OIL VG74	ESTER OIL VG74	ESTER OIL VG74	ESTER OIL VG74	ESTER OIL VG74
	Oil Charge	Fl. Oz.	17.64	23.58	35.27	49.38	49.38
	Rated Current	RLA	10	15	19	21	21
OUTDOOR	Unit Width	in (mm)	37.31 (948)	41.22 (1047)	41.22 (1047)	41.15 (1045)	41.15 (1045)
	Unit Height	in (mm)	27.64 (702)	31.88 (810)	31.88 (810)	52.48 (1333)	52.48 (1333)
	Unit Depth	in (mm)	14.82 (376)	17.91 (455)	17.91 (455)	17.63 (448)	17.63 (448)
	Net Weight	lbs (kg)	105.8 (48)	149.9 (68)	156.5 (71)	221.6 (100.5)	223.8 (101.5)
	Airflow	CFM	1,390	2,130	2,130	4,500	4,500
	Sound Pressure	dB (A)	62	63	62	64	64

PERFORMANCE

Table 6 — Performance

SYSTEM	SIZE		18	24	30	36	48
			38MGRQ18B--3	38MGRQ24C--3	38MGRQ30D--3	38MGRQ36D--3	38MGRQ48E--3
Performance Non-Ducted	Max. Number of Zones		2	3	4	4	5
	Energy Star		YES	YES	YES	YES	YES
	Cooling System Tons		1.5	2.0	2.5	3.0	4.0
	Cooling Rated Capacity	Btu/h	18,000	24,000	30,000	36,000	48,000
	Cooling Cap. Range Min - Max	Btu/h	5,810~21,940	7,880~33,510	8,090~41,470	8,560~45,020	8,560~53,160
	SEER		22.5	23.0	23.8	21.5	22.4
	EER		12.5	12.5	12.5	13.5	12.5
	Heating Rated Capacity (47°F)	Btu/h	19,000	24,000	28,000	36,000	48,000
	Heating Rated Capacity (17°F)	Btu/h	12,000	17,200	17,400	23,200	29,600
	Heating Maximum Capacity (5°F)	Btu/h	14,400	24,450	29,230	36,660	37,290
	Heating Maximum Capacity (-13°F)	Btu/h	9,540	20,250	24,520	30,780	30,970
	Heating Cap. Range Min - Max	Btu/h	5,760~24,480	6,010~36,180	6,350~41,950	7,210~50,350	7,210~55,820
	HSPF		10.3	10.3	10.0	10.5	10.2
	COP (47°F)	W/W	3.6	3.9	3.8	3.8	3.6
	COP (17°F)	W/W	2.8	2.7	2.8	2.8	2.7
	COP (5°F)	W/W	2.2	2.1	2.0	1.8	2.0
Mixed Ducted and Non-Ducted	Energy Star		NO	NO	NO	NO	NO
	Cooling System Tons		1.5	2.0	2.5	3.0	4.0
	Cooling Rated Capacity	Btu/h	18,000	24,000	30,000	36,000	48,500
	Cooling Cap. Range Min - Max	Btu/h	5,795~20,708	7,765~31,955	8,060~39,990	8,510~42,635	8,510~52,580
	SEER		20.50	22.00	22.40	20.25	21.45
	EER		12.15	11.75	11.25	12.40	11.30
	Heating Rated Capacity (47°F)	Btu/h	18,700	24,000	29,000	36,400	49,000
	Heating Rated Capacity (17°F)	Btu/h	11,700	17,400	20,200	23,800	31,800
	Heating Maximum Capacity (5°F)	Btu/h	14,565	24,150	28,615	36,065	37,045
	Heating Maximum Capacity (-13°F)	Btu/h	9,295	18,990	23,390	29,260	29,445
	Heating Cap. Range Min - Max	Btu/h	5,650~24,365	5,980~36,190	6,275~42,305	7,045~47,800	7,045~54,935
	HSPF		10.15	10.15	10.00	10.75	10.85
	COP (47°F)	W/W	3.7	3.9	3.7	3.7	3.5
	COP (17°F)	W/W	2.7	2.6	2.7	2.7	2.7
	COP (5°F)	W/W	2.1	2.0	2.0	1.8	1.9
Performance Ducted	Energy Star		NO	NO	NO	NO	NO
	Cooling System Tons		1.5	2.0	2.5	3.0	4.1
	Cooling Rated Capacity	Btu/h	18,000	24,000	30,000	36,000	49,000
	Cooling Cap. Range Min - Max	Btu/h	5,780~19,476	7,650~30,400	8,030~38,510	8,460~40,250	8,460~52,000
	SEER		18.5	21.0	21.0	19.0	20.5
	EER		11.8	11.0	10.0	11.3	10.1
	Heating Rated Capacity (47°F)	Btu/h	18,500	24,000	30,000	37,000	50,000
	Heating Rated Capacity (17°F)	Btu/h	11,500	17,600	23,000	24,600	34,000
	Heating Maximum Capacity (5°F)	Btu/h	14,730	23,850	28,000	35,470	36,800
	Heating Maximum Capacity (-13°F)	Btu/h	9,050	17,730	22,260	27,740	27,920
	Heating Cap. Range Min - Max	Btu/h	5,539~24,249	5,950~36,200	6,200~42,660	6,880~45,250	6,880~54,050
	HSPF		10.0	10.0	10.0	11.0	11.5
	COP (47°F)	W/W	3.8	3.8	3.6	3.6	3.4
	COP (17°F)	W/W	2.7	2.5	2.5	2.5	2.6
	COP (5°F)	W/W	2.10	1.96	1.98	1.75	1.82

COMPATIBILITY

Table 7 — Compatibility

INDOOR UNIT		OUTDOOR UNIT				
		38MGRQ18B--3	38MGRQ24C--3	38MGRQ30D--3	38MGRQ36D--3	38MGRQ48--3
High Wall	40MPHAQ09XA3	•	•	•	•	•
	40MPHAQ12XA3	•	•	•	•	•
	40MAQB09B--3	•	•	•	•	•
	40MAQB12B--3	•	•	•	•	•
	40MAQB18B--3		•	•	•	•
	40MAQB24B--3			•	•	•
	40MHHQ09---3	•	•	•	•	•
	40MHHQ12---3	•	•	•	•	•
	40MHHQ18---3		•	•	•	•
	40MHHQ24---3				•	•
Cassette	40MBCQ09---3	•	•	•	•	•
	40MBCQ12---3	•	•	•	•	•
	40MBCQ18---3		•	•	•	•
	40MBCQ24---3		•		•	•
Ducted	40MBDQ09---3	•	•	•	•	•
	40MBDQ12---3	•	•	•	•	•
	40MBDQ18---3		•	•	•	•
	40MBDQ24---3		•		•	•
Floor Console	40MBFQ09---3	•	•	•	•	•
	40MBFQ12---3	•	•	•	•	•
	40MBFQ18---3		•	•	•	•
	40MBFQ24---3			•	•	•

* Backwards compatible with 40MBQB*C Cassette, 40MBQB*D Ducted, 40MBQB*F Floor console systems.

* Indoor units 40MPHA sizes 18 – 24 not compatible with multi-zone 38MGR due to size of the indoor unit coil.

COOLING PERFORMANCE NON-DUCTED

Table 8 — COOLING PERFORMANCE NON-DUCTED COMBINATIONS

MODEL	COOLING			OUTDOOR CONDITIONS (DB)											
	INDOOR CONDITIONS DB			-13°F (-25°C)	-4°F (-20°C)	0°F (-17°C)	5°F (-15°C)	17°F (-8°C)	47°F (8°C)	77°F (25°C)	86°F (30°C)	95°F (35°C)	104°F (40°C)	113°F (45°C)	122°F (50°C)
	DB	WB													
18	69.8°F (21°C)	59°F (15°C)	TC	19.12	19.86	19.66	19.26	18.87	20.69	21.78	19.94	17.92	12.00	11.58	9.89
			SC	15.11	15.49	15.34	15.03	14.72	16.14	17.00	15.95	15.23	12.00	11.58	9.89
			Input	1.37	1.41	1.48	1.53	1.57	1.60	1.63	1.79	1.96	1.47	1.52	1.32
	75.2°F (24°C)	62.6°F (17°C)	TC	20.54	21.45	21.23	20.81	20.38	22.35	23.52	21.54	19.35	12.96	12.51	10.13
			SC	15.35	15.61	15.29	15.40	15.28	16.98	18.35	17.01	15.87	11.53	11.88	9.93
			Input	1.40	1.46	1.53	1.58	1.62	1.65	1.68	1.84	2.01	1.50	1.54	1.35
	80.6°F (27°C)	66.2°F (19°C)	TC	21.91	22.46	22.18	22.53	22.85	24.15	25.11	23.85	21.54	14.82	14.22	10.40
			SC	16.44	16.85	16.64	18.05	17.14	18.11	18.33	17.89	16.16	14.52	14.08	10.40
			Input	1.41	1.45	1.51	1.58	1.62	1.65	1.68	1.88	2.05	1.52	1.57	1.36
	89.6°F (32°C)	73.4°F (23°C)	TC	23.89	24.48	24.18	24.56	24.91	26.32	27.37	26.00	23.48	16.15	15.50	11.34
			SC	17.20	17.63	17.65	18.17	18.68	19.22	22.44	21.84	20.19	15.18	14.88	11.11
			Input	1.46	1.50	1.56	1.63	1.67	1.72	1.73	1.93	2.14	1.57	1.62	1.41
24	69.8°F (21°C)	59°F (15°C)	TC	31.96	32.76	32.58	32.60	32.15	32.75	32.44	26.94	24.46	19.98	17.56	15.45
			SC	22.38	22.94	22.81	22.82	22.51	22.93	25.47	22.82	21.70	19.42	17.21	15.45
			Input	2.26	2.32	2.31	2.34	2.36	2.38	2.41	2.26	2.50	2.39	2.58	2.62
	75.2°F (24°C)	62.6°F (17°C)	TC	34.53	35.39	35.19	35.21	34.72	35.37	35.04	29.10	26.42	21.58	18.96	16.69
			SC	24.17	24.77	24.63	24.65	24.31	24.76	26.28	23.86	22.72	19.42	18.02	16.52
			Input	2.30	2.36	2.35	2.38	2.40	2.42	2.45	2.30	2.54	2.43	2.60	2.66
	80.6°F (27°C)	66.2°F (19°C)	TC	36.25	37.15	37.24	37.08	37.51	37.68	37.53	35.39	32.75	24.71	23.96	20.15
			SC	25.38	26.01	26.07	25.96	26.26	26.38	26.95	26.08	25.06	22.09	23.84	20.05
			Input	2.20	2.25	2.28	2.34	2.35	2.41	2.47	2.75	3.04	2.48	2.62	2.74
	89.6°F (32°C)	73.4°F (23°C)	TC	38.78	39.75	39.85	39.68	40.14	40.32	40.16	37.87	35.04	26.44	25.64	21.56
			SC	27.15	27.83	27.89	27.77	28.09	30.64	32.93	32.19	31.19	24.32	24.61	21.56
			Input	2.26	2.32	2.35	2.38	2.42	2.48	2.54	2.82	3.11	2.55	2.69	2.81
30	69.8°F (21°C)	59°F (15°C)	TC	39.15	40.12	40.28	39.54	39.18	40.81	39.79	37.98	36.16	28.21	26.56	23.46
			SC	27.40	28.08	28.20	27.68	27.43	30.61	31.57	30.73	29.86	26.40	26.18	23.12
			Input	3.08	3.16	3.18	3.12	3.21	3.24	3.28	3.62	3.99	3.13	3.25	2.66
	75.2°F (24°C)	62.6°F (17°C)	TC	40.32	41.32	41.49	40.73	40.36	42.03	41.38	41.02	39.05	30.47	28.68	25.34
			SC	28.23	28.93	29.04	28.51	28.25	31.53	33.93	36.10	35.15	28.03	27.25	24.83
			Input	3.13	3.21	3.23	3.17	3.26	3.29	3.33	3.67	4.04	3.18	3.30	2.71
	80.6°F (27°C)	66.2°F (19°C)	TC	41.13	42.15	42.51	42.61	42.10	42.61	42.41	40.63	38.82	32.17	30.47	27.53
			SC	28.79	29.51	29.76	29.83	29.47	31.96	32.30	31.45	30.57	28.30	30.18	27.25
			Input	3.13	3.21	3.25	3.29	3.31	3.38	3.42	3.67	4.05	3.21	3.31	2.76
	89.6°F (32°C)	73.4°F (23°C)	TC	44.41	45.52	45.91	46.02	45.47	46.02	45.80	43.88	41.93	34.74	32.91	29.73
			SC	31.10	31.87	32.14	32.21	31.83	34.51	37.56	38.61	37.73	31.96	31.26	29.73
			Input	3.19	3.27	3.31	3.35	3.37	3.44	3.48	3.73	4.11	3.27	3.37	2.82
36	69.8°F (21°C)	59°F (15°C)	TC	37.82	38.76	38.32	39.02	39.41	40.44	40.91	36.89	33.97	27.85	25.60	23.33
			SC	26.47	27.13	26.82	27.31	28.38	30.33	31.91	30.25	28.88	24.50	23.55	22.40
			Input	2.69	2.76	2.83	2.87	2.91	2.98	3.03	3.39	3.79	3.68	3.76	3.41
	75.2°F (24°C)	62.6°F (17°C)	TC	38.96	39.93	39.47	40.19	40.59	41.65	42.54	39.84	36.69	30.07	27.65	25.20
			SC	27.27	27.95	27.63	28.13	28.42	31.24	34.88	35.06	33.02	27.67	26.26	24.69
			Input	2.74	2.81	2.88	2.92	2.96	3.03	3.08	3.44	3.84	3.73	3.81	3.46
	80.6°F (27°C)	66.2°F (19°C)	TC	42.58	43.64	43.31	44.15	44.54	45.02	45.94	43.73	41.49	34.44	31.93	27.16
			SC	29.81	30.55	30.32	30.91	31.18	33.77	35.83	34.99	35.26	31.00	30.33	26.62
			Input	2.79	2.86	2.89	2.91	2.95	3.06	3.10	3.48	3.91	3.80	3.85	3.47
	89.6°F (32°C)	73.4°F (23°C)	TC	45.98	47.13	46.78	47.68	48.10	48.63	49.61	47.23	44.80	37.20	34.48	29.34
			SC	32.19	32.99	32.74	33.38	33.67	36.47	40.68	41.56	40.32	34.22	32.76	29.34
			Input	2.85	2.92	2.95	2.97	3.01	3.12	3.16	3.54	3.97	3.86	3.91	3.53
48	69.8°F (21°C)	59°F (15°C)	TC	41.22	42.25	42.51	41.87	41.24	41.97	41.47	39.32	36.26	32.97	29.86	26.54
			SC	28.86	29.58	29.76	29.31	28.87	30.64	37.24	36.86	35.53	32.97	29.86	26.54
			Input	2.19	2.24	2.28	2.35	2.38	2.41	2.46	2.78	3.11	3.45	3.64	3.08
	75.2°F (24°C)	62.6°F (17°C)	TC	44.52	45.63	45.91	45.22	44.54	45.33	44.79	42.47	39.16	35.61	32.25	28.66
			SC	32.50	33.31	33.51	33.01	32.51	34.90	37.17	36.10	34.07	32.05	32.25	28.66
			Input	2.25	2.31	2.35	2.42	2.45	2.48	2.53	2.85	3.18	3.52	3.71	3.15
	80.6°F (27°C)	66.2°F (19°C)	TC	53.80	55.14	54.68	55.31	56.15	56.72	60.26	56.82	53.16	40.95	38.57	35.24
			SC	40.35	41.36	41.01	42.12	42.11	42.54	46.04	44.49	42.79	37.95	38.57	35.24
			Input	2.99	3.06	3.15	3.25	3.29	3.46	3.94	4.36	4.80	3.79	3.98	3.43
	89.6°F (32°C)	73.4°F (23°C)	TC	56.49	57.90	57.41	58.08	58.96	59.56	63.27	59.66	55.82	43.00	40.50	37.04
			SC	41.80	42.84	42.49	42.98	43.63	46.45	52.52	51.31	50.24	40.85	40.50	37.04
			Input	3.05	3.13	3.22	3.32	3.36	3.53	4.01	4.43	4.87	3.86	4.05	3.50

LEGEND

DB - Dry Bulb
WB - Wet Bulb

TC - Total Net Capacity (1000 Btu/hour)

SC - Sensible Capacity (1000 Btu/hour)

Input - Total Power (kW)

HEATING PERFORMANCE NON-DUCTED

Table 9 — HEATING PERFORMANCE NON-DUCTED COMBINATIONS

MODEL	HEATING		OUTDOOR CONDITIONS (DB)											
	INDOOR CONDITIONS DB		-22°F (-30°C)	-13°F (-25°C)	-4°F (-20°C)	0°F (-17°C)	5°F (-15°C)	17°F (-8°C)	19.4°F (-7°C)	24.8°F (-4°C)	32°F (0°C)	39.2°F (4°C)	44.6°F (7°C)	53.6°F (12°C)
18	59°F (15°C)	TC	7.74	9.54	11.60	12.54	14.40	19.21	19.46	20.59	20.74	21.67	25.82	27.35
		Input	1.67	1.71	1.76	1.80	1.87	1.93	1.95	2.01	1.60	1.66	1.79	1.87
		COP	1.36	1.64	1.93	2.04	2.19	2.92	2.92	3.00	3.80	3.83	4.21	4.28
	64.4°F (18°C)	TC	7.63	9.40	11.43	12.35	14.01	18.92	19.17	20.28	20.43	21.34	25.43	26.94
		Input	1.70	1.74	1.79	1.83	1.90	1.96	1.98	2.04	1.63	1.69	1.82	1.90
		COP	1.31	1.58	1.87	1.98	2.16	2.83	2.84	2.91	3.67	3.70	4.10	4.16
	69°F (20.5°C)	TC	5.52	6.54	7.69	8.14	13.99	15.02	15.94	17.13	18.93	19.66	23.96	26.67
		Input	1.41	1.44	1.46	1.47	1.91	1.63	1.68	1.76	1.80	1.88	1.95	1.97
		COP	1.15	1.33	1.54	1.62	2.15	2.70	2.78	2.85	3.08	3.05	3.59	3.96
	71.6°F (22°C)	TC	5.84	6.44	7.57	8.02	13.65	14.79	15.70	16.87	18.65	19.37	23.60	26.27
		Input	1.44	1.47	1.49	1.50	2.01	1.66	1.71	1.79	1.83	1.91	1.98	2.00
		COP	1.19	1.28	1.49	1.57	1.99	2.61	2.69	2.76	2.99	2.97	3.49	3.85
24	59°F (15°C)	TC	14.13	17.95	20.25	22.73	24.45	25.66	26.04	28.31	30.43	32.22	36.92	40.88
		Input	2.93	3.19	3.23	3.45	3.63	2.66	2.79	2.87	2.65	2.78	2.96	2.71
		COP	1.41	1.65	1.84	1.93	1.98	2.83	2.74	2.89	3.37	3.40	3.65	4.43
	64.4°F (18°C)	TC	13.95	17.73	20.00	22.45	24.35	25.34	25.72	27.96	30.12	31.89	36.37	40.27
		Input	3.00	3.27	3.31	3.53	3.74	2.73	2.86	2.94	2.72	2.89	2.99	2.74
		COP	1.36	1.59	1.77	1.86	1.91	2.73	2.64	2.79	3.25	3.23	3.56	4.31
	69°F (20.5°C)	TC	13.85	17.59	19.84	22.28	24.17	25.15	25.52	27.74	29.89	31.21	36.22	40.71
		Input	3.07	3.34	3.38	3.61	3.90	2.79	2.92	3.01	2.77	2.96	3.04	3.17
		COP	1.32	1.54	1.72	1.81	1.81	2.65	2.56	2.71	3.16	3.09	3.49	3.76
	71.6°F (22°C)	TC	13.78	17.50	19.75	22.16	23.55	25.02	25.39	27.60	29.74	30.78	35.68	40.10
		Input	3.14	3.42	3.46	3.70	3.83	2.85	2.99	3.08	2.84	3.01	3.07	3.20
		COP	1.29	1.50	1.67	1.76	1.80	2.57	2.49	2.63	3.07	3.00	3.41	3.67
30	59°F (15°C)	TC	18.66	22.54	24.52	26.84	29.23	31.77	32.06	33.46	35.15	37.09	38.47	41.89
		Input	3.39	3.46	3.45	3.62	3.74	3.71	3.73	3.79	3.08	3.12	3.27	3.37
		COP	1.61	1.91	2.08	2.17	2.29	2.51	2.52	2.59	3.34	3.48	3.45	3.64
	64.4°F (18°C)	TC	18.41	22.23	24.18	26.47	28.74	31.31	31.59	32.97	34.64	36.55	37.89	41.26
		Input	3.42	3.49	3.53	3.75	3.86	3.84	3.86	3.92	3.11	3.15	3.30	3.40
		COP	1.58	1.87	2.01	2.07	2.18	2.39	2.40	2.47	3.26	3.40	3.37	3.56
	69°F (20.5°C)	TC	16.70	20.65	22.05	24.02	28.22	27.67	28.13	31.86	33.96	36.08	37.21	40.27
		Input	3.51	3.58	3.64	3.76	4.05	3.85	3.90	4.04	3.14	3.18	3.21	3.30
		COP	1.39	1.69	1.78	1.87	2.04	2.11	2.11	2.31	3.17	3.33	3.40	3.58
	71.6°F (22°C)	TC	15.51	19.42	21.79	23.73	25.99	27.27	27.72	31.38	33.45	35.54	36.65	39.67
		Input	3.64	3.61	3.77	3.79	3.81	3.88	3.93	4.07	3.17	3.21	3.24	3.33
		COP	1.25	1.58	1.69	1.84	2.00	2.06	2.07	2.26	3.09	3.24	3.32	3.49
36	59°F (15°C)	TC	23.82	28.67	30.78	33.61	36.66	39.29	39.91	41.15	43.10	45.78	56.86	62.85
		Input	4.91	5.02	5.17	5.20	5.24	5.11	5.13	5.21	4.56	4.73	4.90	4.56
		COP	1.42	1.67	1.74	1.89	2.05	2.25	2.28	2.31	2.77	2.84	3.40	4.04
	64.4°F (18°C)	TC	23.52	28.29	30.37	33.15	36.15	38.70	39.31	40.53	42.46	45.09	56.01	61.91
		Input	4.97	5.08	5.23	5.26	5.33	5.17	5.19	5.27	4.62	4.79	4.96	4.62
		COP	1.39	1.63	1.70	1.85	2.00	2.19	2.22	2.25	2.70	2.76	3.31	3.93
	69°F (20.5°C)	TC	23.03	27.69	29.04	31.77	36.08	37.41	37.75	39.77	42.39	46.46	50.54	54.37
		Input	5.04	5.15	5.24	5.27	5.39	5.25	5.27	5.35	4.62	4.96	4.66	4.30
		COP	1.34	1.58	1.62	1.77	1.96	2.09	2.10	2.18	2.69	2.74	3.18	3.71
	71.6°F (22°C)	TC	22.63	27.20	28.52	31.20	34.64	36.66	36.99	38.97	41.54	45.53	49.53	53.28
		Input	5.09	5.20	5.29	5.32	5.34	5.30	5.32	5.40	4.67	5.01	4.71	4.35
		COP	1.30	1.53	1.58	1.72	1.90	2.03	2.04	2.11	2.61	2.66	3.08	3.59
48	59°F (15°C)	TC	23.97	28.85	30.97	33.82	37.29	39.53	40.16	41.41	43.37	46.06	57.21	67.67
		Input	4.96	5.07	5.22	5.25	5.33	5.16	5.18	5.26	4.61	4.78	4.95	4.61
		COP	1.42	1.67	1.74	1.89	2.05	2.24	2.27	2.31	2.76	2.83	3.39	4.31
	64.4°F (18°C)	TC	23.71	28.52	30.61	33.42	36.84	39.01	39.62	40.85	42.80	45.45	56.46	66.65
		Input	5.07	5.18	5.33	5.37	5.51	5.27	5.29	5.38	4.71	4.89	5.06	4.71
		COP	1.37	1.61	1.68	1.83	1.98	2.17	2.19	2.23	2.66	2.73	3.27	4.15
	69°F (20.5°C)	TC	23.33	28.05	29.42	32.18	36.34	37.90	38.24	40.29	42.94	47.06	55.83	65.74
		Input	5.10	5.21	5.30	5.33	5.39	5.31	5.33	5.41	4.68	4.63	4.71	5.04
		COP	1.34	1.58	1.63	1.77	1.96	2.09	2.10	2.18	2.69	2.98	3.47	3.82
	71.6°F (22°C)	TC	22.88	27.50	28.83	31.54	35.02	37.06	37.40	39.40	42.00	46.03	54.71	64.43
		Input	5.15	5.26	5.35	5.38	5.40	5.36	5.38	5.46	4.73	5.07	4.76	5.09
		COP	1.30	1.53	1.58	1.72	1.90	2.03	2.04	2.11	2.60	2.66	3.37	3.71

LEGEND

DB - Dry Bulb

WB - Wet Bulb

TC - Total Net Heating Capacity (1000 Btu/hour)

Input - Total Power (kW)

COP - W/W

COOLING PERFORMANCE DUCTED

Table 10 — COOLING PERFORMANCE DUCTED COMBINATIONS

MODEL	COOLING			OUTDOOR CONDITIONS (DB)											
	INDOOR CONDITIONS			-13°F (-25°C)	-4°F (-20°C)	0°F (-17°C)	5°F (-15°C)	17°F (-8°C)	47°F (8°C)	77°F (25°C)	86°F (30°C)	95°F (35°C)	104°F (40°C)	113°F (45°C)	122°F (50°C)
	DB	WB													
18	69.8°F (21°C)	59°F (15°C)	TC	18.3	18.65	18.43	18.75	18.88	19.12	20.26	18.47	16.53	11.28	10.64	9.86
			SC	12.81	13.06	12.90	13.13	13.22	13.38	15.17	14.04	13.10	10.91	10.24	9.73
			Input	1.38	1.41	1.43	1.46	1.51	1.54	1.57	1.71	1.87	1.43	1.49	1.54
	75.2°F (24°C)	62.6°F (17°C)	TC	19.76	20.14	19.90	20.25	20.39	20.65	21.88	19.95	17.85	12.18	11.49	10.13
			SC	13.83	14.10	14.33	14.99	15.29	15.69	17.07	15.76	14.64	10.84	10.92	9.93
			Input	1.43	1.46	1.48	1.51	1.56	1.59	1.62	1.76	1.92	1.50	1.54	1.35
	80.6°F (27°C)	66.2°F (19°C)	TC	21.14	21.54	21.61	21.69	21.86	22.06	23.06	21.85	20.53	13.72	11.56	10.61
			SC	14.8	15.08	15.13	15.18	15.30	15.44	16.14	15.30	14.67	12.11	11.18	10.49
			Input	1.5	1.53	1.55	1.57	1.59	1.60	1.61	1.79	1.97	1.45	1.53	1.58
	89.6°F (32°C)	73.4°F (23°C)	TC	23.04	23.48	23.55	23.64	23.83	24.05	25.14	23.82	22.38	14.95	12.60	11.56
			SC	16.58	16.90	17.20	17.50	17.87	17.55	20.61	20.01	19.24	14.06	12.10	11.33
			Input	1.55	1.58	1.60	1.62	1.64	1.72	1.66	1.84	2.14	1.50	1.58	1.63
24	69.8°F (21°C)	59°F (15°C)	TC	27.01	27.53	27.42	27.46	27.23	27.56	27.05	25.22	22.79	18.48	16.18	14.26
			SC	18.91	19.27	19.19	19.22	19.06	19.29	20.83	19.93	18.92	16.82	15.86	14.16
			Input	1.94	1.98	2.01	2.02	2.04	2.05	2.06	2.28	2.51	2.40	2.48	2.56
	75.2°F (24°C)	62.6°F (17°C)	TC	29.17	29.73	29.61	29.66	29.41	29.76	29.21	27.24	24.61	19.96	17.47	15.40
			SC	20.42	20.81	20.73	20.76	20.59	20.84	21.91	22.33	21.17	17.96	16.60	15.25
			Input	1.98	2.02	2.05	2.06	2.08	2.09	2.10	2.32	2.55	2.44	2.60	2.60
	80.6°F (27°C)	66.2°F (19°C)	TC	32.9	33.53	33.43	33.22	33.18	33.42	33.40	31.64	29.45	22.61	20.56	18.47
			SC	23.03	23.47	23.40	23.25	23.23	23.39	23.04	22.47	21.50	18.76	20.28	18.38
			Input	2.11	2.15	2.20	2.34	3.38	2.42	2.45	2.72	3.03	2.49	2.54	2.63
	89.6°F (32°C)	73.4°F (23°C)	TC	35.21	35.88	35.77	35.55	35.50	35.76	35.74	33.85	31.51	24.19	22.00	19.76
			SC	24.64	25.11	25.04	24.88	24.85	27.18	29.31	28.78	28.05	22.26	21.12	19.76
			Input	2.18	2.22	2.27	2.38	3.45	2.49	2.52	2.79	3.10	2.56	2.61	2.70
30	69.8°F (21°C)	59°F (15°C)	TC	34.76	35.43	35.18	35.62	36.15	36.20	36.96	35.27	33.22	24.93	22.56	20.15
			SC	24.33	24.80	24.63	24.93	25.31	25.34	27.94	27.17	26.27	22.53	21.98	19.49
			Input	3.26	3.32	3.41	3.48	3.52	3.60	3.64	3.69	4.04	3.15	3.20	2.86
	75.2°F (24°C)	62.6°F (17°C)	TC	35.8	36.49	36.24	36.69	37.23	37.29	38.44	38.09	35.88	26.92	24.36	21.76
			SC	25.07	25.55	25.36	25.68	26.06	27.96	31.52	33.52	32.29	24.77	23.15	21.33
			Input	3.31	3.37	3.46	3.53	3.57	3.65	3.69	3.74	4.09	3.20	3.25	2.91
	80.6°F (27°C)	66.2°F (19°C)	TC	39.77	40.53	40.42	41.20	41.08	40.62	40.12	38.91	37.11	29.31	27.14	23.53
			SC	27.84	28.37	28.29	28.56	28.76	28.43	30.33	27.74	27.09	24.22	26.06	23.06
			Input	3.34	3.40	3.49	3.56	3.60	3.68	3.72	3.76	4.14	3.26	3.29	2.79
	89.6°F (32°C)	73.4°F (23°C)	TC	42.95	43.77	43.65	44.49	44.37	43.87	43.33	42.02	40.08	31.65	29.31	25.41
			SC	30.06	30.64	30.56	31.14	31.06	32.90	35.53	36.98	36.07	29.12	27.85	25.41
			Input	3.39	3.46	3.55	3.62	3.66	3.74	3.78	3.82	4.20	3.32	3.35	2.85
36	69.8°F (21°C)	59°F (15°C)	TC	35.88	36.57	36.15	36.81	37.18	38.15	38.59	34.80	32.05	26.27	24.15	22.01
			SC	25.12	25.60	25.31	25.77	26.03	26.71	28.94	26.73	25.64	23.09	24.07	22.01
			Input	2.77	2.82	2.89	2.93	2.97	3.04	3.09	3.46	3.87	3.76	3.84	3.48
	75.2°F (24°C)	62.6°F (17°C)	TC	38.76	39.50	39.04	39.75	40.15	41.20	41.68	37.58	34.61	28.37	26.08	23.77
			SC	28.29	28.83	28.50	29.02	29.31	31.73	34.59	31.95	30.11	25.53	26.08	23.77
			Input	2.84	2.89	2.96	3.00	3.04	3.11	3.16	3.53	3.94	3.83	3.91	3.55
	80.6°F (27°C)	66.2°F (19°C)	TC	40.78	41.56	41.25	42.05	42.42	42.88	43.75	41.65	39.51	32.80	30.41	25.87
			SC	28.54	29.09	28.88	29.44	29.69	30.02	31.06	29.98	28.45	25.78	30.28	25.87
			Input	2.87	2.92	2.95	2.97	3.01	3.12	3.16	3.55	3.99	3.88	3.93	3.54
	89.6°F (32°C)	73.4°F (23°C)	TC	42.82	43.64	43.31	44.15	44.54	45.02	45.94	43.73	41.49	34.44	31.93	27.19
			SC	31.68	32.29	32.05	32.67	32.96	35.12	38.13	37.61	37.34	32.72	31.93	27.19
			Input	2.93	2.99	3.02	3.04	3.08	3.19	3.23	3.62	4.06	3.95	4.00	3.61
48	69.8°F (21°C)	59°F (15°C)	TC	39.49	40.25	40.41	40.87	40.14	40.97	40.25	38.41	35.24	31.42	27.98	25.48
			SC	27.65	28.18	28.29	28.61	28.10	29.91	36.89	35.46	34.61	30.86	27.98	25.48
			Input	2.2	2.24	2.28	2.35	2.38	2.41	2.46	2.78	3.11	3.45	3.64	3.08
	75.2°F (24°C)	62.6°F (17°C)	TC	42.65	43.47	43.64	44.14	43.35	44.25	43.47	41.48	38.06	33.93	30.22	27.52
			SC	31.13	31.73	31.86	32.22	31.65	34.07	36.08	35.26	33.11	30.54	30.22	27.52
			Input	2.27	2.31	2.35	2.42	2.45	2.48	2.53	2.85	3.18	3.52	3.71	3.15
	80.6°F (27°C)	66.2°F (19°C)	TC	51.77	52.76	52.93	52.85	52.41	52.56	52.55	49.63	46.29	38.92	36.56	32.12
			SC	36.24	36.93	37.05	37.00	36.69	36.79	37.31	36.23	34.72	36.30	35.75	32.12
			Input	3.57	3.64	3.69	3.75	3.81	3.86	3.96	4.44	4.94	3.90	4.12	3.68
	89.6°F (32°C)	73.4°F (23°C)	TC	54.36	55.40	55.58	55.49	55.03	55.19	55.18	52.11	48.60	40.87	38.39	33.76
			SC	40.22	40.99	41.13	41.06	40.72	43.05	45.80	44.82	43.74	38.82	38.39	33.76
			Input	3.64	3.71	3.76	3.82	3.88	3.93	4.03	4.51	5.01	3.97	4.19	3.75

LEGEND

DB - Dry Bulb
WB - Wet Bulb
TC - Total Net Heating Capacity (1000 Btu/hour)
SC - Sensible Capacity (1000 Btu/hour)
Input - Total Power (kW)

HEATING PERFORMANCE DUCTED

Table 11 — HEATING PERFORMANCE DUCTED COMBINATIONS

MODEL	HEATING		OUTDOOR CONDITIONS (DB)											
	INDOOR CONDITIONS DB		-22°F (-30°C)	-13°F (-25°C)	-4°F (-20°C)	0°F (-17°C)	5°F (-15°C)	17°F (-8°C)	19.4°F (-7°C)	24.8°F (-4°C)	32°F (0°C)	39.2°F (4°C)	44.6°F (7°C)	53.6°F (12°C)
18	59°F (15°C)	TC	7.25	9.05	11.18	12.58	14.73	16.91	17.12	17.64	18.36	19.67	23.68	25.16
		Input	1.65	1.69	1.81	1.83	1.98	1.87	1.88	1.93	1.65	1.76	2.02	1.86
		COP	1.29	1.57	1.81	2.01	2.18	2.65	2.67	2.68	3.26	3.28	3.44	3.96
	64.4°F (18°C)	TC	7.14	8.91	11.01	12.39	14.56	16.66	16.86	17.38	18.08	19.37	23.32	24.78
		Input	1.68	1.72	1.84	1.86	2.02	1.90	1.91	1.96	1.68	1.79	2.05	1.89
		COP	1.24	1.52	1.75	1.95	2.11	2.57	2.59	2.60	3.15	3.17	3.33	3.84
	69°F (20.5°C)	TC	5.31	6.16	7.02	8.13	14.40	13.39	13.48	16.58	17.86	18.05	20.60	20.09
		Input	1.46	1.49	1.54	1.55	2.01	1.68	1.71	1.88	1.86	1.94	2.00	1.59
		COP	1.07	1.21	1.34	1.54	2.10	2.34	2.31	2.58	2.81	2.73	3.02	3.70
	71.6°F (22°C)	TC	5.23	6.07	6.91	8.01	13.56	13.19	13.28	16.33	17.59	17.78	20.29	19.79
		Input	1.49	1.52	1.57	1.58	2.05	1.71	1.74	1.91	1.89	1.97	2.03	1.62
		COP	1.03	1.17	1.29	1.49	1.94	2.26	2.24	2.51	2.73	2.65	2.93	3.58
24	59°F (15°C)	TC	13.95	17.73	20.00	22.45	23.85	25.34	25.72	27.96	30.05	31.82	36.46	40.37
		Input	2.97	3.24	3.28	3.50	3.62	2.70	2.83	2.91	2.69	2.82	3.00	2.75
		COP	1.38	1.60	1.79	1.88	1.93	2.75	2.66	2.81	3.27	3.31	3.56	4.30
	64.4°F (18°C)	TC	13.78	17.51	19.75	22.17	23.55	25.03	25.40	27.61	29.75	31.49	35.92	39.77
		Input	3.05	3.32	3.36	3.59	3.71	2.77	2.90	2.98	2.76	2.93	3.03	2.78
		COP	1.33	1.55	1.72	1.81	1.86	2.65	2.57	2.71	3.16	3.15	3.47	4.19
	69°F (20.5°C)	TC	13.68	17.37	19.60	22.00	23.37	24.83	25.20	27.40	29.52	30.82	35.77	40.21
		Input	3.11	3.39	3.43	3.67	3.79	2.83	2.97	3.05	2.82	3.00	3.09	3.22
		COP	1.29	1.50	1.67	1.76	1.81	2.57	2.49	2.63	3.07	3.01	3.40	3.66
	71.6°F (22°C)	TC	13.61	17.29	19.50	21.89	23.26	24.71	25.08	27.26	29.37	30.40	35.24	39.60
		Input	3.19	3.47	3.51	3.75	3.88	2.89	3.03	3.12	2.88	3.06	3.12	3.25
		COP	1.25	1.46	1.63	1.71	1.76	2.50	2.42	2.56	2.99	2.92	3.31	3.57
30	59°F (15°C)	TC	18.43	22.26	24.22	26.51	27.98	31.38	31.66	33.05	34.71	36.63	37.99	41.37
		Input	3.44	3.51	3.50	3.67	3.68	3.77	3.79	3.85	3.13	3.17	3.32	3.42
		COP	1.57	1.86	2.03	2.11	2.23	2.44	2.45	2.52	3.25	3.39	3.35	3.54
	64.4°F (18°C)	TC	18.18	21.95	23.88	26.14	27.59	30.92	31.20	32.56	34.21	36.10	37.42	40.75
		Input	3.47	3.54	3.58	3.81	3.82	3.90	3.92	3.98	3.16	3.20	3.35	3.45
		COP	1.54	1.82	1.95	2.01	2.12	2.33	2.33	2.40	3.18	3.31	3.27	3.46
	69°F (20.5°C)	TC	16.49	20.39	21.78	23.72	25.98	27.33	27.78	31.46	33.54	35.63	36.75	39.77
		Input	3.56	3.63	3.69	3.82	3.84	3.91	3.96	4.10	3.19	3.23	3.26	3.35
		COP	1.36	1.64	1.73	1.82	1.98	2.05	2.06	2.25	3.08	3.24	3.31	3.48
	71.6°F (22°C)	TC	15.32	19.18	21.52	23.44	25.67	26.93	27.38	30.99	33.04	35.10	36.20	39.18
		Input	3.69	3.66	3.83	3.85	3.87	3.94	3.99	4.13	3.22	3.26	3.29	3.38
		COP	1.22	1.53	1.65	1.79	1.95	2.00	2.01	2.20	3.01	3.16	3.23	3.40
36	59°F (15°C)	TC	23.05	27.74	29.78	32.52	35.47	38.02	38.62	39.82	41.70	44.30	55.02	60.81
		Input	4.98	5.10	5.25	5.28	5.31	5.19	5.21	5.29	4.63	4.80	4.97	4.63
		COP	1.36	1.60	1.66	1.81	1.96	2.15	2.17	2.21	2.64	2.70	3.24	3.85
	64.4°F (18°C)	TC	22.76	27.38	29.39	32.08	35.29	37.45	38.04	39.22	41.09	43.64	54.21	59.92
		Input	5.04	5.16	5.31	5.34	5.37	5.25	5.27	5.35	4.69	4.86	5.03	4.69
		COP	1.32	1.56	1.62	1.76	1.93	2.09	2.12	2.15	2.57	2.63	3.16	3.74
	69°F (20.5°C)	TC	22.29	26.80	28.10	30.75	35.14	36.21	36.53	38.49	41.03	44.96	48.91	52.62
		Input	5.12	5.23	5.32	5.35	5.37	5.33	5.35	5.43	4.69	5.03	4.73	4.36
		COP	1.28	1.50	1.55	1.68	1.92	1.99	2.00	2.08	2.56	2.62	3.03	3.53
	71.6°F (22°C)	TC	21.90	26.32	27.60	30.20	34.52	35.48	35.80	37.72	40.20	44.06	47.94	51.56
		Input	5.17	5.28	5.37	5.40	5.42	5.38	5.40	5.48	4.74	5.09	4.78	4.42
		COP	1.24	1.46	1.51	1.64	1.87	1.93	1.94	2.02	2.49	2.54	2.94	3.42
48	59°F (15°C)	TC	23.20	27.92	29.97	32.73	36.70	38.26	38.86	40.07	41.97	44.58	55.37	65.49
		Input	5.03	5.15	5.30	5.33	5.36	5.24	5.26	5.34	4.67	4.85	5.02	4.67
		COP	1.35	1.59	1.66	1.80	2.01	2.14	2.17	2.20	2.63	2.69	3.23	4.11
	64.4°F (18°C)	TC	22.94	27.60	29.63	32.34	36.27	37.75	38.35	39.54	41.42	43.99	54.64	64.50
		Input	5.15	5.26	5.41	5.45	5.48	5.35	5.37	5.46	4.78	4.96	5.14	4.78
		COP	1.31	1.54	1.60	1.74	1.94	2.07	2.09	2.12	2.54	2.60	3.12	3.95
	69°F (20.5°C)	TC	22.58	27.15	28.47	31.15	36.13	36.68	37.01	38.99	41.56	45.55	54.03	63.62
		Input	5.18	5.29	5.38	5.41	5.50	5.39	5.41	5.50	4.75	4.70	4.78	5.12
		COP	1.28	1.50	1.55	1.69	1.93	1.99	2.00	2.08	2.57	2.84	3.31	3.65
	71.6°F (22°C)	TC	22.14	26.61	27.91	30.53	35.09	35.87	36.19	38.13	40.64	44.55	52.95	62.36
		Input	5.23	5.34	5.43	5.46	5.52	5.44	5.46	5.55	4.80	5.15	4.83	5.17
		COP	1.24	1.46	1.51	1.64	1.86	1.93	1.94	2.01	2.48	2.54	3.21	3.54

LEGEND

DB - Dry Bulb

WB - Wet Bulb

TC - Total Net Heating Capacity (1000 Btu/hour)

Input - Total Power (kW)

COP - (W/W)

COOLING PERFORMANCE MIXED DUCTED AND NON-DUCTED

Table 12 — COOLING PERFORMANCE MIXED DUCTED AND NON-DUCTED COMBINATIONS

MODEL	COOLING			OUTDOOR CONDITIONS (DB)												
	INDOOR CONDITIONS				-13°F (-25°C)	-4°F (-20°C)	0°F (-17°C)	5°F (-15°C)	17°F (-8°C)	47°F (8°C)	77°F (25°C)	86°F (30°C)	95°F (35°C)	104°F (40°C)	113°F (45°C)	122°F (50°C)
	DB	WB														
18	69.8°F (21°C)	59°F (15°C)	TC	18.71	19.26	19.05	19.01	18.88	19.91	21.02	19.21	17.23	11.64	11.11	9.88	
			SC	13.96	14.28	14.12	14.08	13.97	14.76	16.09	15.00	14.17	11.46	10.91	9.81	
			Input	1.38	1.41	1.46	1.50	1.54	1.57	1.60	1.75	1.92	1.45	1.51	1.43	
	75.2°F (24°C)	62.6°F (17°C)	TC	20.15	20.80	20.57	20.53	20.39	21.50	22.70	20.75	18.60	12.57	12.00	10.13	
			SC	14.59	14.86	14.81	15.20	15.29	16.34	17.71	16.39	15.26	11.19	11.40	9.93	
			Input	1.42	1.46	1.51	1.55	1.59	1.62	1.65	1.80	1.97	1.50	1.54	1.35	
	80.6°F (27°C)	66.2°F (19°C)	TC	21.53	22.00	21.90	22.11	22.36	23.11	24.09	22.85	21.04	14.27	12.89	10.51	
			SC	15.62	15.97	15.89	16.62	16.22	16.78	17.24	16.60	15.42	13.32	12.63	10.45	
			Input	1.46	1.49	1.53	1.58	1.61	1.63	1.65	1.84	2.01	1.49	1.55	1.47	
	89.6°F (32°C)	73.4°F (23°C)	TC	23.47	23.98	23.87	24.10	24.37	25.19	26.26	24.91	22.93	15.55	14.05	11.45	
			SC	16.89	17.27	17.43	17.84	18.28	18.39	21.53	20.93	19.72	14.62	13.49	11.22	
			Input	1.51	1.54	1.58	1.63	1.66	1.72	1.70	1.89	2.14	1.54	1.60	1.52	
24	69.8°F (21°C)	59°F (15°C)	TC	29.49	30.15	30.00	30.03	29.69	30.16	29.75	26.08	23.63	19.23	16.87	14.86	
			SC	20.65	21.11	21.00	21.02	20.79	21.11	23.15	21.38	20.31	18.12	16.54	14.81	
			Input	2.10	2.15	2.16	2.18	2.20	2.22	2.24	2.27	2.51	2.40	2.53	2.59	
	75.2°F (24°C)	62.6°F (17°C)	TC	31.85	32.56	32.40	32.44	32.07	32.57	32.13	28.17	25.52	20.77	18.22	16.05	
			SC	22.30	22.79	22.68	22.71	22.45	22.80	24.10	23.10	21.95	18.69	17.31	15.89	
			Input	2.14	2.19	2.20	2.22	2.24	2.26	2.28	2.31	2.55	2.44	2.60	2.63	
	80.6°F (27°C)	66.2°F (19°C)	TC	34.58	35.34	35.34	35.15	35.35	35.55	35.47	33.52	31.10	23.66	22.26	19.31	
			SC	24.21	24.74	24.74	24.61	24.75	24.89	25.00	24.28	23.28	20.43	22.06	19.22	
			Input	2.16	2.20	2.24	2.34	2.87	2.42	2.46	2.74	3.04	2.49	2.58	2.69	
	89.6°F (32°C)	73.4°F (23°C)	TC	37.00	37.82	37.81	37.62	37.82	38.04	37.95	35.86	33.28	25.32	23.82	20.66	
			SC	25.90	26.47	26.47	26.33	26.47	28.91	31.12	30.49	29.62	23.29	22.87	20.66	
			Input	2.22	2.27	2.31	2.38	2.94	2.49	2.53	2.81	3.11	2.56	2.65	2.76	
30	69.8°F (21°C)	59°F (15°C)	TC	36.96	37.78	37.73	37.58	37.67	38.51	38.38	36.63	34.69	26.57	24.56	21.81	
			SC	25.87	26.44	26.42	26.31	26.37	27.98	29.76	28.95	28.07	24.47	24.08	21.31	
			Input	3.17	3.24	3.30	3.30	3.37	3.42	3.46	3.66	4.02	3.14	3.23	2.76	
	75.2°F (24°C)	62.6°F (17°C)	TC	38.06	38.91	38.87	38.71	38.80	39.66	39.91	39.56	37.47	28.70	26.52	23.55	
			SC	26.65	27.24	27.20	27.10	27.16	29.75	32.73	34.81	33.72	26.40	25.20	23.08	
			Input	3.22	3.29	3.35	3.35	3.42	3.47	3.51	3.71	4.07	3.19	3.28	2.81	
	80.6°F (27°C)	66.2°F (19°C)	TC	40.45	41.34	41.47	41.91	41.59	41.62	41.27	39.77	37.97	30.74	28.81	25.53	
			SC	28.32	28.94	29.03	29.20	29.12	30.20	31.32	29.60	28.83	26.26	28.12	25.16	
			Input	3.24	3.31	3.37	3.43	3.46	3.53	3.57	3.72	4.10	3.24	3.30	2.78	
	89.6°F (32°C)	73.4°F (23°C)	TC	43.68	44.65	44.78	45.26	44.92	44.95	44.57	42.95	41.01	33.20	31.11	27.57	
			SC	30.58	31.26	31.35	31.68	31.45	33.71	36.55	37.80	36.90	30.54	29.56	27.57	
			Input	3.29	3.37	3.43	3.49	3.52	3.59	3.63	3.78	4.16	3.30	3.36	2.84	
36	69.8°F (21°C)	59°F (15°C)	TC	36.85	37.67	37.24	37.92	38.30	39.30	39.75	35.85	33.01	27.06	24.88	22.67	
			SC	25.80	26.37	26.07	26.54	27.21	28.52	30.43	28.49	27.26	23.80	23.81	22.21	
			Input	2.73	2.79	2.86	2.90	2.94	3.01	3.06	3.43	3.83	3.72	3.80	3.45	
	75.2°F (24°C)	62.6°F (17°C)	TC	38.86	39.72	39.26	39.97	40.37	41.43	42.11	38.71	35.65	29.22	26.87	24.49	
			SC	27.78	28.39	28.07	28.58	28.87	31.49	34.74	33.51	31.57	26.60	26.17	24.23	
			Input	2.79	2.85	2.92	2.96	3.00	3.07	3.12	3.49	3.89	3.78	3.86	3.51	
	80.6°F (27°C)	66.2°F (19°C)	TC	41.68	42.60	42.28	43.10	43.48	43.95	44.85	42.69	40.50	33.62	31.17	26.52	
			SC	29.18	29.82	29.60	30.18	30.44	31.90	33.45	32.49	31.86	28.39	30.31	26.25	
			Input	2.83	2.89	2.92	2.94	2.98	3.09	3.13	3.52	3.95	3.84	3.89	3.51	
	89.6°F (32°C)	73.4°F (23°C)	TC	44.40	45.39	45.05	45.92	46.32	46.83	47.78	45.48	43.15	35.82	33.21	28.27	
			SC	31.94	32.64	32.40	33.03	33.32	35.80	39.41	39.59	38.83	33.47	32.35	28.27	
			Input	2.89	2.96	2.99	3.01	3.05	3.16	3.20	3.58	4.02	3.91	3.96	3.57	
48	69.8°F (21°C)	59°F (15°C)	TC	40.36	41.25	41.46	41.37	40.69	41.47	40.86	38.87	35.75	32.20	28.92	26.01	
			SC	28.26	28.88	29.03	28.96	28.49	30.28	37.07	36.16	35.07	31.92	28.92	26.01	
			Input	2.20	2.24	2.28	2.35	2.38	2.41	2.46	2.78	3.11	3.45	3.64	3.08	
	75.2°F (24°C)	62.6°F (17°C)	TC	43.59	44.55	44.78	44.68	43.95	44.79	44.13	41.98	38.61	34.77	31.24	28.09	
			SC	31.82	32.52	32.69	32.62	32.08	34.49	36.63	35.68	33.59	31.30	31.24	28.09	
			Input	2.26	2.31	2.35	2.42	2.45	2.48	2.53	2.85	3.18	3.52	3.71	3.15	
	80.6°F (27°C)	66.2°F (19°C)	TC	52.79	53.95	53.81	54.08	54.28	54.64	56.41	53.23	49.73	39.94	37.57	33.68	
			SC	38.30	39.15	39.03	39.56	39.40	39.67	41.68	40.36	38.76	37.13	37.16	33.68	
			Input	3.28	3.35	3.42	3.50	3.55	3.66	3.95	4.40	4.87	3.85	4.05	3.56	
	89.6°F (32°C)	73.4°F (23°C)	TC	55.43	56.65	56.50	56.79	57.00	57.38	59.23	55.89	52.21	41.94	39.45	35.40	
			SC	41.01	41.92	41.81	42.02	42.18	44.75	49.16	48.07	46.99	39.84	39.45	35.40	
			Input	3.35	3.42	3.49	3.57	3.62	3.73	4.02	4.47	4.94	3.92	4.12	3.63	

LEGEND

DB - Dry Bulb

WB - Wet Bulb

TC - Total Net Capacity (1000 Btu/hour)

SC - Sensible Capacity (1000 Btu/hour)

Input - Total Power (kW)

HEATING PERFORMANCE MIXED DUCTED AND NON-DUCTED

Table 13 — HEATING PERFORMANCE MIXED DUCTED AND NON-DUCTED COMBINATIONS

MODEL	HEATING		OUTDOOR CONDITIONS (DB)											
	INDOOR CONDITIONS DB		-22°F (-30°C)	-13°F (-25°C)	-4°F (-20°C)	0°F (-17°C)	5°F (-15°C)	17°F (-8°C)	19.4°F (-7°C)	24.8°F (-4°C)	32°F (0°C)	39.2°F (4°C)	44.6°F (7°C)	53.6°F (12°C)
18	59°F (15°C)	TC	7.50	9.30	11.39	12.56	14.57	18.06	18.29	19.12	19.55	20.67	24.75	26.26
		Input	1.66	1.70	1.79	1.82	1.93	1.90	1.92	1.97	1.63	1.71	1.91	1.87
		COP	1.33	1.61	1.87	2.03	2.19	2.79	2.80	2.84	3.53	3.56	3.83	4.12
	64.4°F (18°C)	TC	7.39	9.16	11.22	12.37	14.29	17.79	18.02	18.83	19.26	20.36	24.38	25.86
		Input	1.69	1.73	1.82	1.85	1.96	1.93	1.95	2.00	1.66	1.74	1.94	1.90
		COP	1.28	1.55	1.81	1.97	2.14	2.70	2.72	2.76	3.41	3.44	3.72	4.00
	69°F (20.5°C)	TC	5.42	6.35	7.36	8.14	14.20	14.21	14.71	16.86	18.40	18.86	22.28	23.38
		Input	1.44	1.47	1.50	1.51	1.96	1.66	1.70	1.82	1.83	1.91	1.98	1.78
		COP	1.11	1.27	1.44	1.58	2.13	2.52	2.55	2.72	2.95	2.89	3.31	3.83
	71.6°F (22°C)	TC	5.54	6.26	7.24	8.02	13.61	13.99	14.49	16.60	18.12	18.58	21.95	23.03
		Input	1.47	1.50	1.53	1.54	2.03	1.69	1.73	1.85	1.86	1.94	2.01	1.81
		COP	1.11	1.23	1.39	1.53	1.97	2.44	2.47	2.64	2.86	2.81	3.21	3.72
24	59°F (15°C)	TC	14.04	17.84	20.13	22.59	24.15	25.50	25.88	28.14	30.24	32.02	36.69	40.63
		Input	2.95	3.22	3.26	3.48	3.63	2.68	2.81	2.89	2.67	2.80	2.98	2.73
		COP	1.40	1.63	1.82	1.91	1.96	2.79	2.70	2.85	3.32	3.36	3.61	4.37
	64.4°F (18°C)	TC	13.87	17.62	19.88	22.31	23.95	25.19	25.56	27.79	29.94	31.69	36.15	40.02
		Input	3.03	3.30	3.34	3.56	3.73	2.75	2.88	2.96	2.74	2.91	3.01	2.76
		COP	1.35	1.57	1.75	1.84	1.89	2.69	2.61	2.75	3.21	3.19	3.52	4.25
	69°F (20.5°C)	TC	13.77	17.48	19.72	22.14	23.77	24.99	25.36	27.57	29.71	31.02	36.00	40.46
		Input	3.09	3.37	3.41	3.64	3.85	2.81	2.95	3.03	2.80	2.98	3.07	3.20
		COP	1.31	1.52	1.70	1.79	1.81	2.61	2.53	2.67	3.12	3.05	3.45	3.71
	71.6°F (22°C)	TC	13.70	17.40	19.63	22.03	23.41	24.87	25.24	27.43	29.56	30.59	35.46	39.85
		Input	3.17	3.45	3.49	3.73	3.86	2.87	3.01	3.10	2.86	3.04	3.10	3.23
		COP	1.27	1.48	1.65	1.74	1.78	2.54	2.46	2.60	3.03	2.96	3.36	3.62
30	59°F (15°C)	TC	18.55	22.40	24.37	26.68	28.61	31.58	31.86	33.26	34.93	36.86	38.23	41.63
		Input	3.42	3.49	3.48	3.65	3.71	3.74	3.76	3.82	3.11	3.15	3.30	3.40
		COP	1.59	1.89	2.06	2.14	2.26	2.48	2.49	2.56	3.30	3.44	3.40	3.59
	64.4°F (18°C)	TC	18.30	22.09	24.03	26.31	28.17	31.12	31.40	32.77	34.43	36.33	37.66	41.01
		Input	3.45	3.52	3.56	3.78	3.84	3.87	3.89	3.95	3.14	3.18	3.33	3.43
		COP	1.56	1.85	1.98	2.04	2.15	2.36	2.37	2.44	3.22	3.36	3.32	3.51
	69°F (20.5°C)	TC	16.60	20.52	21.92	23.87	27.10	27.50	27.96	31.66	33.75	35.86	36.98	40.02
		Input	3.54	3.61	3.67	3.79	3.95	3.88	3.93	4.07	3.17	3.21	3.24	3.33
		COP	1.38	1.67	1.76	1.85	2.01	2.08	2.09	2.28	3.13	3.29	3.36	3.53
	71.6°F (22°C)	TC	15.42	19.30	21.66	23.59	25.83	27.10	27.55	31.19	33.25	35.32	36.43	39.43
		Input	3.67	3.64	3.80	3.82	3.84	3.91	3.96	4.10	3.20	3.24	3.27	3.36
		COP	1.24	1.56	1.67	1.82	1.98	2.03	2.04	2.23	3.05	3.20	3.28	3.45
36	59°F (15°C)	TC	23.44	28.21	30.28	33.07	36.07	38.66	39.27	40.49	42.40	45.04	55.94	61.83
		Input	4.95	5.06	5.21	5.24	5.28	5.15	5.17	5.25	4.60	4.77	4.94	4.60
		COP	1.39	1.64	1.70	1.85	2.01	2.20	2.23	2.26	2.71	2.77	3.32	3.95
	64.4°F (18°C)	TC	23.14	27.84	29.88	32.62	35.72	38.08	38.68	39.88	41.78	44.37	55.11	60.92
		Input	5.01	5.12	5.27	5.30	5.35	5.21	5.23	5.31	4.66	4.83	5.00	4.66
		COP	1.36	1.60	1.66	1.81	1.97	2.14	2.17	2.20	2.64	2.70	3.24	3.84
	69°F (20.5°C)	TC	22.66	27.25	28.57	31.26	35.61	36.81	37.14	39.13	41.71	45.71	49.73	53.50
		Input	5.08	5.19	5.28	5.31	5.38	5.29	5.31	5.39	4.66	5.00	4.70	4.33
		COP	1.31	1.54	1.59	1.73	1.94	2.04	2.05	2.13	2.63	2.68	3.11	3.62
	71.6°F (22°C)	TC	22.27	26.76	28.06	30.70	34.58	36.07	36.40	38.35	40.87	44.80	48.74	52.42
		Input	5.13	5.24	5.33	5.36	5.38	5.34	5.36	5.44	4.71	5.05	4.75	4.39
		COP	1.27	1.50	1.55	1.68	1.89	1.98	1.99	2.07	2.55	2.60	3.01	3.51
48	59°F (15°C)	TC	23.59	28.39	30.47	33.28	37.00	38.90	39.51	40.74	42.67	45.32	56.29	66.58
		Input	5.00	5.11	5.26	5.29	5.35	5.20	5.22	5.30	4.64	4.82	4.99	4.64
		COP	1.39	1.63	1.70	1.85	2.03	2.19	2.22	2.26	2.70	2.76	3.31	4.21
	64.4°F (18°C)	TC	23.33	28.06	30.12	32.88	36.56	38.38	38.99	40.20	42.11	44.72	55.55	65.58
		Input	5.11	5.22	5.37	5.41	5.50	5.31	5.33	5.42	4.75	4.93	5.10	4.75
		COP	1.34	1.58	1.64	1.79	1.96	2.12	2.14	2.18	2.60	2.67	3.20	4.05
	69°F (20.5°C)	TC	22.96	27.60	28.95	31.67	36.24	37.29	37.63	39.64	42.25	46.31	54.93	64.68
		Input	5.14	5.25	5.34	5.37	5.45	5.35	5.37	5.46	4.72	4.67	4.75	5.08
		COP	1.31	1.54	1.59	1.73	1.95	2.04	2.05	2.13	2.63	2.91	3.39	3.74
	71.6°F (22°C)	TC	22.51	27.06	28.37	31.04	35.06	36.47	36.80	38.77	41.32	45.29	53.83	63.40
		Input	5.19	5.30	5.39	5.42	5.46	5.40	5.42	5.51	4.77	5.11	4.80	5.13
		COP	1.27	1.50	1.55	1.68	1.88	1.98	1.99	2.06	2.54	2.60	3.29	3.63

LEGEND

DB - Dry Bulb

WB - Wet Bulb

TC - Total Net Capacity (1000 Btu/hour)

Input - Total Power (kW)

COP - W/W

APPLICATION DATA

Unit Selection

When selecting a variable speed system, match the system capacity range to the anticipated load range. Since a variable speed system can accommodate a wide range of loads it is important to understand the percentage of time that the system will be required to run at both the maximum and the minimum load points. This differential is most evident when a residential application is compared with a commercial application.

Generally there is more load diversification in the residential application (shifting from a low load to a high load). The commercial application tends to be steadier during the normal day time hours, and will drop to low load levels after normal business hours. If it is anticipated that the system needs to run at the maximum load point for the majority of the time, the next larger system capacity should be selected.

Table 14 provides a guideline for selecting the appropriate size for the application.

Table 14 — Application Data (Sheet 1 of 3)

	NO. OF ZONES	COOLING CAPACITY (BTU/H)					HEATING CAPACITY (BTU/H)				
18K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+9	2-Zone	9,000	9,000				9,500	9,500			
9+12		8,500	10,500				9,000	11,000			
12+12		9,500	9,500				10,000	10,000			
24K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+9	2-Zone	9,500	9,500				10,000	10,000			
9+12		9,500	12,000				10,000	13,000			
9+18		8,400	16,600				9,000	18,000			
12+12		12,000	12,000				13,000	13,000			
12+18		10,000	15,000				11,200	16,800			
18+18		14,000	14,000				15,000	15,000			
9+9+9	3-Zone	9,000	9,000	9,000			9,500	9,500	9,500		
9+9+12		8,667	8,667	11,667			9,500	9,000	12,000		
9+9+18		8,333	8,333	13,333			9,000	9,000	14,000		
9+12+12		8,500	10,000	10,000			8,500	11,000	11,000		
12+12+12		9,667	9,667	9,667			10,667	10,667	10,667		
30K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+9	2-Zone	10,000	10,000				10,500	10,500			
9+12		9,500	12,000				10,000	13,000			
9+18		9,500	17,500				10,000	18,000			
9+24		9,000	24,000				10,000	25,000			
12+12		12,000	12,000				13,000	13,000			
12+18		12,000	18,000				13,000	18,000			
12+24		11,000	23,000				12,000	24,000			
18+18		16,500	16,500				17,000	17,000			
9+9+9	3-Zone	9,333	9,333	9,333			9,667	9,667	9,667		
9+9+12		9,000	9,000	12,000			9,500	9,500	12,500		
9+9+18		8,000	8,000	16,000			8,500	8,500	17,000		
9+9+24		7,500	7,500	20,000			8,000	8,000	21,000		
9+12+12		8,500	11,500	11,500			9,000	12,000	12,000		
9+12+18		8,000	11,000	15,000			8,500	11,500	16,000		
9+12+24		7,000	9,000	20,000			8,500	9,500	21,000		
9+18+18		8,000	14,000	14,000			8,500	14,500	14,500		
12+12+12		11,333	11,333	11,333			12,000	12,000	12,000		
12+12+18		11,000	11,000	14,000			12,000	12,000	12,000		
12+18+18		9,333	13,333	13,333			10,000	14,500	14,500		
12+12+24		8,000	8,000	20,000			9,000	9,000	21,000		
9+9+9+9	4-Zone	9,000	9,000	9,000	9,000		9,500	9,500	9,500	9,500	
9+9+9+12		8,500	8,500	8,500	11,500		9,000	9,000	9,000	12,000	
9+9+9+18		8,000	8,000	8,000	14,000		8,500	8,500	8,500	14,000	
9+9+12+12		8,000	8,000	10,500	10,500		8,500	8,500	8,500	11,000	
9+9+12+18		7,500	7,500	9,000	14,000		8,000	8,000	9,500	14,500	
9+12+12+12		7,000	10,000	10,000	10,000		8,000	10,500	10,500	10,500	
12+12+12+12		9,500	9,500	9,500	9,500		10,000	10,000	10,000	10,000	

Table 14 — Application Data (Sheet 2 of 3)

	NO. OF ZONES	COOLING CAPACITY (BTU/H)					HEATING CAPACITY (BTU/H)				
36K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+18	2-Zone	9,500	18,000				10,000	18,000			
9+24		9,500	24,000				10,000	25,000			
12+12		12,500	12,500				13,000	13,000			
12+18		12,000	18,000				13,000	19,000			
12+24		12,000	24,000				10,000	25,000			
18+18		18,500	18,500				19,000	19,000			
18+24		17,500	22,500				18,000	23,000			
24+24		21,000	21,000				22,000	22,000			
9+9+9	3-Zone	9,500	9,500	9,500			11,000	11,000	11,000		
9+9+12		9,500	9,500	12,000			10,000	10,000	13,000		
9+9+18		9,500	9,500	18,000			10,000	10,000	19,000		
9+9+24		9,000	9,000	22,500			9,500	9,500	23,500		
9+12+12		9,500	12,500	12,500			10,000	10,000	13,000		
9+12+18		9,000	12,000	18,000			9,500	9,500	19,000		
9+12+24		9,000	12,000	21,500			9,500	12,500	22,000		
9+18+18		9,000	18,000	18,000			9,500	18,500	18,500		
9+18+24		8,500	15,500	21,000			9,000	16,000	21,500		
9+24+24		8,000	20,000	20,000			8,500	21,000	21,000		
12+12+12		12,000	12,000	12,000			13,000	13,000	13,000		
12+12+18		12,000	12,000	17,000			12,500	12,500	18,000		
12+12+24		11,000	11,000	22,000			11,500	11,500	23,000		
12+18+18		11,000	16,500	16,500			11,500	17,000	17,000		
12+18+24		10,500	15,500	21,500			11,000	16,000	22,000		
12+24+24		10,000	20,000	20,000			11,000	20,500	20,500		
18+18+18		16,000	16,000	16,000			16,500	16,500	16,500		
18+18+24		15,000	15,000	20,000			15,500	15,500	21,000		
9+9+9+9	4-Zone	9,250	9,250	9,250	9,250		9,500	9,500	9,500	9,500	
9+9+9+12		9,000	9,000	9,000	12,000		9,500	9,500	9,500	12,500	
9+9+9+18		9,000	9,000	9,000	17,000		9,500	9,500	9,500	17,500	
9+9+9+24		8,500	8,500	8,500	20,500		9,000	9,000	9,000	21,000	
9+9+12+12		9,000	9,000	12,000	12,000		9,500	9,500	13,000	13,000	
9+9+12+18		9,000	9,000	11,000	17,000		9,500	9,500	11,500	17,500	
9+9+12+24		8,500	8,500	10,500	20,500		9,000	9,000	11,100	21,000	
9+9+18+18		8,500	8,500	15,500	15,500		9,000	9,000	16,000	16,000	
9+9+18+24		8,000	8,000	14,500	20,000		8,500	8,500	15,000	20,000	
9+12+12+12		9,000	12,000	12,000	12,000		9,500	12,500	12,500	12,500	
9+12+12+18		9,000	11,000	11,000	16,000		9,500	11,500	11,500	16,500	
9+12+12+24		8,500	10,000	10,000	20,000		9,000	10,500	10,500	20,500	
9+12+18+18		8,500	10,000	15,000	15,000		9,000	10,500	15,500	15,500	
9+18+18+18		8,000	14,000	14,000	14,000		8,500	14,500	14,500	14,500	
12+12+12+12		12,000	12,000	12,000	12,000		12,500	12,500	12,500	12,500	
12+12+12+18		11,000	11,000	11,000	16,000		11,500	11,500	11,500	16,500	
12+12+12+24		10,000	10,000	10,000	20,000		10,500	10,500	10,500	20,500	
12+12+18+18		10,000	10,000	15,000	15,000		10,000	10,500	15,500	15,500	

Table 14 — Application Data (Sheet 3 of 3)

	NO. OF ZONES	COOLING CAPACITY (BTU/H)					HEATING CAPACITY (BTU/H)				
48K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+18	2-Zone	9,500	18,000				10,000	18,000			
9+24		9,500	24,000				10,000	25,000			
12+12		12,500	12,500				13,000	13,000			
12+18		12,000	18,000				13,000	19,000			
12+24		12,000	24,000				10,000	25,000			
18+18		18,500	18,500				19,000	19,000			
18+24		17,500	22,500				18,000	23,000			
24+24		21,000	21,000				22,000	22,000			
9+9+9	3-Zone	9,500	9,500	9,500			11,000	11,000	11,000		
9+9+12		9,500	9,500	12,000			10,000	10,000	13,000		
9+9+18		9,500	9,500	18,000			10,000	10,000	19,000		
9+9+24		9,000	9,000	22,500			9,500	9,500	23,500		
9+12+12		9,500	12,500	12,500			10,000	10,000	13,000		
9+12+18		9,000	12,000	18,000			9,500	9,500	19,000		
9+12+24		9,000	12,000	21,500			9,500	12,500	22,000		
9+18+18		9,000	18,000	18,000			9,500	18,500	18,500		
9+18+24		8,500	15,500	21,000			9,000	16,000	21,500		
9+24+24		8,000	20,000	20,000			8,500	21,000	21,000		
12+12+12		12,000	12,000	12,000			13,000	13,000	13,000		
12+12+18		12,000	12,000	17,000			12,500	12,500	18,000		
12+12+24		11,000	11,000	22,000			11,500	11,500	23,000		
12+18+18		11,000	16,500	16,500			11,500	17,000	17,000		
12+18+24		10,500	15,500	21,500			11,000	16,000	22,000		
12+24+24		10,000	20,000	20,000			11,000	20,500	20,500		
18+18+18		16,000	16,000	16,000			16,500	16,500	16,500		
18+18+24		15,000	15,000	20,000			15,500	15,500	21,000		
9+9+9+9	4-Zone	9,250	9,250	9,250	9,250		9,500	9,500	9,500	9,500	
9+9+9+12		9,000	9,000	9,000	12,000		9,500	9,500	9,500	12,500	
9+9+9+18		9,000	9,000	9,000	17,000		9,500	9,500	9,500	17,500	
9+9+9+24		8,500	8,500	8,500	20,500		9,000	9,000	9,000	21,000	
9+9+12+12		9,000	9,000	12,000	12,000		9,500	9,500	13,000	13,000	
9+9+12+18		9,000	9,000	11,000	17,000		9,500	9,500	11,500	17,500	
9+9+12+24		8,500	8,500	10,500	20,500		9,000	9,000	11,100	21,000	
9+9+18+18		8,500	8,500	15,500	15,500		9,000	9,000	16,000	16,000	
9+9+18+24		8,000	8,000	14,500	20,000		8,500	8,500	15,000	20,000	
9+12+12+12		9,000	12,000	12,000	12,000		9,500	12,500	12,500	12,500	
9+12+12+18		9,000	11,000	11,000	16,000		9,500	11,500	11,500	16,500	
9+12+12+24		8,500	10,000	10,000	20,000		9,000	10,500	10,500	20,500	
9+12+18+18		8,500	10,000	15,000	15,000		9,000	10,500	15,500	15,500	
9+18+18+18		8,000	14,000	14,000	14,000		8,500	14,500	14,500	14,500	
12+12+12+12		12,000	12,000	12,000	12,000		12,500	12,500	12,500	12,500	
12+12+12+18		11,000	11,000	11,000	16,000		11,500	11,500	11,500	16,500	
12+12+12+24		10,000	10,000	10,000	20,000		10,500	10,500	10,500	20,500	
12+12+18+18		10,000	10,000	15,000	15,000		10,500	10,500	15,500	15,500	
9+9+9+9+9	5-Zone	9,000	9,000	9,000	9,000	9,000	9,500	9,500	9,500	9,500	9,500
9+9+9+9+12		9,000	9,000	9,000	9,000	12,000	9,500	9,500	9,500	9,500	13,000
9+9+9+9+18		8,500	8,500	8,500	8,500	16,000	9,000	9,000	9,000	9,000	16,500
9+9+9+9+24		7,750	7,750	7,750	7,750	19,500	8,000	8,000	8,000	8,000	20,000
9+9+9+12+12		9,000	9,000	9,000	11,500	11,500	9,500	9,500	9,500	12,000	12,000
9+9+9+12+18		8,000	8,000	8,000	11,000	16,000	8,500	8,500	8,500	11,500	16,500
9+9+9+18+18		8,000	8,000	8,000	11,000	16,000	8,500	8,500	8,500	16,500	16,500
9+9+12+12+12		8,500	8,500	11,000	11,000	11,000	9,000	9,000	12,000	12,000	12,000
9+9+12+12+18		8,500	8,500	10,000	10,000	15,000	8,500	8,500	10,500	10,500	15,500
9+12+12+12+12		8,000	11,000	11,000	11,000	11,000	8,500	11,500	11,500	11,500	11,500
9+12+12+12+18		7,500	10,000	10,000	10,000	14,500	8,000	10,500	10,500	10,500	15,000
12+12+12+12+12		10,500	10,500	10,500	10,500	10,500	11,000	11,000	11,000	11,000	11,000

APPLICATION DATA (USING 40MHHQ HIGH WALL)

Table 15 — Application Data (Using 40MHHQ High Wall) (Sheet 1 of 3)

	NO. OF ZONES	COOLING CAPACITY (BTU/H)					HEATING CAPACITY (BTU/H)				
18K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+9	2-ZONE	8,000	8,000				8,500	8,500			
9+12		8,000	10,500				8,000	11,000			
12+12		10,000	10,000				10,000	10,000			
24K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+9	2-ZONE	8,500	8,500				9,000	9,000			
9+12		8,500	12,000				9,000	13,000			
9+18		7,400	16,600				8,000	18,000			
12+12		12,000	12,000				13,000	13,000			
12+18		10,000	15,000				11,200	16,800			
18+18		14,000	14,000				15,000	15,000			
9+9+9		8,000	8,000	8,000			8,500	8,500	8,500		
9+9+12	3-ZONE	7,600	7,600	11,667			8,500	8,500	12,000		
9+9+18		7,300	7,300	13,333			8,000	8,000	14,000		
9+12+12		7,500	10,000	10,000			7,500	11,000	11,000		
12+12+12		9,667	9,667	9,667			10,667	10,667	10,667		
30K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+9	2-ZONE	9,000	9,000				9,500	9,500			
9+12		8,500	12,000				9,000	13,000			
9+18		8,500	17,500				9,000	18,000			
9+24		8,000	24,000				9,000	25,000			
12+12		12,000	12,000				13,000	13,000			
12+18		12,000	18,000				13,000	18,000			
12+24		11,000	23,000				12,000	24,000			
18+18		16,500	16,500				17,000	17,000			
9+9+9	3-ZONE	8,300	8,300	8,300			8,700	8,700	8,700		
9+9+12		8,000	8,000	12,000			8,500	8,500	12,500		
9+9+18		7,000	7,000	16,000			7,500	7,500	17,000		
9+9+24		7,000	7,000	20,000			7,300	7,300	22,000		
9+12+12		7,500	11,500	11,500			8,000	12,000	12,000		
9+12+18		7,000	11,000	15,000			7,500	11,500	16,000		
9+12+24		6,000	9,000	20,000			7,500	9,500	21,000		
9+18+18		7,000	14,000	14,000			7,500	14,500	14,500		
12+12+12		11,333	11,333	11,333			12,000	12,000	12,000		
12+12+18		11,000	11,000	14,000			12,000	12,000	15,000		
12+18+18		9,333	13,333	13,333			10,000	14,500	14,500		
12+12+24		8,000	8,000	20,000			9,000	9,000	21,000		
9+9+9+9	4-ZONE	8,000	8,000	8,000	8,000		8,500	8,500	8,500	8,500	
9+9+9+12		7,500	7,500	7,500	11,500		8,000	8,000	8,000	12,000	
9+9+9+18		7,000	7,000	7,000	14,000		7,500	7,500	7,500	14,000	
9+9+12+12		7,000	7,000	10,500	10,500		7,500	7,500	11,000	11,000	
9+9+12+18		6,600	6,600	9,000	14,000		7,000	7,000	9,500	14,500	
9+12+12+12		6,300	10,000	10,000	10,000		7,000	10,500	10,500	10,500	
12+12+12+12		9,500	9,500	9,500	9,500		10,000	10,000	10,000	10,000	
36K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+18	2-ZONE	8,500	18,000				9,000	18,000			
9+24		8,500	24,000				9,000	25,000			
12+12		12,500	12,500				13,000	13,000			
12+18		12,000	18,000				13,000	19,000			
12+24		12,000	24,000				10,000	25,000			
18+18		18,500	18,500				19,000	19,000			
18+24		17,500	22,500				18,000	23,000			
24+24		21,000	21,000				22,000	22,000			

Table 15 — Application Data (Using 40MHHQ High Wall) (Sheet 2 of 3)

	NO. OF ZONES	COOLING CAPACITY (BTU/H)					HEATING CAPACITY (BTU/H)				
36K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+9+9	3-ZONE	8,500	8,500	8,500			10,000	10,000	10,000		
9+9+12		8,500	8,500	12,000			9,000	9,000	13,000		
9+9+18		8,500	8,500	18,000			9,000	9,000	19,000		
9+9+24		8,000	8,000	22,500			8,500	8,500	23,500		
9+12+12		8,500	12,500	12,500			9,000	13,000	13,000		
9+12+18		8,000	12,000	18,000			8,500	13,000	19,000		
9+12+24		8,000	12,000	21,500			8,500	12,500	22,000		
9+18+18		8,000	18,000	18,000			8,500	18,500	18,500		
9+18+24		7,500	15,500	21,000			8,000	16,000	21,500		
9+24+24		7,000	20,000	20,000			7,500	21,000	21,000		
12+12+12		12,000	12,000	12,000			13,000	13,000	13,000		
12+12+18		12,000	12,000	17,000			12,500	12,500	18,000		
12+12+24		11,000	11,000	22,000			11,500	11,500	23,000		
12+18+18		11,000	16,500	16,500			11,500	17,000	17,000		
12+18+24		10,500	15,500	21,500			11,000	16,000	22,000		
12+24+24		10,000	20,000	20,000			11,000	20,500	20,500		
18+18+18		16,000	16,000	16,000			16,500	16,500	16,500		
18+18+24		15,000	15,000	20,000			15,500	15,500	21,000		
9+9+9+9	4-ZONE	8,250	8,250	8,250	8,250		8,500	8,500	8,500	8,500	
9+9+9+12		8,000	8,000	8,000	12,000		8,500	8,500	8,500	12,500	
9+9+9+18		8,000	8,000	8,000	17,000		8,500	8,500	8,500	17,500	
9+9+9+24		7,500	7,500	7,500	20,500		8,000	8,000	8,000	21,000	
9+9+12+12		8,000	8,000	12,000	12,000		8,500	8,500	13,000	13,000	
9+9+12+18		8,000	8,000	11,000	17,000		8,500	8,500	11,500	17,500	
9+9+12+24		7,500	7,500	10,500	20,500		8,000	8,000	11,100	21,000	
9+9+18+18		7,500	7,500	15,500	15,500		8,000	8,000	16,000	16,000	
9+9+18+24		7,000	8,000	14,500	20,000		7,500	7,500	15,000	20,000	
9+12+12+12		8,000	12,000	12,000	12,000		8,500	12,500	12,500	12,500	
9+12+12+18		8,000	11,000	11,000	16,000		8,500	11,500	11,500	16,500	
9+12+12+24		7,500	10,000	10,000	20,000		8,000	10,500	10,500	20,500	
9+12+18+18		7,500	10,000	15,000	15,000		8,000	10,500	15,500	15,500	
9+18+18+18		8,000	14,000	14,000	14,000		7,500	14,500	14,500	14,500	
12+12+12+12		12,000	12,000	12,000	12,000		12,500	12,500	12,500	12,500	
12+12+12+18		11,000	11,000	11,000	16,000		11,500	11,500	11,500	16,500	
12+12+12+24		10,000	10,000	10,000	20,000		10,500	10,500	10,500	20,500	
12+12+18+18		10,000	10,000	15,000	15,000		10,500	10,500	15,500	15,500	

Table 15 — Application Data (Using 40MHHQ High Wall) (Sheet 3 of 3)

	NO. OF ZONES	COOLING CAPACITY (BTU/H)					HEATING CAPACITY (BTU/H)				
48K		ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
9+18	2-ZONE	8,500	18,000				9,000	18,000			
9+24		8,500	24,000				9,000	25,000			
12+12		12,500	12,500				13,000	13,000			
12+18		12,000	18,000				13,000	19,000			
12+24		12,000	24,000				10,000	25,000			
18+18		18,500	18,500				19,000	19,000			
18+24		17,500	22,500				18,000	23,000			
24+24		21,000	21,000				22,000	22,000			
9+9+9	3-ZONE	8,500	8,500	8,500			10,000	10,000	10,000		
9+9+12		8,500	8,500	12,000			9,000	9,000	13,000		
9+9+18		8,500	8,500	18,000			9,000	9,000	19,000		
9+9+24		8,000	8,000	22,500			8,500	8,500	23,500		
9+12+12		8,500	8,500	12,500			9,000	13,000	13,000		
9+12+18		8,000	12,000	18,000			8,500	13,000	19,000		
9+12+24		8,000	12,000	21,500			8,500	12,500	22,000		
9+18+18		8,000	18,000	18,000			8,500	18,500	18,500		
9+18+24		7,500	15,500	21,000			8,000	16,000	21,500		
9+24+24		7,000	20,000	20,000			7,500	21,000	21,000		
12+12+12		12,000	12,000	12,000			13,000	13,000	13,000		
12+12+18		12,000	12,000	17,000			12,500	12,500	18,000		
12+12+24		11,000	11,000	22,000			11,500	11,500	23,000		
12+18+18		11,000	16,500	16,500			11,500	17,000	17,000		
12+18+24		10,500	15,500	21,500			11,000	16,000	22,000		
12+24+24		10,000	20,000	20,000			11,000	20,500	20,500		
18+18+18		16,000	16,000	16,000			16,500	16,500	16,500		
18+18+24		15,000	15,000	20,000			15,500	15,500	21,000		
9+9+9+9	4-ZONE	8,250	8,250	8,250	8,250		8,500	8,500	8,500	8,500	
9+9+9+12		8,000	8,000	8,000	12,000		8,500	8,500	8,500	12,500	
9+9+9+18		8,000	8,000	8,000	17,000		8,500	8,500	8,500	17,500	
9+9+9+24		7,500	7,500	7,500	20,500		8,000	8,000	8,000	21,000	
9+9+12+12		8,000	8,000	12,000	12,000		8,500	8,500	13,000	13,000	
9+9+12+18		8,000	8,000	11,000	17,000		8,500	8,500	11,500	17,500	
9+9+12+24		7,500	7,500	10,500	20,500		8,000	8,000	11,100	21,000	
9+9+18+18		7,500	7,500	15,500	15,500		8,000	8,000	16,000	16,000	
9+9+18+24		7,000	7,000	14,500	20,000		7,500	7,500	15,000	20,000	
9+12+12+12		8,000	12,000	12,000	12,000		8,500	12,500	12,500	12,500	
9+12+12+18		8,000	11,000	11,000	16,000		8,500	11,500	11,500	16,500	
9+12+12+24		7,500	10,000	10,000	20,000		8,000	10,500	10,500	20,500	
9+12+18+18		7,500	10,000	15,000	15,000		8,000	10,500	15,500	15,500	
9+18+18+18		7,000	14,000	14,000	14,000		7,500	14,500	14,500	14,500	
12+12+12+12		12,000	12,000	12,000	12,000		12,500	12,500	12,500	12,500	
12+12+12+18		11,000	11,000	11,000	16,000		11,500	11,500	11,500	16,500	
12+12+12+24		10,000	10,000	10,000	20,000		10,500	10,500	10,500	20,500	
12+12+18+18		10,000	10,000	15,000	15,000		10,500	10,500	15,500	15,500	
9+9+9+9+9	5-ZONE	8,000	8,000	8,000	8,000	8,000	8,500	8,500	8,500	8,500	8,500
9+9+9+9+12		8,000	8,000	8,000	8,000	12,000	8,500	8,500	8,500	8,500	13,000
9+9+9+9+18		7,500	7,500	7,500	7,500	16,000	8,000	8,000	8,000	8,000	16,500
9+9+9+9+24		6,750	6,750	6,750	6,750	19,500	7,000	7,000	7,000	7,000	20,000
9+9+9+12+12		8,000	8,000	8,000	11,500	11,500	8,500	8,500	8,500	12,000	12,000
9+9+9+12+18		7,000	7,000	7,000	11,000	16,000	7,500	7,500	7,500	11,500	16,500
9+9+9+18+18		7,000	7,000	7,000	11,000	16,000	7,500	7,500	7,500	16,500	16,500
9+9+12+12+12		7,500	7,500	11,000	11,000	11,000	8,000	8,000	8,000	12,000	12,000
9+9+12+12+18		7,500	7,500	10,000	10,000	15,500	7,500	7,500	10,500	10,500	15,500
9+12+12+12+12		7,000	11,000	11,000	11,000	11,000	7,500	11,500	11,500	11,500	11,500
9+12+12+12+18		6,500	10,000	10,000	10,000	14,500	7,000	10,500	10,500	10,500	15,000
12+12+12+12+12		10,500	10,500	10,500	10,500	10,500	11,000	11,000	11,000	11,000	11,000

UNIT MOUNTING (OUTDOOR)

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

Support – A location which can bear the weight of outdoor unit.

See “Physical Data” on page 10 for weights, and “DIMENSIONS” on page 5.

Unit Leveling – For reliable operation, units should be level in all planes.

Clearances – Minimum clearances (See Fig. 9 — on page 9), must be provided for airflow. The outdoor units are designed for free-blow applications. Air inlets and outlets should not be restricted.

Unit location – A location which is convenient to installation and not exposed to strong wind.

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

System Operating Conditions

Table 16 — Operating Range (Min / Max °F (°C))

	COOLING	HEATING
Outdoor DB	-13 / 122°F (-25 / 50°C)	-22 / 86°F (-30 / 30°C)

Metering Devices

The outdoor unit has multiple electronic expansion valves to manage the refrigerant flow to the different indoor fan coils connected to that unit.

WIRING

All wires must be sized per NEC (National Electrical Code) or CEC (Canadian Electrical Code) and local codes. Use Electrical Data table MCA (minimum circuit amps) and MOCP (maximum over current protection) to correctly size the wires and the disconnect fuse or breakers respectively.

RECOMMENDED CONNECTION METHOD FOR POWER AND COMMUNICATION WIRING:

The main power is supplied to the outdoor unit. The field supplied 14/3 stranded wire with ground with a 600 volt insulation rating, power/communication wiring from the outdoor unit to indoor unit consists of four (4) wires and provides the power for the indoor unit. Two wires are line voltage AC power, one is communication wiring (S) and the other is a ground wire. Wiring between indoor and outdoor unit is polarity sensitive. The use of BX wire is **NOT** recommended.

If installed in a high Electromagnetic field (EMF) area and communication issues exists, a 14/2 stranded shielded wire can be used to replace L2 and (S) between outdoor unit and indoor unit landing the shield onto ground in the outdoor unit only.

Table 17 —

CABLE	CABLE SIZE	REMARKS
Connection Cable	14AWG	3 wire + Ground 1Φ 208/230 V



WARNING

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Wires should be sized based on NEC and local codes.



WARNING

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Be sure to 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 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 shall be located within sight and readily accessible from the air conditioner.

Connecting cable with conduit shall be routed through the hole in the conduit panel.

PIPING REQUIREMENTS

IMPORTANT: Both refrigerant lines must be insulated separately.

The minimum refrigerant line length between the indoor and outdoor units is 10 ft. (3 m). The following lengths are allowed. Table 18 lists the pipe sizes for the outdoor unit. For the indoor unit pipe sizes refer to the indoor unit installation instructions.

Refrigerant Piping:

Line sets to be sized based on the connection size of the indoor unit. Each pipe should be insulated individually.

Table 18 — PIPING REQUIREMENTS

SYSTEM SIZE			18K	24K	30K	36K	48K
Piping	Min. Piping Length per each indoor unit	ft (m)	10 (3)	10 (3)	10 (3)	10 (3)	10 (3)
	Standard Piping Length per each indoor unit	ft (m)	25 (7.5)	25 (7.5)	25 (7.5)	25 (7.5)	25 (7.5)
	Max. outdoor-indoor height difference (OU higher than IU)	ft (m)	49 (15)	49 (15)	49 (15)	65 (20)	65 (20)
	Max. outdoor-indoor height difference (IU higher than OU)	ft (m)	49 (15)	49 (15)	49 (15)	65 (20)	65 (20)
	Max. height different between indoor units	ft (m)	32 (10)	32 (10)	32 (10)	32 (10)	32 (10)
	Max. Length per each indoor unit	ft (m)	82 (25)	98 (30)	115 (35)	115 (35)	115 (35)
	Max. Piping Length with no additional refrigerant charge per System	ft (m)	49 (15)	74 (22.5)	98 (30)	123 (37.5)	123 (37.5)
	Total Maximum Piping Length per system	ft (m)	131 (40)	197 (60)	263 (80)	328 (100)	328 (100)
	Additional refrigerant charge (between Standard – Max piping length)	Oz/ft (g/m)	0.16 (15)	0.16 (15)	0.16 (15)	0.16 (15)	0.16 (15)
	Suction Pipe Size	in (mm)	3/8*2 (9.52*2)	3/8*3 (9.52*3)	1/2*1+3/8*3 (12.7*1+9.52*3)	1/2*2+3/8*2 (12.7*2+9.52*2)	1/2*2+3/8*3 (12.7*2+9.52*3)
	Liquid Pipe Size	in (mm)	1/4 *2 (6.3*2)	1/4 *3 (6.3*3)	1/4 *4 (6.3*4)	1/4 *4 (6.3*4)	1/4 *5 (6.3*5)
Refrigerant	Refrigerant Type		R410A	R410A	R410A	R410A	R410A
	Charge Amount	Lbs (kg)	4.41 (2.0)	6.17 (2.8)	6.61 (3.0)	10.14 (4.6)	10.14 (4.6)

NOTE: For piping runs greater than the “Maximum Piping Length with no additional refrigerant charge per System”, see the Additional Refrigerant Charge note in the Long-Line Applications section.

General Guidelines:

1. The outdoor units are shipped with a full charge of R-410A refrigerant. For runs over the Maximum Piping Length with no additional refrigerant charge per System listed in Table 19, consult the **Long-Line Applications** section for proper charge adjustments.
2. Refrigerant lines should not be buried in the ground. If it is necessary to bury the lines, do not bury more than 36 inches (914 mm). Provide a minimum of 6 inch (152 mm) vertical rise to the service valves to prevent refrigerant migration.
3. Both lines must be insulated. Use a minimum of ½-inch (12.7 mm) thick insulation. Closed-cell insulation is recommended in all long-line applications.
4. Special consideration should be given to isolating the interconnecting tubing from the building structure. Isolate the tubing so vibration or noise does not transmit into the structure.

Long-Line Applications:

- No change in line sizing is required.

Table 19 — Long-Line Applications

UNIT SIZE	ZONES	CHARGE OZ. (KG.)	ADDITIONAL CHARGE REQUIRED AFTER FT. (M)	ADDITIONAL CHARGE OZ./FT. (G/M)	TOTAL MAXIMUM PIPING LENGTH FT. (M.)
18	2	70.55 (2.0)	49 (15)	0.16 (15)	131 (40)
24	3	98.76 (2.8)	74 (22.5)		197 (60)
30	4	105.82 (3.0)	98 (30)		263 (80)
36	4	162.26 (4.6)	123 (37.5)		328 (100)
48	5	162.26 (4.6)	123 (37.5)		

NOTE: Additional Refrigerant Calculation Sum Total Liquid Pipe ft. (m) Additional Charge Required After ft. (m.) x Additional Charge oz./ft. (g/m) 0.16 (15).

NOTE: If the calculation results in a negative number, no additional refrigerant is required.

Drain Connections

Install drains that meet the local sanitation codes.

Control System

The **38MGR** unit is equipped with a microprocessor control to operate the system and give optimum levels of comfort and operating efficiency. There are microprocessor boards and thermistors located in both the indoor and outdoor units. The thermistors monitor the system operation and control the operating mode.

Sequence of Operation

NOTE: Simultaneous heating and cooling is not allowed.

The **HEATING** mode is the system's primary mode and the mode controls the operation mode for the remaining indoor units connected to the same outdoor unit. If any unit in the system is set to the **HEATING** mode, the system switches to heat. If any unit is in the **COOLING** mode, while any unit in the system is set to the **HEATING** mode, the units set to **COOLING** enter the **CONFLICT** mode and an error message appears on the units in the **COOLING** mode.

All units must be set to the **COOLING** or **FAN** mode for the system to cool. When a unit is set to the **COOL**, **HEAT** or **DRY** mode, the electronic expansion valve is initialized first (closed) and then it is opened to a preset position.

SUPERHEAT heating for each fan coil (the ones that are energized) is monitored and the position of the electronic expansion valve is adjusted to ensure that each fan coil gets the appropriate amount of refrigerant to maintain the required superheat. In the **COOLING** mode, after the set point is satisfied, the electronic expansion valve remains open for a specified time to ensure the system pressures equalize. In the **HEATING** mode, after the set point is satisfied, the electronic expansion valve remains open to ensure proper oil flow back and to maintain a low pressure.

When the system is set for the **COOL**, **HEAT** or **DRY** mode, the compressor speed is varied by comparing the indoor air temperature with the set point and continuously adjusting the compressor speed (to keep the compressor running as long as possible) in an effort to maintain the greatest comfort possible.

The indoor fan can run in either the **MANUAL** or **AUTO** mode. When the fan runs in the **AUTO** mode, the speed is determined by comparing the room temperature to the set point.

For High Walls and Floor Console Fan Coils, when the set point is satisfied, the fan speed is reduced. For Cassettes and Ducted Fan Coils when the set point is satisfied, the fan continues to run. The Fan Coils are not de-energized.

When the unit goes through the defrost cycle, the indoor fans are de-energized and the refrigerant is circulated through all the fan coils (even if they are off or were in the standby mode before the defrost cycle) to maximize the heat transfer surface area available for defrost operation.



WARNING

AUTO mode is recommended for use on single zone applications **ONLY**. **AUTO** mode is **NOT** recommended for use on multi-zone applications.

Using **AUTO** changeover on multi-zone applications could set an indoor unit to **Standby** mode, indicated as (—) on the display, and turn off the indoor unit until all the indoor units are on the same mode (**COOLING** or **HEATING**).

HEATING mode is the priority for the system. Simultaneous **HEATING** and **COOLING** is not allowed.

AIRFLOW DATA

Table 20 — Airflow Data

OUTDOOR MULTI-ZONE					
SYSTEM SIZE	18K	24K	30K	36K	48K
OUTDOOR (CFM)	1,390	2,130	2,130	2,130	3,500

SOUND PRESSURE

Table 21 — Sound Pressure

OUTDOOR MULTI-ZONE						
SYSTEM SIZE		18K	24K	30K	36K	48K
OUTDOOR SOUND PRESSURE LEVEL	DB(A)	62.4	63.4	62.3	63	64

SOUND POWER IN OCTAVE BANDS

Table 22 — Sound Power

	FREQUENCY (HZ)	63	125	250	500	1,000	2,000	4,000	8,000
2 ZONE 18K	COOLING DB(A)	53.9	52.0	55.4	48.9	44.5	40.4	36.3	30.8
	HEATING DB(A)	57.0	55.8	59.3	52.8	49.5	45.2	41.6	38.6
3 ZONE 24K	COOLING DB(A)	62.0	63.2	58.5	56.0	54.7	49.3	46.3	41.8
	HEATING DB(A)	64.4	65.9	65.4	58.5	57.7	52.7	50.3	52.2
4 ZONE 30K	COOLING DB(A)	58.4	60.1	58.3	52.6	51.0	47.6	44.2	38.7
	HEATING DB(A)	62.1	62.7	61.8	56.4	55.5	51.5	49.8	46.0
4 ZONE 36K	COOLING DB(A)	67.9	64.6	58.7	58.3	55.4	50.3	44.7	38.5
	HEATING DB(A)	65.1	61.8	62.4	59.0	56.7	52.2	45.5	41.6
5 ZONE 48K	COOLING DB(A)	68.4	65.8	58.6	58.3	55.5	51.8	45.3	44.2
	HEATING DB(A)	68.5	62.3	62.4	61.3	59.1	54.0	48.7	44.0

OUTDOOR UNIT SOUND PRESSURE TEST CONDITIONS

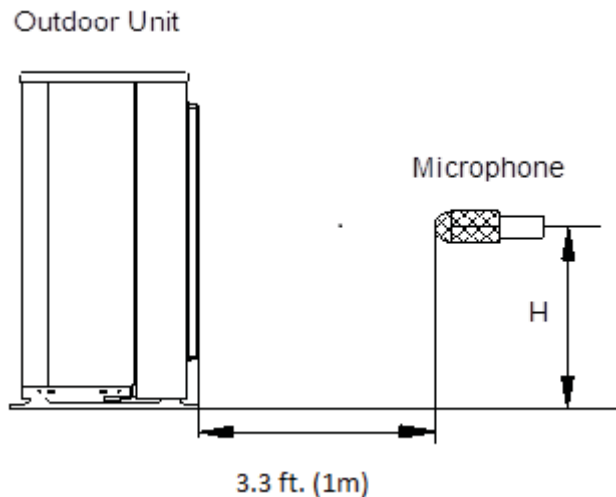


Fig. 11 — Outdoor Unit Sound Pressure Test Conditions

NOTE: $H = 0.5 \times \text{Height of the outdoor unit.}$

Table 23 — Outdoor Unit Sound Pressure Test Conditions

	INDOOR CONDITION		OUTDOOR CONDITION	
	DB	WB	DB	WB
COOLING	80.6°F (27°C)	66.2°F (19°C)	95°F (35°C)	75.2°F (24°C)
HEATING	68°F (20°C)	59°F (15°C)	44.6°F (7°C)	42.8°F (6°C)

FAN AND MOTOR SPECIFICATIONS

Table 24 — Fan and Motor Specifications

			18K (208/230 V)	24K (208/230 V)	30K (208/230 V)	36K (208/230 V)	48K (208/230 V)
OUTDOOR	MATERIAL		AS	AS	AS	AS	AS
	TYPE		ZL490*151*12-3KN	ZL560*139*12-3KN	ZL560*139*12-3KN	ZL554*148*12-3KFN	ZL554*148*12-3KFN
	DIAMETER	inch	490	560	560	554	554
	HEIGHT	inch	151	139	139	148	148
OUTDOOR FAN MOTOR	MODEL		ZKFN-50-8-2	ZKFN-120-8-2	ZKFN-120-8-2	ZKFN-120-8-2	ZKFN-85-8-22
	VOLTS	V	208/230	208/230	208/230	208/230	208/230
	PHASE		1	1	1	1	1
	HERTZ	Hz	60	60	60	60	60
	FLA		0.74	0.9	1.3	1.0x2	1.0x2
	RATED HP	HP	0.07	0.16	0.16	0.11	0.11
	OUTPUT	W	50	120	120	85	85
	TYPE		DC	DC	DC	DC	DC
	INSULATION CLASS		A				
	SAFE CLASS		IPX4				
	INPUT	W	115	156	156	108	108
	RANGE OF CURRENT	Amps	0.41±10%	1.34±10%	1.34±10%	0.92±10%	0.92±10%
	RATED CURRENT	Amps	0.41	1.34	1.34	0.92	0.92
	CAPACITOR	µF	No Capacitor				
	SPEED	rev/min	850~150	1000~150	1000~150	870~300	870~300
	RATED RPM	rev/min	800	900	900	800	800
	MAX. INPUT	W	130	173	173	126	126

ELECTRICAL DATA

Table 25 — Electrical Data

UNIT SIZE	SYSTEM VOLTAGE	OPERATING VOLTAGE	COMPRESSOR	OUTDOOR FAN			MCA	RECOMMENDED FUSE/ BREAKER SIZE (A.)	MOCP MAX FUSE
	VOLT / PHASE / HZ	MAX / MIN*	RLA	FLA	HP	W			
18K	208/230/1/60	253 / 187	10	0.74	0.07	50	18	20	25
24K			15	0.9	0.16	120	25	25	35
30K			19	1.3	0.16	120	30	30	45
36K			21	1.0x2	0.11	85	35	35	50
48K			21	1.0x2	0.11	85	35	35	50

*Permissible limits of the voltage range at which the unit operates satisfactorily.

LEGEND

FLA - Full Load Amps

MCA - Minimum Circuit Amps

MOCP - Maximum Over Current Protection

RLA - Rated Load Amps

WIRING DIAGRAMS

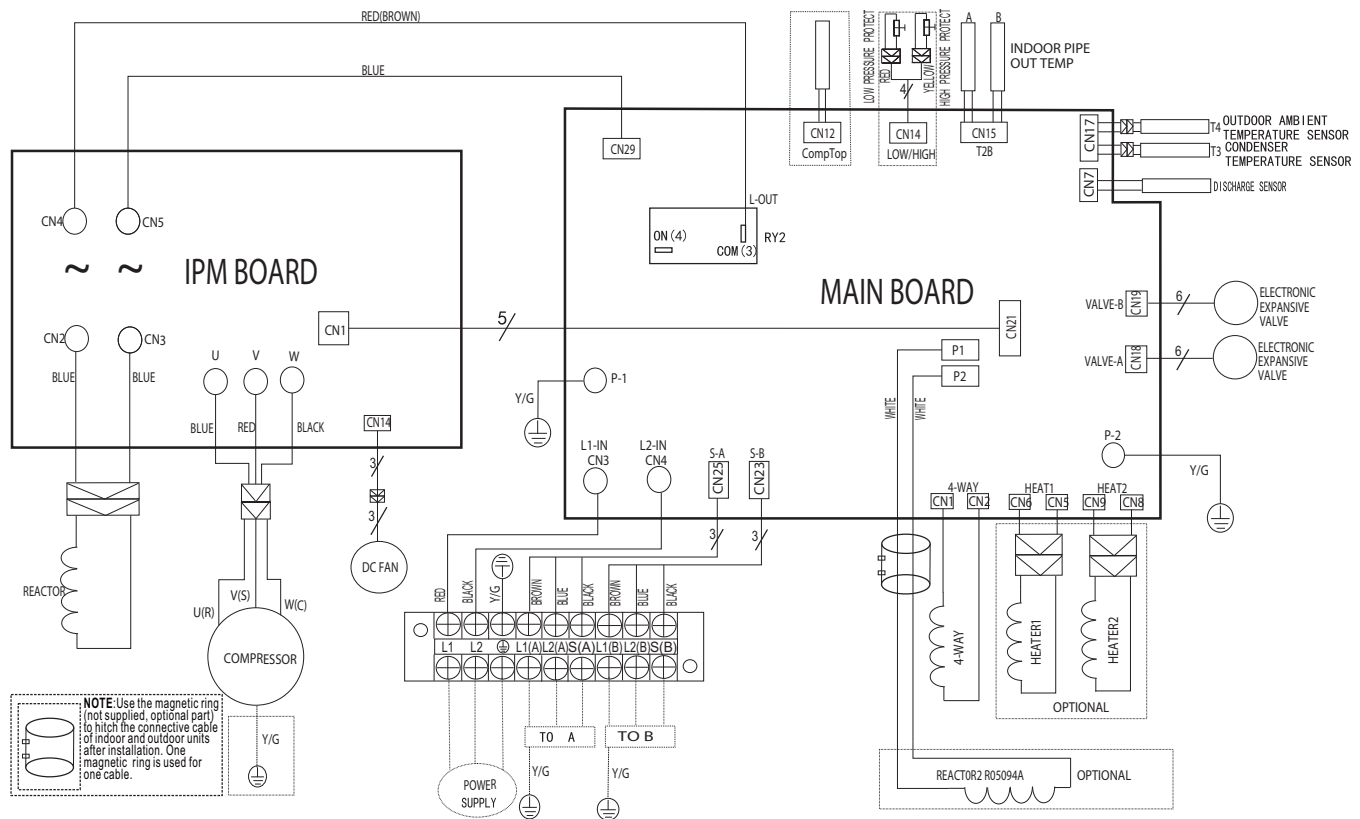


Fig. 12 — Wiring Diagram 18K - 2 Zone

Table 26 — Outdoor Unit Main Board Size 18K

CODE	PART NAME
CN3-CN4	Input: 230VAC High voltage
CN23,CN25	Output: Pin1 (Connection of the high voltage) ----"S"Pin2~Pin3 (230VAC High voltage) ---"L1 & L2"
P1-P2	Output: Connection of the REACTOR
CN1-CN2	Output: 230VAC High voltage ---- 4 Way Valve
CN5-CN6	Output: 230VAC High voltage ---- Compressor Crankcase Heater
CN8-CN9	Output: 230VAC High voltage ---- Chassis Crankcase Heater
P-1~P-2	Connection to the earth
CN18, CN19	Output: Pin1-Pin4: Pulse waveform (0-12VDC), Pin5, Pin6 (12VDC)--EEV
CN7	Input:Pin1 (0-5VDC), Pin2 (5VDC) -- Discharge Sensor
CN17	Input: Pin3, Pin4 (5VDC), Pin2 (0VDC), Pin1, Pin5 (0-5VDC)--Cond. and Ambient Temperature
CN15	Input: Pin1, Pin3, Pin5 (5VDC) Pin2, Pin4, Pin6 (0-5VDC) -- IDU Pipe Temp
CN14	Input: Pin2, Pin4 (0VDC), Pin1, Pin3 (0-5VDC) --- H/L Pressure Switches
CN12	Input: Pin1 (0-5VDC), Pin2 (5VDC) -- Compressor Temp
CN29~L-OUT	Output: 230VAC High voltage -- to IPM Board
CN 21	Connect to IPM BOARD

Table 27 — Outdoor Unit IPM Board Size 18K

CODE	PART NAME
CN4~CN5	Input: 230VAC High voltage---from the Main Board
CN2~CN3	Output: Connection of the REACTOR
U~V~W	Connection to compressor voltage among phases 0~200VAC
CN14	Connection to DC FAN
CN1	Connection to MAIN BOARD

WIRING DIAGRAMS (CONT)

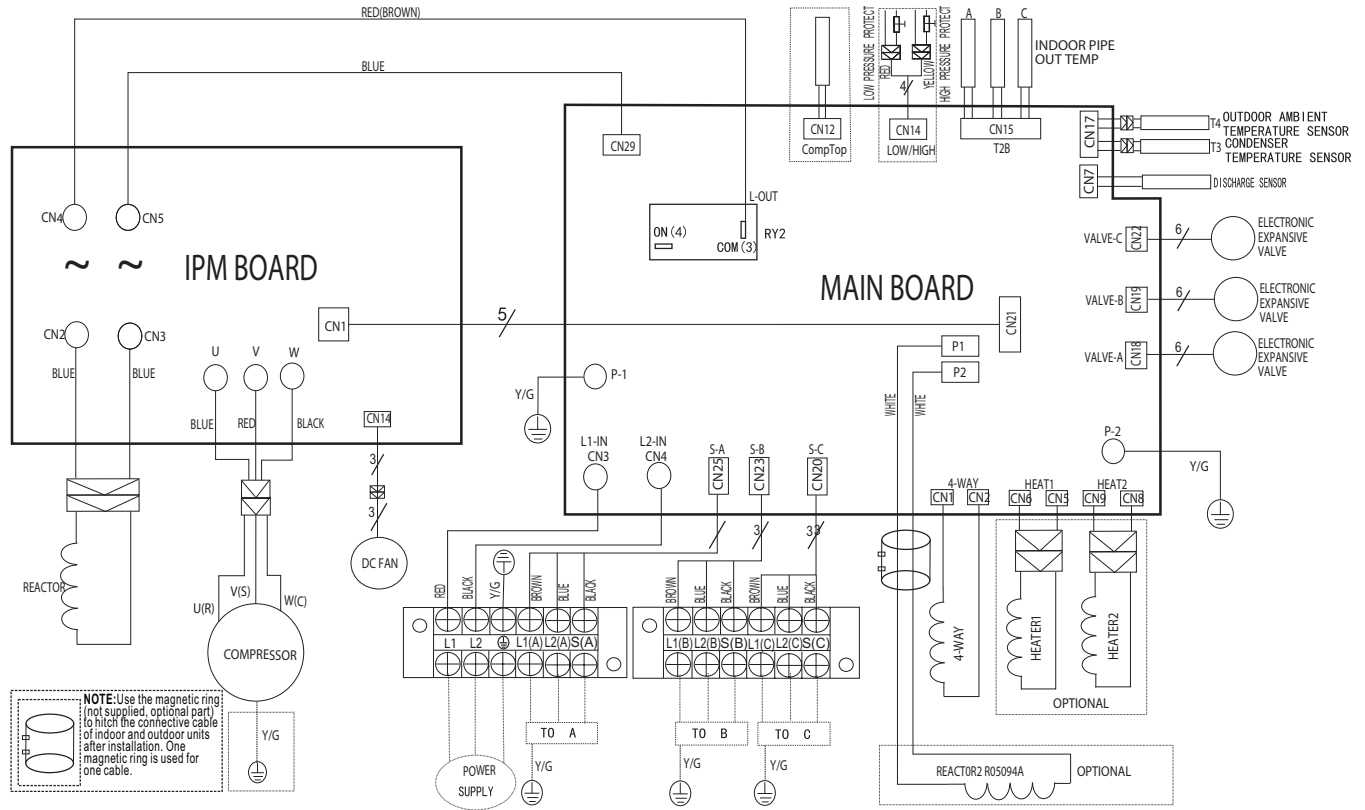


Fig. 13 — Wiring Diagrams 24K - 3 Zone Max

Table 28 — Outdoor Unit Main Board Size 24K

CODE	PART NAME
CN3-CN4	Input: 230VAC High voltage
CN20,CN23,CN25	Output: Pin1 (Connection of the high voltage)---"S" Signal Pin2~Pin3 (230VAC High voltage)---IDU Power
P1-P2	Output: Connection of the REACTOR
CN1-CN2	Output: 230VAC High voltage --- 4 way Valve
CN5-CN6	Output: 230VAC High voltage --- Compressor Crankcase Heater
CN8-CN9	Output: 230VAC High voltage --- Chassis Crankcase Heater
P-1~P-2	Connection to the earth
CN18,CN19,CN22	Output: Pin1-Pin4: Pulse waveform (0-12VDC), Pin5, Pin6 (12VDC)---EEV
CN7	Input: Pin1 (0-5VDC), Pin2 (5VDC) --- Discharge Temp
CN17	Input: Pin3, Pin4 (5VDC), Pin2 (0VDC), Pin1, Pin5 (0-5VDC)-Conditioner and Ambient Temperature
CN15	Input: Pin1, Pin3, Pin5 (5VDC) Pin2, Pin4, Pin6 (0-5VDC) --- IDU Pipe Temp
CN14	Input: Pin2, Pin4 (0VDC), Pin1, Pin3 (0-5VDC) --- H/L Pressure Switch
CN12	Input: Pin1 (0-5VDC), Pin2 (5VDC) --- Compressor Temp
CN29~L-OUT	Output: 230VAC High voltage to IPM Board
Cn21	Connect to the IPM BOARD

Table 29 — Outdoor Unit IPM Board Size 24K

CODE	PART NAME
CN4-CN5	Input: 230VAC High voltage
CN2-CN3	Output: Connection of the REACTOR
U~V~W	Connect to compressor voltage among phases 0~200VAC
CN14	Connect to the DC FAN
CN1	Connect to the MAIN BOARD

WIRING DIAGRAMS (CONT)

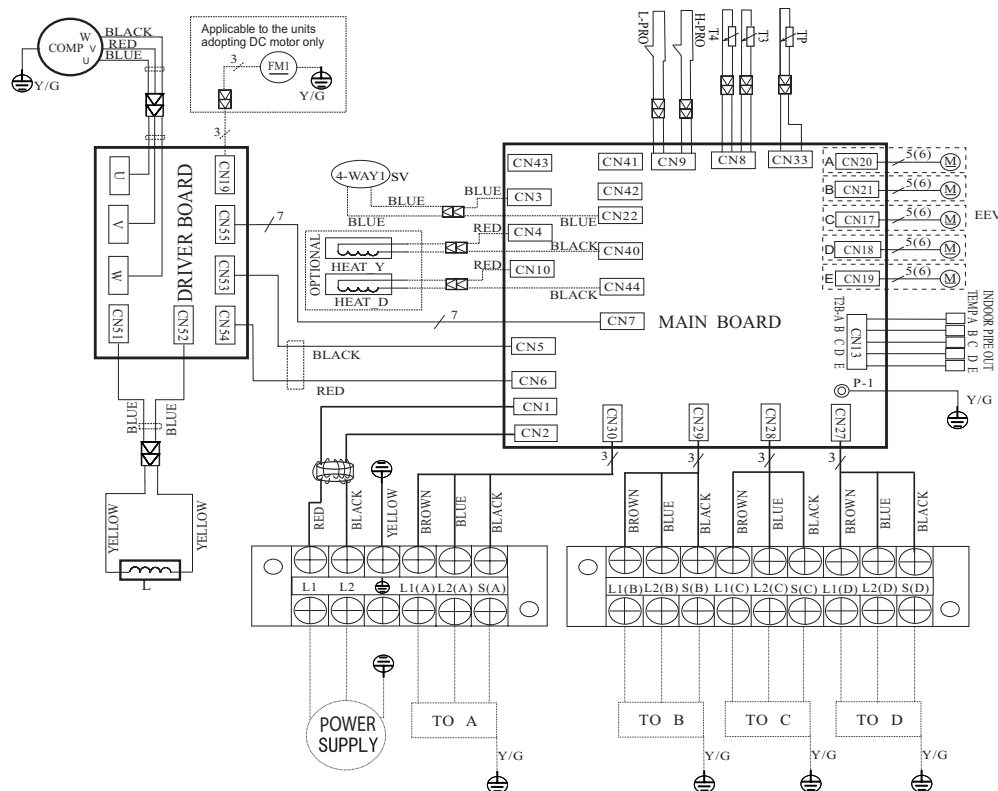


Fig. 14 — Wiring Diagrams 30K - 4 Zone Max

Table 30 — Outdoor Unit Main Board Size 30K

CODE	PART NAME
CN1~CN2	Input: 230VAC High voltage
CN5~CN6	Output: 230VAC High voltage
P-1	Connection to the earth
CN10~CN44	Output: 230VAC High voltage Chassis Crankcase Heater
CN4~CN40	Output: 230VAC High voltage Compressor Crankcase Heater
CN3~CN22	Output: 230VAC High voltage
CN17~CN21	Output: Pin1-Pin4: Pulse waveform (0-12VDC), Pin5, Pin6 (12VDC)
CN7	Output: Pin1 (12VDC), Pin2 (5VDC), Pin3 (EARTH)
CN27~CN30	Output: Pin 2~Pin 3 (230VAC High voltage) - IDU Power & "S"
CN13	Pin1, Pin3, Pin5, Pin7, Pin9 (5VDC); Pin2, Pin4, Pin6, Pin8, Pin10 (0-5VDC)
CN33	Input: Pin1 (0-5VDC), Pin2 (5VDC) - Discharge Temp
CN8	Input: Pin3, Pin4 (5VDC), Pin2 (0VDC), Pin1, Pin5 (0-5VDC) T3 & T4
CN9	Input: Pin2, Pin4 (0VDC), Pin1, Pin3 (0-5VDC) H/L Pressure Switches

Table 31 — Outdoor Unit PFC & IPM Board Size 30K

CODE	PART NAME
CN53~CN54	Input: 230VAC High voltage
CN55	Output: Pin1 (12VDC), Pin2 (5VDC), Pin3 (EARTH)
CN19	Pin1~Pin3: Connect to FAN voltage among phases 0~200VAC
U~V~W	Connect to compressor voltage among phases 0~200VAC
CN51~CN52	CN51~EARTH, CN52~EARTH Output: 224-380VDC High voltage

Table 32 — Outdoor Unit Size 30K

CODE	PART NAME	CODE	PART NAME
COMP	COMPRESSOR	L	PFC INDUCTOR
CAP1	FAN MOTOR CAPACITOR	L-PRO	LOW PRESSURE SWITCH
HEAT	CRANKCASE HEATING	TP	EXHAUST TEMPERATURE SENSOR
FM1	OUTDOOR DC FAN	SV	4-WAY VALVE
FAN1	OUTDOOR AC FAN	T3	CONDENSER TEMPERATURE SENSOR
EEV	ELECTRONIC EXPANSION VALVE	T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
H-PRO	HIGH PRESSURE SWITCH	TH	HEATSINK TEMPERATURE SENSOR

WIRING DIAGRAMS (CONT)

NOTE: -----

This symbol indicates the element is optional. The actual shape prevails.

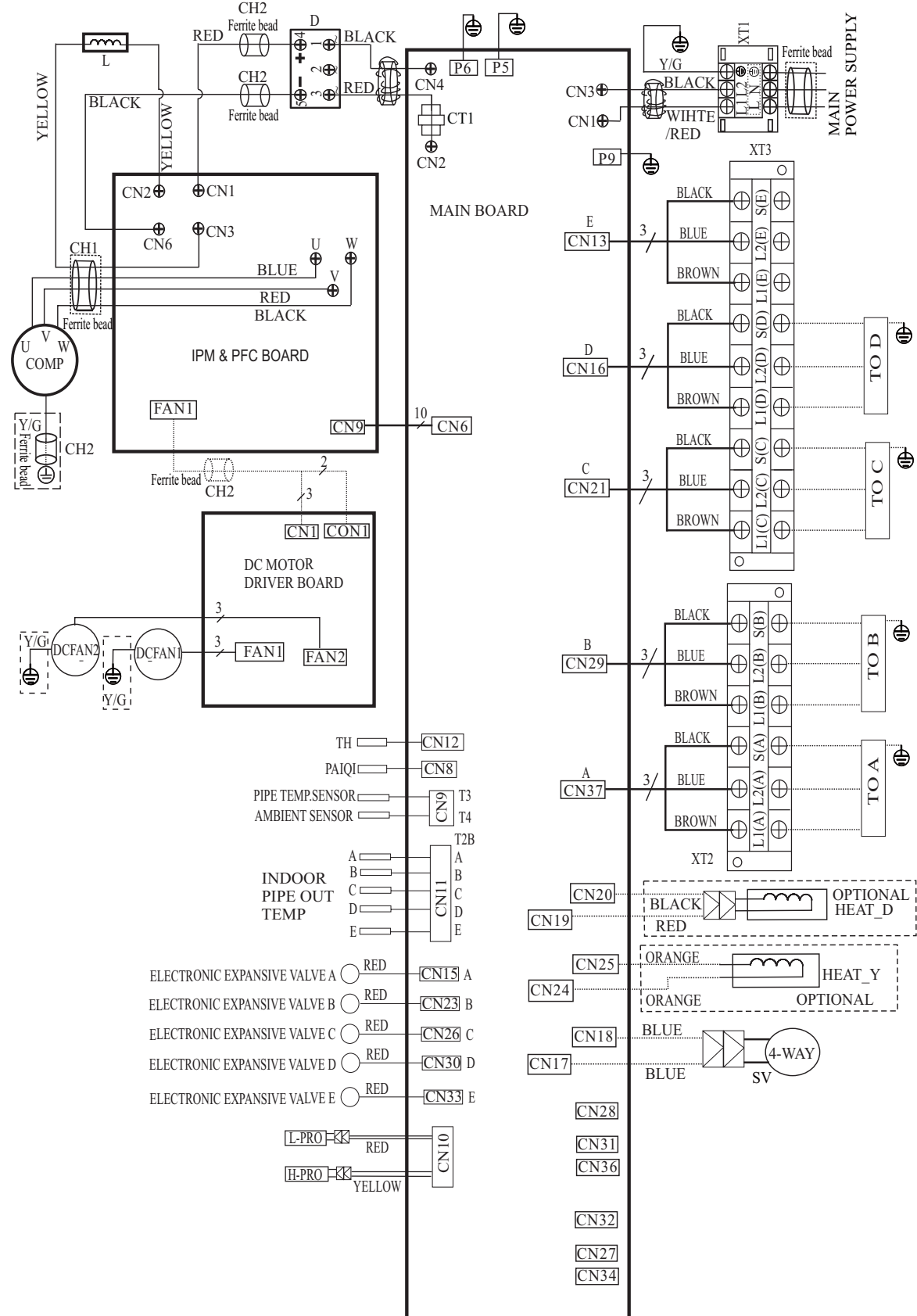


Fig. 15 — Wiring Diagrams 36K - 4 Zone Max

Table 33 — Outdoor Unit Main Board Size 36K

CODE	PART NAME
CN1~ CN3	Input: 230VAC High voltage
CN13, CN16, CN21, CN29, CN37	Output: Pin1(Connection of the high voltage) "S" Pin2~ Pin3 (230VAC High voltage)"L1& L2"
P5, P6, P9	Connection to the earth
CN22	Output:-24VDC-24VDC
CN17~ CN18	Output: 230VAC High voltage to 4 way valve
CN19~ CN20	Output: 230VAC High voltage Compressor Crankcase Heater
CN24~ CN25	Output: 230VAC High voltage Chassis Crankcase Heater
CN11	Input: Pin1, Pin3, Pin5, Pin7, Pin9 (5VDC) Pin2, Pin4, Pin6, Pin8, Pin10 (0-5VDC) indoor pipe out sensor
CN12	Input: Pin1 (0-5VDC), Pin2 (5VDC) Heatsink Temperature Sensor
CN8	Input: Pin1 (0-5VDC), Pin2 (5VDC) Compressor top sensor (PAIQI)
CN9	Input: Pin3, Pin4 (5VDC), Pin2 (0VDC), Pin1, Pin5 (0-5VDC) Pipe sensor and ambient sensor
CN15, CN23, CN26 CN30, CN33	Output: Pin1-Pin4: Pulse waveform (0-12VDC), Pin5, Pin6 (12VDC) to EEV
CN6	Communication: Pin1-Pin6: Pulse waveform (0-5VDC), Pin7, Pin9 (0VDC) Pin8 (0-5VDC), Pin10 (5VDC)--to IPM & PFC board
CN2~ CN4	Output: 230VAC High voltage to IPM & PFC Board
CN10	Input: Pin2, Pin4 (0VDC), Pin1, Pin3 (0-5VDC)--H/L Pressure switch

Table 34 — Outdoor Unit PFC and IPM Board Size 36K

CODE	PART NAME
CN1~CN6	Output: 224-380VDC High voltage
CN2~CN6	Output: 224-380VDC High voltage
CN3~CN6	Output: 224-380VDC High voltage
U~V~W	Connect to compressor voltage among phases 0~200VAC
CN9	Communication: Pin1-Pin6: Pulse waveform (0-5VDC), Pin7, Pin9 (0VDC), Pin8 (0-5VDC), Pin10 (5VDC) to the main board
FAN1	Output: Pin1~Pin2: High voltage (224-380VDC), Pin4 (0-15VDC) Pin5 (0-5.6VDC), Pin6: Pulse waveform (0-15VDC) to drive board

Table 35 — Outdoor Unit PFC and IPM Board Size 36K

CODE	PART NAME
CON1	Output: Pin1~Pin2:High voltage (224-380VDC)
CN1	Input:Pin4: Pulse waveform (0-15VDC), Pin3 (0-6.5VDC) Pin2 (0VDC), Pin1 (15VDC)
FAN1	Pin1-Pin3: Connect to FAN voltage among phases 0~200VAC
FAN2	Pin1-Pin3: Connect to FAN voltage among phases 0~200VAC

Table 36 — Outdoor Unit PFC and IPM Board Size 48K

CODE	PART NAME
COMP	COMPRESSOR
CAP1,CAP2	FAN MOTOR CAPACITOR
CT1	AC CURRENT DETECTOR
D	DIODE MODULE
EEV	ELECTRONIC EXPANSION VALVE
FM1, FM2	OUTDOOR DC FAN
FAN1, FAN2	OUTDOOR AC FAN
HEAT	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L	PFC INDUCTOR
L-PRO	LOW PRESSURE SWITCH
KM	AC CONTACTOR
SV	4-WAY VALVE
TP	EXHAUST TEMPERATURE SENSOR
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
TH	HEATSINK TEMPERATURE SENSOR
PAIQI	COMPRESSOR TOP SENSOR (GAS PIPE)
CH1, CH2, CH3	FERRITE BEAD

WIRING DIAGRAMS (CONT)

NOTE: -----

This symbol indicates the element is optional. The actual shape prevails.

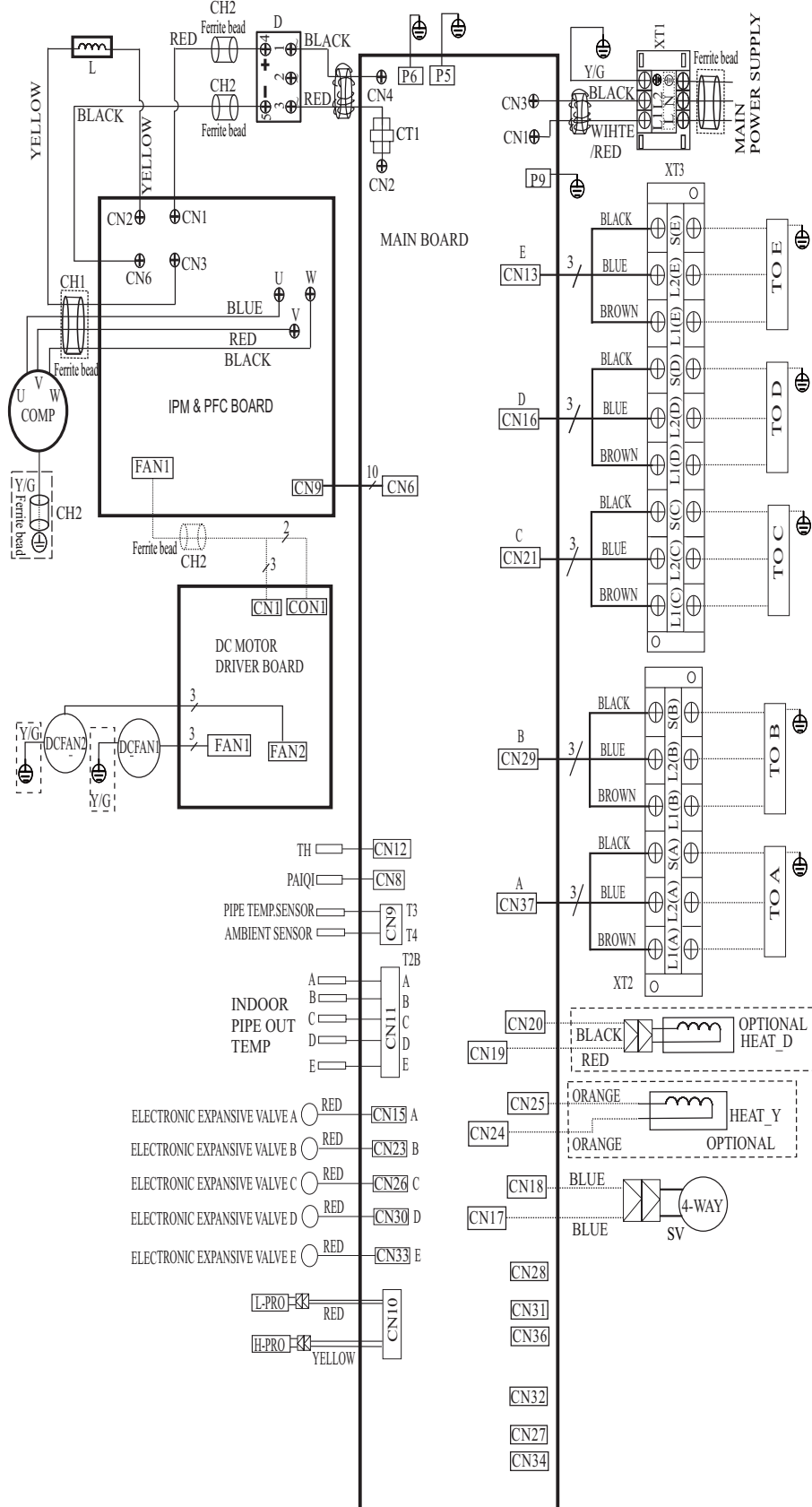


Fig. 16 — Wiring Diagrams 48K - 5 Zone Max

Table 37 — Outdoor Unit Main Board Size 48K

CODE	PART NAME
CN1~CN3	Input: 230VAC High voltage
CN13,CN16,CN21,CN29,CN37	Output: Pin1 (Connection of the high voltage) "S" Pin2~Pin3 (230VAC High voltage) "L1 & L2"
P5,P6,P9	Connection to the earth
CN22	Output:-24VDC-24VDC
CN17~CN18	Output: 230VAC High voltage to 4 way valve
CN19~CN20	Output: 230VAC High voltage Compressor Crankcase Heater
CN24~CN25	Output: 230VAC High voltage Chassis Crankcase Heater
CN11	Input: Pin1, Pin3, Pin5, Pin7, Pin9 (5VDC) Pin2, Pin4, Pin6, Pin8, Pin10 (0-5VDC) indoor pipe out sensor
CN12	Input: Pin1 (0-5VDC), Pin2 (5VDC) Heatsink Temperature Sensor
CN8	Input: Pin1 (0-5VDC), Pin2 (5VDC) Compressor top sensor (PAIQI)
CN9	Input: Pin3, Pin4 (5VDC), Pin2 (0VDC), Pin1, Pin5 (0-5VDC) Pipe sensor and ambient sensor
CN15,CN23,CN26 CN30,CN33	Output: Pin1-Pin4: Pulse waveform (0-12VDC), Pin5, Pin6 (12VDC) to EEV
CN6	Communication: Pin1-Pin6: Pulse waveform (0-5VDC), Pin7, Pin9 (0VDC) Pin8 (0-5VDC), Pin10 (5VDC)--to IPM&PFC board
CN2~CN4	Output: 230VAC High voltage to IPM & PFC Board
CN10	Input: Pin2, Pin4 (0VDC), Pin1, Pin3 (0-5VDC)--H/L Pressure switch

Table 38 — Outdoor Unit PFC and IPM Board Size 48K

CODE	PART NAME
CN1~CN6	Output: 224-380VDC High voltage
CN2~CN6	Output: 224-380VDC High voltage
CN3~CN6	Output: 224-380VDC High voltage
U~V~W	Connect to compressor voltage among phases 0~200VAC
CN9	Communication: Pin1-Pin6: Pulse waveform (0-5VDC), Pin7, Pin9 (0VDC), Pin8 (0-5VDC), Pin10 (5VDC) to the main board
FAN1	Output: Pin1~Pin2: High voltage (224-380VDC), Pin4 (0-15VDC) Pin5 (0-5.6VDC), Pin6: Pulse waveform (0-15VDC) to drive board

Table 39 — Outdoor Unit DC Motor Driver Board Size 48K

CODE	PART NAME
CON1	Output: Pin1~Pin2: High voltage (224-380VDC)
CN1	Input: Pin4: Pulse waveform (0-15VDC), Pin3 (0-6.5VDC) Pin2 (0VDC), Pin1 (15VDC)
FAN1	Pin1-Pin3: Connect to FAN voltage among phases 0~200VAC
FAN2	Pin1-Pin3: Connect to FAN voltage among phases 0~200VAC

Table 40 — Outdoor Unit DC Motor Driver Board Size 48K

CODE	PART NAME
COMP	COMPRESSOR
CAP1,CAP2	FAN MOTOR CAPACITOR
CT1	AC CURRENT DETECTOR
D	DIODE MODULE
EEV	ELECTRONIC EXPANSION VALVE
FM1, FM2	OUTDOOR DC FAN
FAN1,FAN2	OUTDOOR AC FAN
HEAT	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L	PFC INDUCTOR
L-PRO	LOW PRESSURE SWITCH
KM	AC CONTACTOR
SV	4-WAY VALVE
TP	EXHAUST TEMPERATURE SENSOR
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
TH	HEATSINK TEMPERATURE SENSOR
PAIQI	COMPRESSOR TOP SENSOR (GAS PIPE)
CH 1, CH 2, CH 3	FERRITE BEAD

MULTI-ZONE HEAT PUMP HORIZONTAL DISCHARGE OUTDOOR DUCTLESS SYSTEM

Size Range: 1 1/2, 2, 2 1/2, 3 and 4 Ton Nominal Cooling and Heating Capacity
Model Number: **38MGR**

Part 1 - General

1.01 System Description

- a. Outdoor air-cooled split system compressor sections suitable for on-the-ground, rooftop, wall hung or balcony mounting. Units consist of a variable speed rotary compressor, an air-cooled coil, propeller-type draw-through outdoor fan, reversing valve, accumulator, electronic expansion valves, multiple service valves, and controls that allow multiple indoor units to be connected to the outdoor unit. Units discharge horizontally as shown on the contract drawings. Units function as the outdoor component of an air-to-air heat pump system.
- b. Units are designed for use in a refrigeration circuit matched to two, three, four, or five multi style heat pump fan coil units.

1.02 Agency Listings

- a. Unit construction complies with ANSI/ASHRAE 15, latest revision, and with the NEC.
- b. Units are evaluated in accordance with the UL standard 1995.
- c. Units are listed in CEC directory.
- d. Unit cabinet is capable of withstanding the 500-hour salt spray test per Federal Test Standard no. 141 (method 6061).
- e. Air-cooled condenser coils are leak tested at 550 psig.

1.03 Delivery, Storage, And Handling

Units are shipped in one piece and are stored and handled per the manufacturer's recommendations.

1.04 Warranty (For Inclusion By Specifying Engineer)

Part 2 - Products

2.01 Equipment

1. General:

Factory assembled, single piece, air-cooled outdoor unit. Contained within the enclosure are the factory wiring, piping, controls, and the compressor.

2. Unit Cabinet:

- a. The unit cabinet is constructed of galvanized steel, bonderized and coated with baked-enamel finish on the inside and outside.
- b. The unit access panel is removable and provides full access to the compressor, fan, and the control components.
- c. The outdoor compartment is isolated and has an acoustic lining to assure a quiet operation.

3. Fans:

- a. The outdoor fans are direct-drive propeller type, and discharge air horizontally. The fan draws air through the outdoor coil.
- b. Outdoor fan motors are multi-speed, totally-enclosed, single phase motors with permanently lubricated ball bearings. The motor is protected by internal thermal overload protection.
- c. The shaft has an inherent corrosion resistance.
- d. Outdoor fan openings are equipped with a metal/mesh PVC coated protection grille over the fan.

4. Compressor:

- a. The compressor is the fully hermetic variable speed rotary type.
- b. The compressor is inverter driven.
- c. The compressor is equipped with an oil system, operating oil charge, and motor.
- d. The motor is suitable for operation in a refrigerant and oil atmosphere.
- e. The compressor assembly is installed on rubber vibration isolators.
- f. The inverter and compressor are protected against over temperature and over current.

5. Outdoor Coil:

The coil is constructed of aluminum hydrophilic pre-coated fins mechanically bonded to seamless copper tubes, which are cleaned, dehydrated and sealed.

6. Refrigerant Components:

Refrigerant circuit components include multiple brass external liquid line service valves with a service gauge connection port, multiple suction line service valves with a service gauge connection port, accumulator, reversing valve, and electronic expansion valves.

7. Safeties:

Operating safeties are factory selected, assembled, and tested. The minimum functions include the following:

- a. Compressor discharge over temperature protection.
- b. System low voltage protection.
- c. Compressor overload protection.
- d. Compressor over current protection.
- e. IPM module protection.

8. Electrical Requirements:

- a. Units operate on single-phase, 60 Hz power at 208/230v.
- b. The unit electrical power is a single point connection.
- c. All power and control wiring must be installed per NEC and all local electrical codes.
- d. Units have multiple terminal blocks to connect to multiple indoor units.

Standard Construction

Frame	Heavy gauge extruded 6063-T5 aluminum, 6 in. (152 mm) x 0.081 in. (2 mm) nominal wall thickness
Blades	Drainable design, heavy gauge extruded 6063-T5 aluminum, 0.081 in. (2 mm) nominal wall thickness, positioned 37° on approximately 4 in. (102 mm) centers
Louver Depth	6 in. (152 mm)
Construction	Mechanically fastened
Finish	Mill
Minimum Size	12 in. W x 12 in. H (305 mm W x 305 mm H)
Maximum Single Section Size	120 in. W x 120 in. H (3048 mm W x 3048 mm H) Limited to 70 ft. sq. (6.5 sq. m)
Wind Load	25 PSF (1.2 kPa)



Performance Ratings



Greenheck Fan Corporation certifies that the ESD-635 louvers shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to Water Penetration and Air Performance ratings.

Performance of 48 in. x 48 in. (1219 mm x 1219 mm) Louver

Free Area	
Area	9.41 sq. ft. (0.874 sq. m)
Percent	58.8%
Performance at Beginning Point of Water Penetration	
Free Area Velocity	Above 1250 fpm (6.350 m/s)
Max Intake Volume	11,763 cfm (5.551 m³/s)
Performance at 6,000 CFM (2.832 m³/s) Intake	
Pressure Drop	0.061 in. wg (0.015 kPa)

Document Links

[Louver Finishes & Colors](#)
[Louver Product Selection Guide](#)
[Louver Products Catalog](#)
[Louver Warranty Statement](#)

Options and Accessories

- [Bird Screen](#)
- [Blank Off Panels](#)
- [Extended Sill](#)
- [Filter Rack/Filter](#)
- [Flange Frame](#)
- [Glazing Frame](#)
- [Hinged Frame](#)
- [Insect Screen](#)
- [Mounting Angles](#)
- [Security Bars](#)
- [Variety of Architectural Finishes](#)
- Welded Construction
- 0.125 in. (3 mm) Nominal Frame and/or Blade Thickness

Standard Details

[ESD-635 Standard Details](#)

Structural reinforcing members may be required to adequately support and install multiple louver sections within a large opening. Structural reinforcing members along with any associated installation hardware is not provided by Greenheck unless indicated otherwise by Greenheck. Options and accessories including, but not limited to, screens, filter racks, louver doors, and blank off panels are not subject to structural analysis unless indicated otherwise by Greenheck.

Free Area Chart

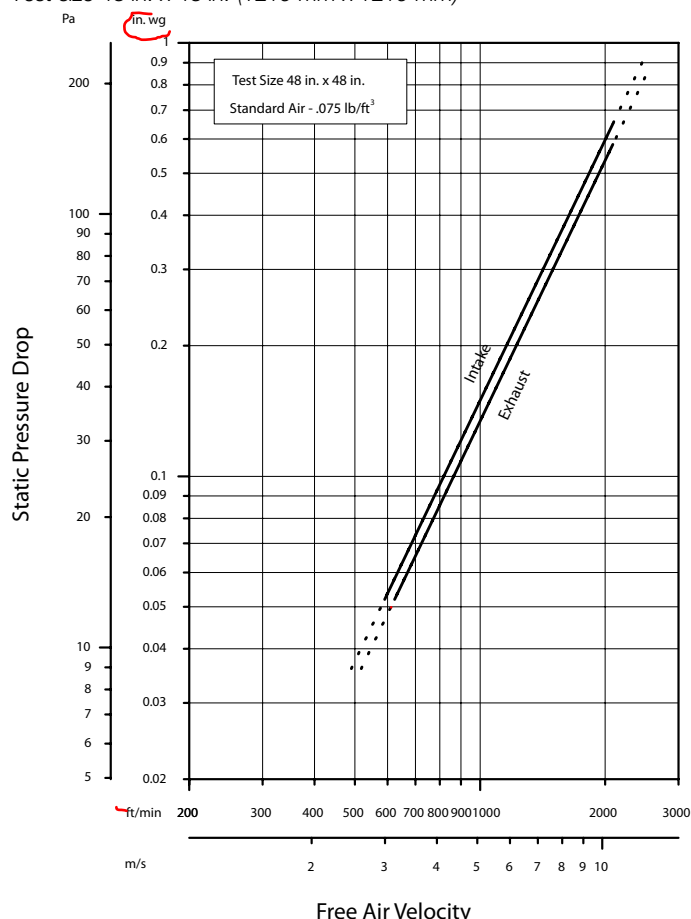
Free Area Chart shows free area in square feet and square meters.

Louver Height Inches (Meters)	Louver Width in Inches (Meters)																		
	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
0.30	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.17	0.18	0.19	0.20	0.21	0.22
0.46	0.04	0.07	0.10	0.13	0.16	0.19	0.22	0.24	0.27	0.30	0.33	0.36	0.39	0.42	0.45	0.47	0.50	0.52	0.55
0.61	0.07	0.12	0.16	0.21	0.26	0.30	0.35	0.38	0.43	0.48	0.52	0.57	0.62	0.66	0.71	0.74	0.79	0.84	0.88
0.76	0.10	0.16	0.22	0.29	0.35	0.41	0.48	0.52	0.59	0.65	0.71	0.78	0.84	0.90	0.97	1.01	1.08	1.14	1.20
0.91	0.13	0.21	0.29	0.37	0.45	0.53	0.61	0.67	0.75	0.84	0.92	1.00	1.08	1.16	1.24	1.30	1.38	1.46	1.54
1.07	0.15	0.25	0.34	0.44	0.54	0.64	0.73	0.81	0.90	1.00	1.10	1.20	1.30	1.39	1.49	1.56	1.66	1.76	1.86
1.22	0.18	0.29	0.41	0.53	0.64	0.76	0.87	0.96	1.08	1.19	1.31	1.42	1.54	1.66	1.77	1.86	1.98	2.09	2.21
1.37	0.20	0.33	0.47	0.60	0.73	0.86	0.99	1.09	1.22	1.35	1.49	1.62	1.75	1.88	2.01	2.11	2.24	2.37	2.51
1.52	0.23	0.38	0.53	0.68	0.83	0.98	1.13	1.24	1.39	1.54	1.69	1.84	1.99	2.14	2.29	2.40	2.55	2.70	2.85
1.68	0.26	0.42	0.59	0.75	0.92	1.08	1.25	1.37	1.54	1.71	1.87	2.04	2.20	2.37	2.53	2.66	2.82	2.99	3.15
1.83	0.28	0.47	0.65	0.84	1.02	1.20	1.39	1.52	1.71	1.89	2.08	2.26	2.44	2.63	2.81	2.95	3.13	3.32	3.50
1.98	0.31	0.51	0.71	0.91	1.11	1.31	1.51	1.66	1.86	2.06	2.26	2.46	2.66	2.85	3.05	3.20	3.40	3.60	3.80
2.13	0.34	0.55	0.77	0.99	1.21	1.43	1.64	1.81	2.03	2.24	2.46	2.68	2.90	3.12	3.33	3.50	3.71	3.93	4.15
2.29	0.36	0.59	0.83	1.06	1.30	1.53	1.76	1.94	2.17	2.41	2.64	2.87	3.11						
2.44	0.39	0.64	0.89	1.14	1.40	1.65	1.90	2.09	2.34	2.59	2.85	3.10	3.35						
2.59	0.41	0.68	0.95	1.22	1.48	1.75	2.02	2.22	2.49	2.76	3.02	3.29	3.56						
2.74	0.44	0.73	1.01	1.30	1.59	1.87	2.16	2.37	2.66	2.95	3.23	3.52	3.80						
2.90	0.47	0.77	1.07	1.37	1.67	1.98	2.28	2.50	2.81	3.11	3.41	3.71	4.01						
3.05	0.49	0.81	1.13	1.45	1.77	2.09	2.42	2.66	2.98	3.30	3.62	3.94	4.26						

Airflow Resistance

Standard Air - 0.075 lb/ft³ (1.2 kg/m³)

Test size 48 in. x 48 in. (1219 mm x 1219 mm)

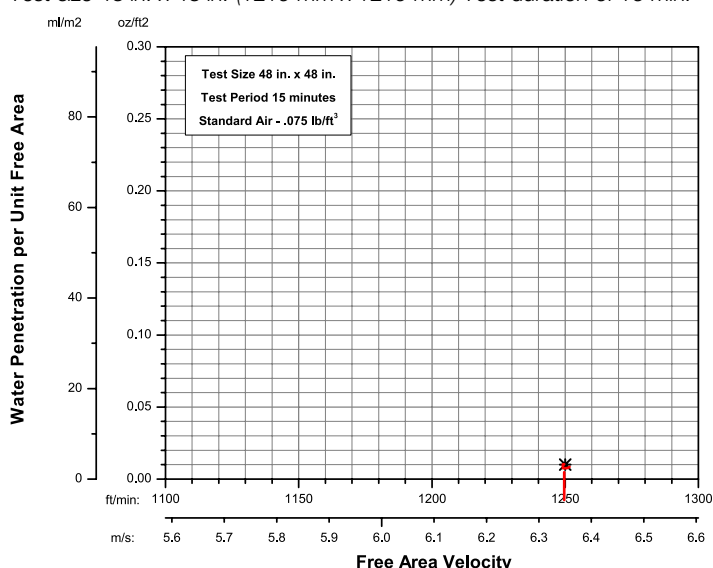


Model ESD-635 resistance to airflow (pressure drop) varies depending on louver application (air intake or air exhaust). Free area velocities (shown) are higher than average velocity through the overall louver size. See louver selection information. (Test Figure 5.5-6.5)

Water Penetration

Standard Air - 0.075 lb/ft³ (1.2 kg/m³)

Test size 48 in. x 48 in. (1219 mm x 1219 mm) Test duration of 15 min.



The AMCA Water Penetration Test provides a method for comparing various louver models and designs as to their efficiency in resisting the penetration of rainfall under specific laboratory test conditions. The beginning point of water penetration is defined as that velocity where the water penetration curve projects through 0.01 oz. (3 g) of water (penetration) per sq. ft. (m²) of louver free area. ***The beginning point of water penetration for Model ESD-635 is above 1250 fpm (6.350 m/s) free area velocity.** These performance ratings do not guarantee a louver to be weatherproof or stormproof and should be used in combination with other factors including good engineering judgement in selecting louvers.