Ductless Installation & Service Training

Instructor: Josh Goodman Josh.goodman@carrierenterprise.com







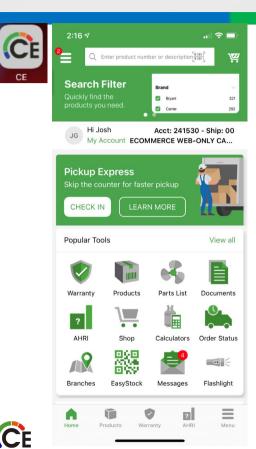
Heating & Cooling Systems

Site Demo

CEMATRAINING.COM



"CE – HVAC CONTRACTOR ASSIST"





Carrier[®] Infinity[®] - 2 Ton 20 SEER Residential Variable Speed Air Conditioner Condensing Unit with Greenspeed[™] Intelligence

24VNA036A003

Carrier[®] Infinity[®] - 3 Ton 20 SEER Residential Variable Speed Air Conditioner Condensing Unit with Greenspeed[™] Intelligence

24VNA048A003

Carrier[®] Infinity[®] - 4 Ton 20 SEER Residential Variable Speed Air Conditioner Condensing Unit with Greenspeed[™] Intelligence

24VNA060A003

Carrier[®] Infinity[®] - 5 Ton 20 SEER Residential Variable Speed Air Conditioner Condensing Unit with Greenspeed[™] Intelligence

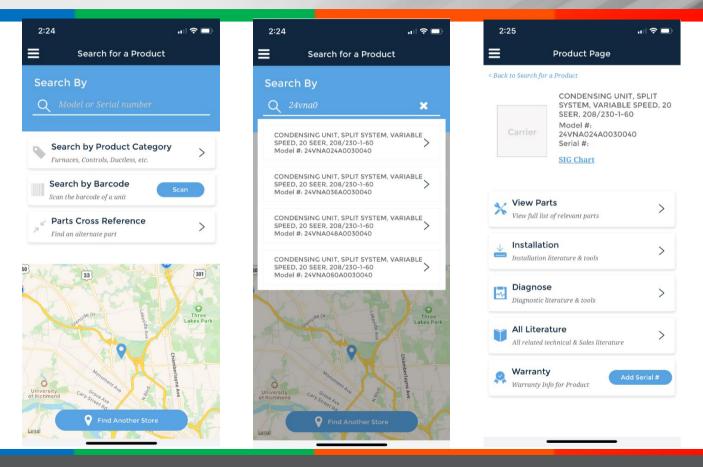


First Name • Josh	Last Name • Goodman	
Company - ECOMMERCE 1	WEB-ONLY CASH 1601	
Phone number •		
+1		
Scan or enter	serial number	
Model number		
How can we h	elp you? •	

We call it Wingman

"CARRIER SERVICE TECH"







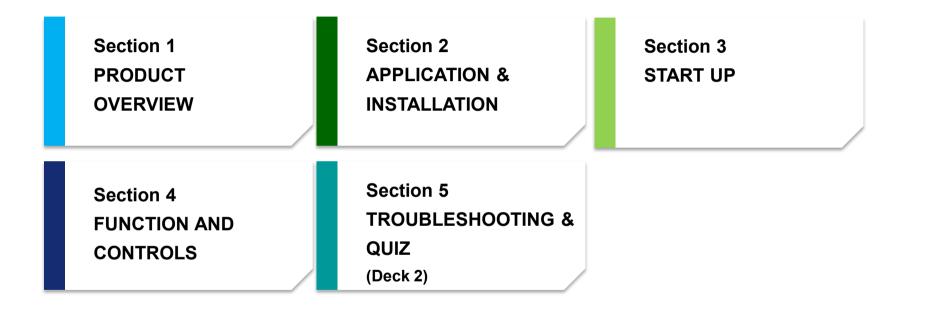
TECH SUPPORT

866-902-4822 Option #3 or CE App(Wingman) or Cematraining.com or

cma.techsupport@carrierenterprise.com



WHAT WE WILL COVER





38MPRA Infinity® Single Zone HeatPump



9/12

15



18 / 24



Standard Features

- 1 to 1 Connectivity
- Up to 42.0 SEER cooling efficiency
- Up to 15.0 EER heating efficiency
- 100% Heating Capacity at 0° F (-17° C)
- 100% Cooling capacity at -22° F (-30° C) without additional kit
- Up to 75% of Heating Capacity at -22° F (-30° C)
- Wireless controller
- Built-inWi-Fi®
- ECO Mode
- Follow Me (senses temperature at handheldremote)
- Heating Setback (46° F HeatingMode)
- Up-down / right-left louver control (fixed or swing)
- Relative Humidity Sensor
- Intelligent Eye (occupancy sensor)
- Quiet indoor operation, as low as 29dB(A)1
- Inverter Compressor
- · Built-in base pan heater
- Auto-restart function
- Refrigerant leakage detection
- Quiet outdoor operation, as low as 55 dB(A)¹
- Aluminum Golden Hydrophilic pre-coated fins
- 10-year parts limited and 10-year compressor limited warranties to the original purchasing owner upon timely registration



38MAR Performance[™] Single Zone HeatPump

Compatible with Indoor Units:

- 40MA*Q High Wall
- 40MB*C Cassette
- 40MB*D Ducted
- 40MB*F Floor Console
- FMA4 FanCoil
- 24 VoltInterface

required

- FMC & FMU Fan Coil
- FV4C Fan Coil

CF



Standard Features

- 1 to 1 Connectivity
- 100% Heating Capacity at 5° F (-15° C)*
- Up to 25.0 SEER
- Upto 12.0 HSPF
- Sizes: 9 / 12 / 18 / 24 / 30 / 36
- Variable Speed (Inverter) Compressor
- Base Pan heater on outdoorunit
- Improved outdoor serviceability
- Compact footprint
- Modes: Cool, Heat, Dry, Fan, Auto
- Auto louvermode
- Turbo mode
- Sleepmode
- Follow Me
- 46° F Heating Mode (Heating Setback)
- Quiet operation
- Piping length 82 ~164 ft.
- Cooling operating range -4° F ~122° F (-20° C ~50° C)
- Heating operating range -22° F ~86° F (-30° C ~30° C) Sizes 9-24 (208/230V), -4° F ~86° F (-20° C ~30° C) – Sizes 9, 12 (115V) & 30, 36 (208/230V)
- Cost competitive

*Sizes 9-24 (208/230V)

38MBR Performance[™] Single Zone HeatPump



48 / 58

Standard Features

- 1 to 1 Connectivity
- Inverter Compressor
- Up to 17.4 SEER cooling efficiency
- Up to 10.5 HSPF heating efficiency
- Sizes: 36 / 48 / 58
- Available 208/230V
- Built-in Base Pan Heater
- Condenser high tempprotection
- Refrigerant leakage detection
- Quiet outdoor operation, as low as 62.5 decibels*
- Total piping length up to 213 ft.
- 10-year parts limited and 10-year compressor limited warranties to the original purchasing owner upon timely registration⁺

Units:

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Compatible with Indoor

40MB*C Cassette

40MB*D Ducted

40MB*F Floor Console



38MHR Comfort[™] Single Zone Heat Pump



CF



Standard Features

- 1 to 1 Connectivity
- Sizes: 9 / 12 / 18 / 24
- Up to 19.8 SEER cooling efficiency
- Up to 10.6 HSPF heating efficiency
- Wireless Controller
- Available in 115V (9/12) and 208/230V
- Refrigerant leakage detection
- Auto-restart function
- Condenser high-temperature protection
- Quiet outdoor operation, as low as 52 decibels
- Aluminum Golden Hydrophilic pre-coated fins
- 10-year parts limited and 10-year compressor limited warranties to the original purchasing owner upon timely registration

38MGR Performance™ Multi-Zone HeatPump





24/30

18

100% Heating Capacity at 5° F (-15° C) (Sizes 24 to 36) 1 to 2, 1 to 3, 1 to 4, 1 to 5 Connectivity Inverter Compressor

- Up to 23.8 SEER cooling efficiency
- Up to 10.5 HSPF heating efficiency
- Sizes: 18 / 24 / 30 / 36 / 48
- Available in 208/230V
- Built-in Base Pan Heater

Standard Features

- Connects two to five multiple style indoor units off a single outdoor unit
- Condenser high temperature protection
- Refrigerant leakage detection
- Quiet outdoor sound operation, as low as 62 decibels1
- Total piping length 131 ~328 ft. (40 ~100 m) depending on unit capacity

Compatible with Indoor Units:

- 40MPHAQ HighWall
- 40MA*Q High Wall
- 40MHHQ High Wall
- 40MB*C Cassette
- 40MB*D Ducted
- 40MB*F FloorConsole



Multi-Zone Quick Reference Guide (cont.)

Rated Combinations									
Outdoor Models	Two Zones		Three Zones		Four Zones		Five Zones		
38MGRQ18B3		9+9 9+12							
		12+12							
38MGRQ24C3	9+9	12+12	9+9+9	9+12+12					
	9+12	12+18	9+9+12	12+12+12					
	9+18	18+18	9+9+18						
38MGRQ30D3	9+9	12+12	9+9+9	9+12+12	12+12+12	9+9+9+9	9+9+12+18		
	9+12	12+18	9+9+12	9+12+18	12+12+18	9+9+9+12	9+12+12+12		
	9+18	12+24	9+9+18	9+12+24	12+18+18	9+9+9+18	12+12+12+12		
	9+24	18+18	9+9+24	9+18+18	12+12+24	9+9+12+12			
	9+18	12+12	9+9+9	9+12+24	12+12+24	9+9+9+9	9+12+12+12		
	9+24	12+18	9+9+12	9+18+18	12+18+18	9+9+9+12	9+12+12+18		
		12+24	9+9+18	9+18+24	12+18+24	9+9+9+18	9+12+12+24		
		18+18	9+9+24	9+24+24	12+24+24	9+9+9+24	9+12+18+18		
38MGRQ36D3		18+24	9+12+12	12+12+12	18+18+18	9+9+12+12	9+18+18+18		
		24+24	9+12+18	12+12+18	18+18+24	9+9+12+18	12+12+12+12		
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		9+18	9+9+9	9+24+24		9+9+9+9	9+12+12+12		
		9+24	9+9+12	12+12+12		9+9+9+12	9+12+12+18		
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		12+18	9+9+24	12+12+24		9+9+9+24	9+12+18+18	9+9+9+9+12	9+9+12+12
38MGRQ48E3		12+24	9+12+12	12+18+18		9+9+12+12	9+18+18+18	9+9+9+9+18	9+9+12+12
		18+18	9+12+18	12+18+24		9+9+12+18	12+12+12+12	9+9+9+9+24	9+12+12+1
		18+24	9+12+24	12+24+24		9+9+12+24	12+12+12+18	9+9+9+12+12	9+12+12+1
		24+24	9+18+18	18+18+18		9+9+18+18	12+12+12+24	9+9+9+12+18	12+12+12+1
			9+18+24	18+18+24		9+9+18+24	12+12+18+18		

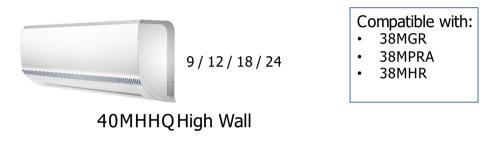


Single & Multi-Zone Indoor Units





Single & Multi-Zone Indoor Units



Standard Features

- Wireless Controller (all units)
- Modes: Cool, Heat, Dry, Fan, Auto
- Auto-restart function
- Louver control (fixed or swing if applicable)
- Multiple fan speeds
- Follow Me (senses temperature at handheld remote location)
- Aluminum Golden Hydrophilic pre-coated fins
- 10-year parts limited and 10-year compressor limited warranties to the original purchasing owner upon timely registration





Optional Controls

7 Day Programmable Wired Wall Remote Controller

KSACN0401AAA – High Wall Infinity, Performance & Comfort all sizes, Console size 12 KSACN0501AAA – All Cassettes, all sizes, Console sizes 18~58



24 Volt Interface Kit

This allows end user to use any standard 5-wire 24 volt thermostat

This is our favorite control choice! Less learning curve for end user! Most higher end stats are Wi-Fi!

24V INTERFACE GEN 2 Mod

Model number: KSAIC0301230

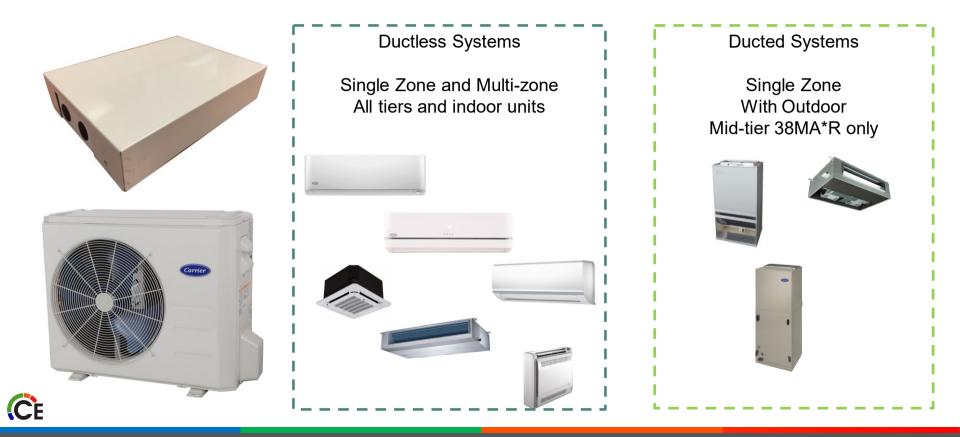
- Available in 208/230V
- Built-in 24V transformer for DLS Set application
- Single Zone and Multi-zone on Ductless applications
 - AUTO Fan Speed
- Ductless Outdoor matched with Multi-family and Residential Fan Coils
 - Up to 3 Fan Speed outputs with tap control on selected models
- One 24V Interface Kit per Indoor Head
- Keeps the Inverter compressor operating as a variable speed system
- Rated for outdoor and indoor mounting
- Dry mode contact for active dehumidification control for Ductless
 - NOTE: Not supported for Multi-family and Residential fan coils
- Remote ON/OFF contact
- Auxiliary Heat control through the thermostat
- Diagnostic code display LEDs





24V INTERFACE GEN 2

Flexibility of applications using the 24V interface



24V INTERFACE

- 24V Interface model number: KSAIC**03**01230
- Multi-zone <u>Ductless</u> Applications with a third-party thermostat
- Compatibility with Multi-family Fan Coils Single Zone Applications FMA, FMC and FMU
- Compatibility with Residential Fan Coils <u>Single Zone</u> Applications FV4C
- Piping adapter Kits available through RCD







24V INTERFACE GEN 2

SINGLE ZONE AND MULTI-ZONE DUCTLESS APPLICATIONS

Compatibility of a Single Zone or Multi-zone Ductless Indoor

with Ductless Outdoor and a third-party thermostat

One 24V interface per indoor unit





Wired Wall-Mounted Controller

KSACN0801AAA, KSACN0701AAA, KSACN0601AAA

- 7 day programmable
- Room Temperature Set Point Temperature
- Follow Me as default setting
- Mode Customization:
 - CH Heat Pump
 - CC Cooling Only
 - HH Heating Only
 - NA No Auto Mode
- Min Max Temperature limit customization
- 12 HR format (am/pm)
- Infrared receiver built-in
- Back-lit
- Always consult with the compatibility charts use your resources



Optional Controls



KSAIF0101AAA – High Wall Comfort Series – 40MHH Sizes 9, 12, 24 KSAIF0201AAA – High Wall Comfort Series – 40MHH Sizes 18 KSAIF0301AAA – High Wall Performance Series – 40MAQ all sizes KSAIF0401AAA – High Wall All Cassettes, All Ducted, Console (except 12) KSAIF0601AAA – High Wall Infinity 40MPHA (included with Infinity indoor units)



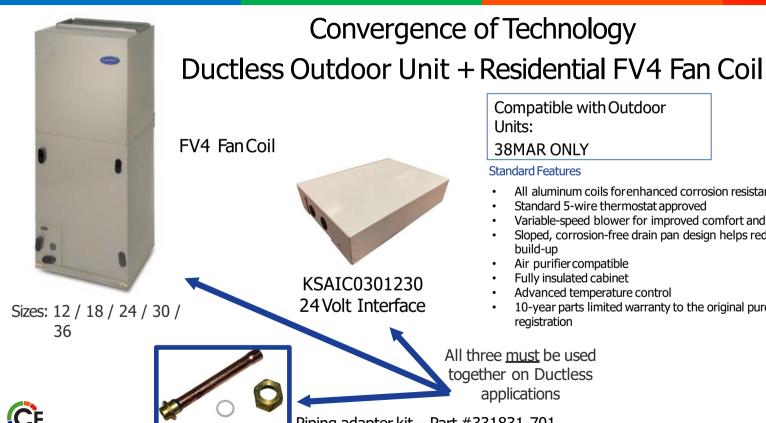


WI-FI DUCTLESS

Indoor Unit Type	Kit Part number	Wi-Fi Dongle	Wi-Fi Translator PCB	USB Intermediate Cable*	Display Box
High Wall Entry Tier 9/12/24k	KSAIF0101AAA		N/R	1	17222000A21608
High Wall Entry Tier 18k	KSAIF0201AAA	17310900000281	N/R	17401204002105	17222000A25268
CBP High Wall Mid Tier	KSAIF0301AAA	17310900000281	N/R	17222000A00767	17222000A178521
Cassette, Ducted, & Ceiling/Floor 18-58	KSAIF0401AAA	N/R	17310900A01741 Includes 6m cable and Wi-Fi Dongle Wireless Control	N/R	N/R
High Wall High Tier (Replacement ONLY)	KSAIF0601AAA	17310900000281	N/R	N/R	N/R



N/R = Not Required



Compatible with Outdoor Units:

38MAR ONLY

Standard Features

- All aluminum coils for enhanced corrosion resistance
- Standard 5-wire thermostat approved
- Variable-speed blower for improved comfort and quietoperation
- Sloped, corrosion-free drain pan design helps reduce mold and bacteria build-up
- Air purifier compatible
- Fully insulated cabinet
- Advanced temperature control
- 10-year parts limited warranty to the original purchasing owner upon timely registration

All three must be used together on Ductless applications

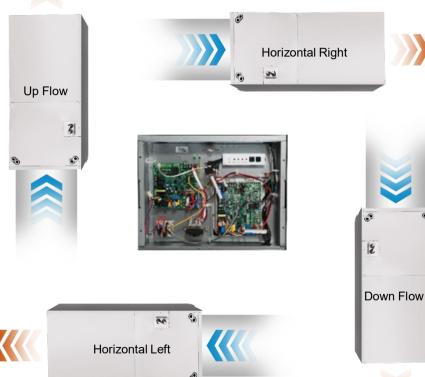
Piping adapter kit – Part #331831-701

New Product AHU Features 40MBAA

Sizes 24K, 36K, & 48K

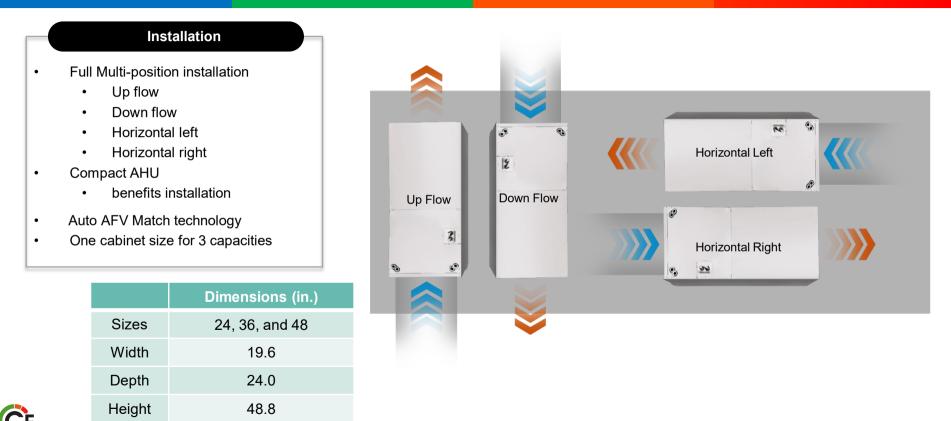
- Size 24 compatible with Single Zone 38MA*R and Multi-Zone 38MGR
- · Sizes 36 and 48 compatible only with single zone
 - New outdoor unit required for compatibility on these larger sizes
- 4-way installation (Up flow, Down flow, Right, Left)
- Modulating ECM motor that's provides a constant volume airflow algorithm
- 24V interface built-in for third party thermostat compatibility
- Static Pressure up to 0.8 in. W.C.
- Less than 2% air leakage when tested in accordance with ASHRAE standard 193
- Electric Heater Kit Accessory
- Ductless ready indoor coil (No TXV)

Outdoor
38MAQB24R3
38MBRBQ36AA3
38MBRBQ48AA3





AHU INSTALLATION CONVENIENCE AND DIMENSIONS



AHU MECHANICAL VIEW (LABELING)





Malfunction

Panel Cover Wiring Labels

AHU MECHANICAL VIEW (PANELS REMOVED)



CE

AHU MECHANICAL VIEW

CE



Bottom View

AHU ELECTRICAL VIEW



AHU ELECTRIC HEATER (OPTIONAL)

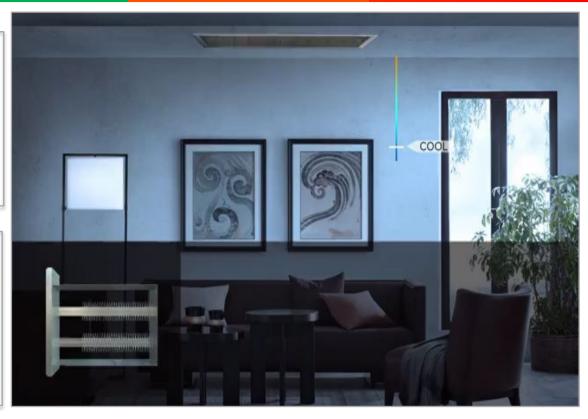
Sequence

- Electric heat is enabled by the controller after the room temp has dropped below a predetermined setpoint in the selected controller
- Easy installation remove 4 screws to access the control panel, slide in the electric heater kit and simply plug in the Molex connector.

Available KW Sizes

Rating	Part No.
5 kW	EHKMA05KN
10 kW	EHKMA10KN
15 kW	EHKMA15KN
20 kW	EHKMA20KN

CF



ELECTRIC HEATER CONTROL

- The Auxiliary Electric Heater Kit is to be controlled by a Two Stage Heat/Single Stage Cool Thermostat with a common terminal.
- Fan operation is controlled by the system's algorithm during the defrost cycle.

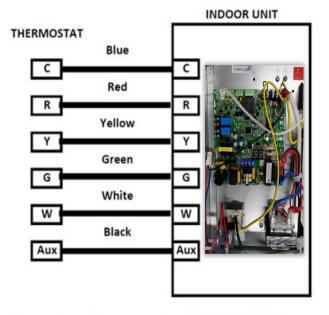


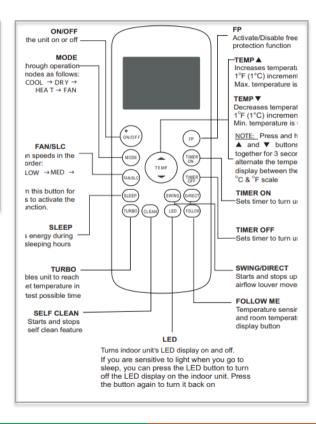
Fig. 64 — Cooling and Heating Units Adopt Electric Heating Device



WIRELESS REMOTE CONTROLLER

Set Up

- Used for initial indoor blower configuration & airflow selection.
- Set the wireless handheld remote to Service Mode by pressing MODE and TIMER ON simultaneously for 5 seconds until F1 is displayed.





INDOOR FAN AIR FLOW SELECTION

Setting Static Pressure & Airflow

The indoor fan coil units can be programmed to have different static pressures settings or airflows; the factory default setting is SP1. Follow the next steps to set the static pressure or **Automatic Airflow** using the **Wireless Remote Controller** according to the installation conditions.

- The external static pressure can be manually changed to the fan curves SP2, SP3, SP4.
- Choose the Automatic Airflow "AF" adjustment function to automatically identify the static pressure and regulate the airflow amount.

Page 20* IM-40MBAA-01 Installation Manual

Manually Setting Static Pressure

- Place the wireless handheld remote in the Service Mode (F1 is displayed).
- Press the 'DOWN' arrow on the **TEMP** button until **E9** is displayed.
- Press **MODE** to select a range of **1**, **2**, **3**, or **4**.
 - ♦ (1 = SP1 [Factory Default], 2 = SP2, 3 = SP3, and 4 = SP4)
- Press TIMER ON to confirm and lock the setting in place.

Automatic Airflow Volume (AFV) Setting

- Must begin with **F1** in the display of the wireless handheld remote.
- Press the 'DOWN' arrow on the **TEMP** button until **d4** is displayed.
- Press TIMER ON to confirm, AF appears in the display.
 - Must now reinstall the middle panel and leave in place while the fan is running to establish automatic airflow adjustment.
- The **ON** indicator flashes when the fan runs during the AUTOMATIC AIRFLOW ADJUSTMENT (takes 3 to 6 minutes to complete).
- The system stops operating once the AFV is complete.

To **EXIT** Service Mode, remove the batteries from the wireless handheld remote, once the screen goes blank (takes about 45 seconds) and re-insert the batteries.





CARRIER/BRYANT DUCTLESS UPDATES

- New Mid-Tier High Wall Indoor Unit
- New Mid-Tier Outdoor Unit
- New Entry Tier Outdoor Unit
- Ductless & Ducted Combinations
- New Hybrid Combinations
- And Much More



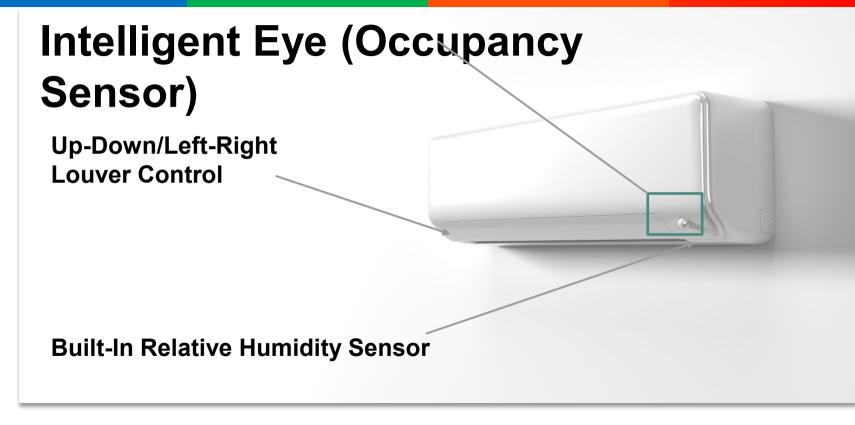






New Mid-Tier High Wall

40MAHB High Wall A NEW STANDARD INDOOR COMFORT FEATURES





IMPROVED MAINTENANCE AND INSTALLATION ACCESS

Reduced Installation Clearance and Magnetically Mounted Top Access Air Filters

Redesigned Front Cover

Improved Electrical Control Box Access



INDUSTRY LEADING SERVICE AND MAINTENANCE ACCESS

Front Facing Control Panel with Larger Electrical Connections

Drop Out Blower Assembly



REDESIGNED WALL PLATE

Installing the High Wall back plate Mark the position with the installation scale 1. Set the back plate and adjust it with the built-in level 2. Complete the install for setting the High Wall 3.



40MAHB High Wall

CE

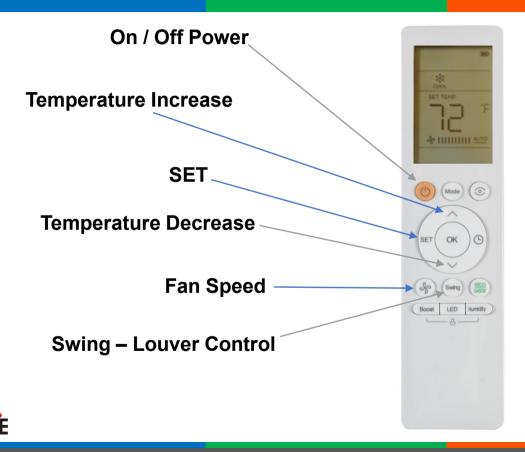


REDESIGNED WIRELESS REMOTE CONTROLLER





REDESIGNED WIRELESS REMOTE CONTROLLER



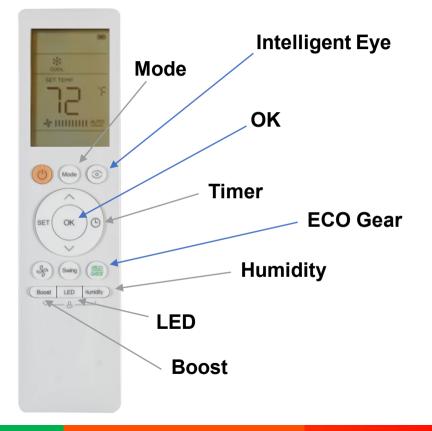
Key Takeaways:

- Temperature changes in 1°F increments
- Maximum temperature set point is 86°F
- SET accesses additional features
- Press up and down temperature buttons at the same time for 3 seconds to alternate between °F & °C
- Minimum temperature set point is 60°F
- Press Swing once = activates horizontal louver (press and hold Swing for 2 seconds = initiates vertical louver swing)

REDESIGNED WIRELESS REMOTE CONTROLLER

Key Takeaways:

- MODE = AUTO, COOL, DRY, HEAT, FAN
- Intelligent eye = occupancy sensor
- OK = press to confirm selected functions
- Timer = Set turn on & turn off times
- ECO Gear = COOL mode only; 75°F set point
- Humidity = Set RH% from 35% to 85%
- LED = Turns on or off LED Display on unit
- Boost = Reach set temp as fast as possible





ACCESSING ADDITIONAL SETTINGS

Press and release the SET button

- Active clean feature display
- ッ Sleep mode display

S Follow me feature display

Wireless control feature display

Press and release OK to confirm

Press and hold the Boost button for seven seconds to start/stop the memory feature of the Follow Me function

- When memory is activated, "On" displays for 3 seconds on the screen
- · When memory is deactivated, "Of" displays for 3 seconds on the screen





The RG-10 remote is not universal like the RG-57, the system may become less responsive if using the incorrect remote.

RG10A: 40MHHC Cooling Only RG10A4: DHMVHAQ RG10A5: DHMVHAH Cooling Only RG10B: 40MHHQ, 40MBC, 40MBD,40MBF RG10L: 40MAHB/61AHB





New Mid-Tier Outdoor Unit

ONE NEW OUTDOOR UNIT - FIVE INDOOR OPTIONS



38MARB New Outdoor Unit

Slim Ducted



THE NEW 38MARB MID-TIER ODU

<u>Higher Efficiency Ratings</u>

- SEER (up to 28.1)
- EER (up to 16.2)
- HSPF (up to 13.0)

Improved Performance

- Up to 100% Heating Capacity to -4°F (-20°C)
- Up to 100% Cooling Capacity to -22°F (-30°C)

Extended Operating Ranges

- Cooling Operation Range: 22°F (-30°) ~130°F (54°C)
- Heating Operation Range: 22°F (-30°) ~86°F (30°C)



- New Cabinet Design
- Improved Service Access
- Redesigned Base Pan Heater
- Total Line Set Length up to 213'
- Total Lift Up to 98'
- Backwards Compatibility

* Source: 38MARB-01PD; 1/21 Ed.





Future Products

THE NEW FRONTIER IN COMFORT

DUCTLESS & DUCTED PRODUCT ROAD MAP



Ductless Outdoor Unit with

Ductless Outdoor Unit with Gas Furnace and Coil Combinations







Ductless Outdoor Unit and Indoor Coils







BRANDED QUICK REFERENCE GUIDES

NOMINAL CAPACITY	SEEF	EER	HSPF	INDOOR UNIT WITH WIRELESS REMOTE	OUTDOOR UNIT WITH BASE PAN HEATER	LINE SET SURS LIDUED X DUCTION	MIN LINE LENGTH		ADDITIONAL CHARGE >201	MAX LIFT	MCAMOCP	Maximum Heating Btu's at -4"F	Maximum Heating Btu's at 0°F	Maximum Cooling Btu's at -22*F	Maximum Cooling Btu's at 113'F	WIRED CONTROLLEF Optional Unless Otherwise Noted
lution** High				The dire					Vall Systems		diet en y		ndoor DB		Indoor DB	
9,000	42.0	15.0		619PHAQ06XA3 619PHAQ12XA3	38MPRAQ09AA3 38MPRAQ12AA3	1/4 X 3/8 1/4 X 1/2	10"	95'	.16 Oz/FL .16 Oz/FL	49	13A/15A 15A/20A	10,870	12,320	12,400	7,080	KSACN0601AAA KSACN0601AAA
12,000	28.2	13.5		619PHAQ12XA3 619PHAQ18XA3	38MPRAQ12AA3	1/4 X 1/2 3/8 X 5/8	10	95'	.16 OZFL .32 OzFL	49	15A/20A 18A/20A	11,530	12,870	13,800	8,850	KSACN0601AAA KSACN0601AAA
24,000	23.5	13.6		619PHAQ24XA3	38MPRAQ24AA3	38 X 58	10"	95'	.32 Oz/FL	65'	20A/30A	22,490	24,300	28,590	18,420	KSACN0601AAA
ferred ^m High I	Wall 1:		Pump				idard Cap		Wall System				ndoor DB	At 75.2°F	Indoor DB	
2,000 - 115 Volt	23.0	13.0	9.6	619AHBQ12XA1 619AHBQ30XA3	38MARBQ12AA1 38MARBQ30AA3	1/4 X 1/2 3/8 X 5/8	10"	82'	.16 Oz/FL .32 Oz/FL	32'	19A/25A 23A/30A	5,480	6,300	14,570 36,690	8,360	KSACN0801AAA KSACN0801AAA
36,000	17.5	8.5	9.0	619AHBQ36XA3	38MARBQ36AA3	38 X 58	10	213	.32 OUFL	96'	28A/35A	19,290	22,000	37,720	22,480	KSACN0801AAA
ferred High							gh Capa	city High W				At 69"F 1		At 75.2°F	Indoor DB	
9,000	28.1	16.2	13.0	619AHBQ06XA3 619AHBQ12XA3	38MARBQ09AA3 38MARBQ12AA3	1/4 X 3/8 1/4 X 1/2	10"	82	.16 Oz/FL 16 Oz/FL	32'	15A/15A 15A/15A	9,640	11,000	13,100	9,980	KSACN0801AAA KSACN0801AAA
12,000	25.5	14.0	13.0	619AHBQ12XA3	38MARBQ12AA3	1/4 X 1/2 1/4 X 1/2	10	82	.16 QuFL	32	15A/15A 16A/25A	10,300	11,740	21,330	9,700	KSACN0801AAA
24,000	21.5	13.0	12.0	619AHBQ24XA3	38MARBQ24AA3	38X58	10	164	.32 OzFL	82	25A/35A	23.600	23,390	26,110	19,230	KSACN0801AAA
ferred ^a Casse	ette 1:1	Heat F	ump			High	Capacity	Ceiling Ca	ssette Syste	ms		At 69*F 1	ndoor DB	At 75.2°F	Indoor DB	
9,000	20.0	13.0	10.8	40MBCQ093	35MARBQ09AA3	1/4 X 3/8	10"	82'	.16 Oz/FL	32'	15A/15A 15A/15A	9,290	10,410	7,690	8,490	KSACN0701AAA KSACN0701AAA
12,000	19.5	12.5	10.6	40MBCQ123 40MBCQ183	38MARBQ12AA3 38MARBQ18AA3	1/4 X 1/2 1/4 X 1/2	10"	82'	.16 Oz/FL .16 Oz/FL	32'	15A/15A 16A/25A	10,070	11,280	15,080	10,520	KSACN0701AAA KSACN0701AAA
24,000	20.0	11.0	11.5	40MBC0243	38MARBQ24AA3	38×58	10	164	.32 Ou/FL	82	25A/35A	23,810	25,120	21,040	17,470	KSACN0701AAA
				or 9K, 12K & 18K	BTU 40MBCQ01X					rille for 24K	36K & 48K B	U 40MBCQ02XX				oparately)
ferred ^{ae} Ducte			mp 12.0	40MBD0093	31MARBOOSAA3		gh Capac		uot Systems	32	15A/15A	At 69"F 1	ndoor DB 10,900	At 75.2°F	Indoor DB	KSACN0701AAA Included
9,000	23.0	13.5	12.0	40MBDQ093 40MBDQ123	38MARBQ09AA3	1/4 X 3/8 1/4 X 1/2	10"	82	.16 OzFL 16 OzFL	32'	15A/15A 15A/15A	9,670	10,900	10,230	8,310	KSACN0701AAA Included
18,500	19.6	12.5	11.0	40MBDQ183	38MARBQ18AA3	1/4 X 1/2	10	98	16 Ou/FL	65	16A/25A	16,000	16,720	21,270	11,650	KSACN0701AAA Included
	20.5	12.5		40MBDQ243	38MARBQ24AA3	38X58	10"	98'	.32 Ou/FL	12	25A/35A	24,890	26,250	34,440	20,970	KSACN0701AAA Included
ferred ^{ae} Consi								acity Conse				At 69"F 1			Indoor DB	
12,000	19,4	12.5	10.5	40MBFQ123 40MBFQ183	38MARBQ12AA3 38MARBQ18AA3	1/4 X 1/2 1/4 X 1/2	10"	82'	.16 Oz/FL .16 Oz/FL	32'	15A/15A 16A/25A	10,610	11,720	13,500	10,760	KSACN0601AAA KSACN0701AAA
24,000	20.0	11.5	11.5	40MBFQ243	38MARBQ24AA3	38X58	10	95	32 OzFL	82	25A/35A	24.620	25,990	23,230	19,280	KSACN0701AAA
ferred ^m Light	Comm							d Capacity				At 69"F 1		At 75.2°F	Indoor DB	
6.000 Cassetle*	17.5	9.0	10.5	40MBCQ363 40MBCQ483	38MBRBQ36AA3 38MBRBQ46AA3	38×58 38×58	10"	213	.32 Ou/FL .32 Ou/FL	96'	30A/50A 35A/50A	20,400	29,530	36,130	21,520	KSACN0701AAA KSACN0701AAA
36 000 Durled	16.5	9.0	11.0	40M8DQ363	36MBRBQ36AA3	38X58	10	213	.32 OZFL	96	30A/50A	23,890	26,720	36.020	21,450	KSACN0701AAA
68,000 Ducted	17.4	9.2	10.3	40M8DQ483	30MBR8Q40AA3	38X58	10	213	.32 OzFL	96'	35A/50A	30,890	38,090	45,490	33,520	KSACN0701AAA
57,000 Ducted	18.0	10.0	9.0	40M8DQ583	S8MBRQ58A-3	38 X 34	10"	213	A3 Oz/FL	96'	35A/50A	29,500		58,360	33,920	KSACN0701AAA
6,000 Console	16.0	8.0	10.0	40MBFQ36-3 40MBFQ46-3	38MBRBQ36AA3 36MBRBQ46AA3	38×58	10"	213	.32 Ou/FL .32 Ou/FL	96'	30A/50A	24,000	26,870	38,050	21,470	KSACN0701AAA KSACN0701AAA
4.000 Console	17.8	9.8	10.5	40MBFQ58-3	38488038443	38 X 34	10	213	43 QzFL	90	35A/50A	27,850	32,240	43,060	25,870	KSACN0701AAA
alistion Note :			The 38	NBR systems require	a shielded, surande					undeer units				400	BAA Accessory Ele	otric Heater Kite
eferred™	1-1	Heat	Pum	/ Multi-Pos	ition Air Har	dier w	Eacto	ny Insta	lled 24V	Interfac	•			Size	Model Number	Size Used With
24,000	20.0	12.5	11.6	40MBAA024XA3	38MARBQ24AA3							At 69"F 1 21,340	ndoor DB 23.090	5 KW 10 KW	EHKMA05KN EHKMA10KN	24,36,48
24,000	16.5	12.5	11.6	40MBAAQ24XA3 40MBAAQ25XA3	38MARBQ24AA3	38×58	10"	164	.32 Ou/FL 43 Ou/FL	82'	25A/35A 30A/50A	21,340	23,090	10 KW	EHKMA10KN EHKMA15KN	24,36,48
48,000	16.0		9.5	40MBAAQ45XA3	35MBRDQ18AA3	38×58	10"	213	43 OzFL	96'	35A/50A	25,310	27,120	20 KW	EHKMA20KN	48 Only
		_	-			_						0°F Outdoor	5*F Outdoor	0°F Outdoor	113°F Outdoor	
acy High Wa 2,000 - 115 Volt	19.8	eat Pu	10.6	40MHHQ121	38MHRBQ12AA1	5tar	ndard Cap	pacity High	Wall System	15	134/204	6.250	ndoor DB	At 75.2°F	Indoor DB 8 300	KSACN0601AAA
9.000	18.5	11.2	10.0	40MHHQ093	38MHRBQ09AA3	1/4 X 3/8	10	82	.16 OUTL	32	8A/15A	5,280	5,700	9,590	6,700	KSACN0601AAA
12,000	19.8	11.2	9.6	40MHHQ123	35MHRBQ12AA3	1/4 X 1/2	10"	82'	.16 Ou/FL	32	10A/15A	5,550	6,070	13,260	8,670	KSACN0601AAA
18,000	19.0	11.2	10.6	40MHHQ183	38MHRBQ18AA3	1/4 X 1/2	10'	98'	.16 Oz/FL	65'	15A/20A	8,470	9,670	20,510	12,610	KSACN0601AAA
24,000	17.3	9.7	9.6	40MHHQ243	38MHRBQ24AA3	38 X 58	10"	164"	.32 OuFL ories, Warra	65'	18A/25A	12,600	14,920	27,070	15,760	KSACN0601AAA
Lise any 2	rd name	247	S-wire the	mostat to costrol -	imost any Bryant P	luctiess rue	tem by ed	iding the M	SAIC0301220	24V Interfac	e Compatible	with all indeer unit	a listed above en	ent 40MBEQ 12-	3 40MBEO58	. & 40MBDQ583.
				is systems are ship												
				ily Applications:												
					mercial Application											
						1.00										

NOMINAL	SEER		_	INDOOR UNIT WITH WIRELESS REMOTE "This Sheet	OUTDOOR UNIT WITH BASE PAN HEATER	suction to replace th	LINE LENGTH	MAX LINE LENGTH	CHARGE >261	MAX LIFT	MCA/MOCP	Maximum Heating Btu's at -4% ways read throug	Maximum Heating Btu's at 0% h the Installation	Maximum Cooling Btu's at -22*s Instructions*	Maximum Cooling Btu's at 113%	WIRED CONTROLLEI Optional University Otherwise Noted
finity= High Wa							igh Capac		all Systems			At 69*F I			Indoor DB	
9,000	42.0	15.0	15.0	40MPHAQ09XA3	38MPRAQ09AA3	1/4 X 3/8	10'	98'	.16 Oz/FL	49	13A/15A	10,870	12,320	12,400	7,080	KSACN0601AAA
12,000	32.0	13.5	14.0	40NPHAQ12XA3 40NPHAQ18XA3	38MPRAQ12AA3 38MPRAQ18AA3	1/4 X 1/2 3/8 X 5/8	10'	98'	.16 O2/FL .32 O2/FL	49'	15A/20A 18A/20A	11,530	12,870	13,800 22,670	8,850	KSACN0601AAA KSACN0601AAA
24,000	28.2	14.5	14.0	40MPHAQ18XA3	38MPRAQ18AA3 38MPRAQ24AA3	38 X 58 38 X 58	10'	98'	.32 O2/H. .32 O2/H.	65'	18A/30A 20A/30A	18,450 22,490	20,240	22,670	16,650	KSACN0601AAA KSACN0601AAA
			at Pumo		30MPTOAU24AA3			acity High			204304	22,490 At 69*F I			Indoor DB	KSACNUUUIAAA
2.000 - 115 Volt	23.0	13.0	11.5	40MAHBQ12XA1	38MARBQ12AA1	1/4 X 1/2	107	82	.16 O2/Ft.	32'	19A/25A	5,450	6.300	14,570	8,360	KSACN0801AAA
30.000	20.0	11.5	9.6	40MAHBQ30XA3	38MAREQ30AA3	38 X 5/8	107	164	.32 Oz/FL	82'	23A/30A	15,230	16,790	36,690	19,100	KSACNORDIAAA
35,000	17.5	8.5	9.0	40MAHBQ36XA3	38MARBQ36AA3	3/8 X 5/8	107	213	.32 OZ/Ft.	98'	28A/35A	19,280	22,060	37,720	22,480	KSACN0801AAA
formance" H	igh Wall	1:1 He	at Pump			Hi	igh Capac	ity High W	all Systems			At 69*F I	ndoor DB	At 75.2 F	Indoor DB	
9,000	28.1	16.2	13.0	40MAHBQ09XA3	38MARBQ09AA3	1/4 X 3/8	107	82'	.16 OZ/FL	32'	15A/15A	9,640	11,000	13,100	9,980	KSACN0801AAA
12,000	25.5	14.0	13.0	40MAHBQ12XA3	38MARBQ12AA3	1/4 X 1/2	107	82'	.16 Oz/FL	32'	15A/15A	10,300	11,740	13,650	9,700	KSACN0801AAA
18,000	21.5	12.5	13.0	40MAHBQ18XA3	38MARBQ18AA3	1/4 X 1/2	107	98'	.16 Oz/FL	65'	16A/25A	14,410	15,600	21,330	12,070	KSACN0801AAA
24,000	21.5	13.0	12.0	40MAHBQ24XA3	35MARBQ24AA3	38 X 58	107	164	.32 OUTL	82'	25A/35A	23,600	23,380	25,110	19,230	KSACN0801AAA
	assette								ssette Syste			At 69*F I			Indoor DB	
9,000	20.0	13.0	10.8	40MBCQ09-3	35MARBQ09AA3	1/4 X 3/8	107	82'	.16 Oz/TL	32'	15A/15A 15A/15A	9,290	10,410	7,690	8,490	KSACN0701AAA KSACN0701AAA
12,000	19.5	12.5	10.6	40MBCQ12-3 40MBCQ15-3	38MARBQ12AA3 38MARBQ18AA3	1/4 X 1/2 1/4 X 1/2	107	82'	.16 O2/FL	32	15A/15A	10,070	11,280	15,080	10,520	KSACN0701AAA KSACN0701AAA
24,000	20.0		10.5	40MBCQ18-3 40MBCQ24-3	38MARBQ18AA3 38MARBQ24AA3	1/4 X 1/2 3/8 X 5/8	10'	98'	.16 O2/PL .32 O2/PL	65'	16A/25A 25A/35A	15,540	15,940	19,820	10,850	
	eilina C				BTU 40MBC0012			- Ceilin	Gassette G			23,810 TU 40MBC002X0				KSACN0701AAA
rformance™ D				ST SK, TZK G TOK	BTO ADM BCQUIA				uct Systems	The for 24P	C 36K & 46K E	At 69°F I			Indoor DB	eparately
9,000	23.0	13.5	12.0	40MBDQ09-3	38MARBQ09AA3	1/4 X 3/8	107	82	.16 02/FL	32'	15A/15A	9,670	10.930	10,230	8.310	KSACN0701AAA Include
12,000	20.5	12.5	11.0	40MBDQ12-3	38MARBQ12AA3	1/4 X 1/2	107	82	.16 Oz/FL	32'	15A/15A	10.650	11,830	12,850	10,190	KSACN0701AAA Include
16.500	19.6	12.5	11.0	40M8DQ18-3	38MARBQ18AA3	1/4 X 1/2	107	98'	.16 Oz/Ft.	65'	16A/25A	16.300	16,720	21,270	11,650	KSACN0701AAA Include
24,000	20.5	12.5	12.5	40M8DQ24-3	38MARBQ24AA3	38 X 5/8	107	98'	.32 O2/F1	82'	25A/35A	24,880	26,250	34,440	20,970	KSACN0701AAA Included
	onsole '		Pump				ligh Capa		le Systems			At 69*F I	ndoor DB	At 75.2*F		
12,000	19.4	12.5	10.5	40MBFQ12-3	38MARBQ12AA3	1/4 X 1/2	107	82'	.16 Ob/FL	32'	15A/15A	10,610	11,720	13,500	10,760	KSACN0601AAA
17,000	19.9	12.5	10.6	40MBFQ18-3	38MARBQ18AA3	1/4 X 1/2	10"	98'	.16 O2/FL	65'	16A/25A	15,920	16,330	22,510	12,330	KSACN0701AAA
24,000	20.0	11.5	11.5	40MBFQ24-3	38MARBQ24AA3	3/8 X 5/8	107	98"	.32 Oz/FL	82'	25A/35A	24,620	25,980	23,230	19,280	KSACN0701AAA
rformance [®] Li				at Pump			Standard		Systems			At 69*F Is		At 75.2*F		
36,000 Cassette"	17.5	9.0	10.5	40MBCQ36-3	38MBRBQ36AA3	3/8 X 5/8	10'	213'	.32 Oz/Ft.	98'	30A/50A	26,400	29,530	36,130	21,520	KSACN0701AAA
48,000 Cassette"	16.8	9.5	11.0	40MBCQ48-3	38MBRBQ48AA3	3/8 X 5/8	10'	213	.32 Ob/FL	98'	35A/50A	23,290	35,650	41,550	30,620	KSACN0701AAA
36,000 Ducted	16.5	9.0	11.5	40MBDQ363	38MBRBQ36AA3	3/8 X 5/8	10'	213'	.32 Oz/FL	98'	30A/50A	23,890	26,720	36,020	21,450	KSACN0701AAA
48,000 Ducted 57,000 Ducted	17,4	9.2	10.3	40M8DQ48-3 40M8DQ58-3	35MBRBQ45AA3 38MBRQ58A=3	3/8 X 5/8 3/8 X 3/4	10'	213	.32 O2/FL .43 O2/FL	98' 98'	35A/50A 35A/50A	30,880	38,090 33,910	45,490 56,360	33,520 33,920	KSACN0701AAA KSACN0701AAA
36 DOD COTSOR	16.0	8.0	10.0	40MBDQ583 40MBFQ363	35MBRQ58A-3	38 X 58	10	213	.43 OZPL .32 OZPL	96	304/504	24,500	26,870	36,050	21,470	KSACN0701AAA
48.000 Console	17.8	9.3	11.0	40MBFQ48-3	38MBRBQ48AA3	38 X 5/8	10'	213	.32 Oz/R.	98'	35A/50A	26,590	40,710	43,660	32,170	KSACN0701AAA
54.000 Console	18.0	9.5	10.5	40MBFQ58-3	38MBRQ58A-3	3/6 X 3/4	10	213	43 OZ/FL	96'	354/504	20,000	32,240	49,620	25.870	KSACN0701AAA
taliation Note	10.0	-			e a shielded, strande						ourroun	\$1,000	04,040		BAA Accessory Ele	
														Size	Model Number	Size Used With
erforman	se	1.1.6	ieat P	ump / Multi	-Position A	Handl	er w/F	actory	installed	24V Int	enace	At 69*F h	ndoor DB	5 KW	EHKMADSKN	24,36,48
24,000	20.0	12.5	10.0	40NBAAQ24XA3	38MARBQ24AA3	3/8 X 5/8	10'	164	.32 Oz/FL	82'	25A/35A	21,340	23,080	10 KW	EHKMA10KN	24,35,48
36,000	16.5	8.5	10.4	40NBAAQ36XA3	38MBRBQ36AA3	3/8 X 5/8	10'	213	.32 Oz/FL	98'	30A/SOA	20,440	22,850	15 KW	EHKMA15KN	36,48
48,000	16.0	8.2	9.5	40NBAAQ48XA3	38MBRBQ48AA3	3/8 X 5/8	10'	213'	.32 Oz/FL	98'	35A/50A	25,310	27,120	20 KW	EHKMA20KN	48 Only
			_							_		0*F Outdoor			113'F Outdoor	
mfort= High V									Wall System			At 69*F I			Indoor DB	
2,000 - 115 Volt	19.8	10.0	10.6	40MHHQ121 40MHHQ093	38MHRBQ12AA1 38MHRBQ00AA3	1/4 X 1/2 1/4 X 3/8	10	82	.16 O2/FL .16 O2/FL	32'	13A/20A 8A/15A	5,250 5,280	4,370	12,250	8,300	KSACN0601AAA KSACN0601AAA
9,000	18.5	11.2	9.6	40MHHQ09-3 40MHHQ12-3	38MHRBQ09AA3 3MMHRBQ12AA3	1/4 X 3/8	107	82	.16 C2/PL	32'	8A/15A 10A/15A	5,250	5,700	9,590	6,700	KSACN0601AAA KSACN0601AAA
12,000	19.8	11.2	9.6	40MHHQ12-3 40MHHQ18-3	38MHRBQ12AA3 38MHRBQ18AA3	1/4 X 1/2 1/4 X 1/2	10'	98'	.16 O2/FL .16 O2/FL	32'	10A/15A 15A/20A	5,550	6,070	13,260 20,510	8,670	KSACN0601AAA KSACN0601AAA
24,000	17.3	97	9.6	40MHHQ24-3	38MHRBQ24AA3	36 X 5/8	10	164	.16 OZPL	60	15A/25A	12,600	14,920	20,510	15,760	KSACN0601AAA
								Acces	sories, Warra	nty Informa	tion, Etc.					3. & 40MBDQ583.
				systems are ship												



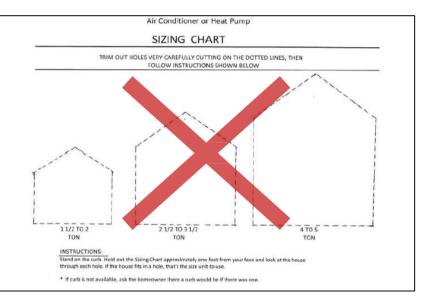
APPLICATION & INSTALLATION

2

Fundamentals

How to choose the correct size system

- The next few pages contain basic universal principles for applying HVAC equipment.
- Preform building Load Calculations 1st.
- Match the equipment's BTU output with the calculated design condition
- Select the equipment that best fits the load conditions for heating and cooling



Please don't use rule of thumb methods for sizing.



Load Calculations

- Do not guess No rule of thumbs, No holding fingers from the curb or cutouts
- There are many sources for building load calculation software & phone Apps
- Manual J is the acceptable guide for calculating Residential BTU loss/gain
- Manual N is the acceptable guide for calculating Commercial BTU loss/gain
- Manual J and N are not interchangeable
- Block load sizing can be ok for estimating, but a room-by-room is required for proper design and application
- To properly size equipment Manual J or N calculations must be matched to the equipment's output which is found in the Equipment Product Data
- <u>Make sure on Multi-head systems the indoor units all have the same load</u> <u>characteristics/requirements</u>



Load Calculations

Once you have used an App or program 3 or 4 times, it will only take 15 minutes or less to get a Load Summary. All you need are the measurements of the building. The 1st time will be the hardest.

- Measure the building. Start with the length, width and ceiling height. And then go room by room.
- While onsite measuring up, try and collect the following:
 - What temp's do the owners like in the home during Winter and Summer?
 - Exposed Walls Length, width, height, What direction or exposure; N, NE, W, SW, etc.
 - Common Walls Length, width, height,
 - Wall Construction Type, Thickness, Amount below grade
 - Floors Type Carpet, Tile, Hardwood, Slab on grade
 - Windows Height and Width, Type of glass and sash, How many panes, Coating or shading
 - What direction of exposure; N, NE, W, SW, etc.
 - Overhang above Window How far above and how far out
 - Wall & Ceiling Insulation Type, Thickness, R-value
 - Roof Light or Dark
 - Insulation below grade or around slab Type and thickness NOTE: Some Residential and Commercial buildings may require additional information, consult the appropriate guide for assistance.

1 2 3 4 5		EXAMPLE A		Exp Cell Roc	m name osed wa ing heigh m dimen m area	di st	Entire House 240.0 m 8.0 1750.0 m ²				
	ту	Construction	U- value	Or		TM h/ft²)	Area or perin	a (ft²) neter (ft	Lo. (Bt	ad uh)	
		Select any cell			Heat	Cool	Gross	N/P/S	Heat	Cool	
6	W	158-10sfc-2	0.083	n	0.305	1.129	560	492	189	39	
	-G	1D-c2ow	0.570	n	2.850	19.32	40	0	114	77	
	LD	11D0	0.390	n	1.950	11.19	28	28	55	31	
	N	158-10sfc-2	0.083	0	0.305	1.129	400	368	142	30	
11	L-G	1D-c2ow	0.570	e	2.850	61.39	32	0	91	196	
	N	158-10sfc-2	0.083		0.305	1.129	560	484	185	38	
	-G	1D-c2ow	0.570	8	2.850	21.64	48	0	137	103	
	L_D	11D0	0.390	8	1.950	11.19	28	28	55	31	
	N	158-10sfc-2	0.083		0.305	1.129	400	384	148	32	
	L_G	1D-c2ow	0.570	w	2.850	61.39	16	0	46	98	
	С	168-30ad	0.032	-	0.160	1.670	875	875	140	146	
	F	21B-28t	0.015	-	0.075	0.000	875	120	66		
	Tot	tal room load							2923	1203	
	Ale	required (cfm)							505	50	



Equipment Considerations for Sizing & Application

- Layout of building, type of space and occupancy levels day and night.
- When selecting ductless indoor units, consider the Air Throw Range data for ideal coverage.
- Temperature Control
 - Stock Controls? Wireless or Wired?
 - Cor[™]24VAC Thermostat, Nest, ecobee or other?
 - Wi-Fi?, App based? All have different features and benefits.
 - Where in the space will the room's temp be measured to control the system?
 - Desired set points in heating and cooling for day and night.
 - Distance from unit?
 - Line-of-sight?
- What installation considerations do you have, should you use ducted or non-ducted indoor units and their placement within the space, attic, basement or crawl space.
- Average snow fall, stand or wall bracket required?
- Over head hazards to outdoor unit: water, ice, snow? Do not trust gutters.



Example – Heat Pump Sizing – Block Load

- Complete Load calculations, go to desired equipment's Product Data Manual to match up required BTU's.
- Decide which Carrier models you want to use for the application. Make sure you have the Product's Data Manuals for each, they will be needed after the load calculations are complete.
- In this application, we will be installing a Multi-head HP Outdoor unit and we will be adding a few high wall indoor units.

Customer Requested Indoor Set Points

Seasonal Design Temps

pment's	IP	Project Repo	rt							
		eneral Project Inf								_
J′s.	De	roject Title: esigned By: roject Date:		er Information ohen Meurs	n: transform					
for the		esign Data								
for the		eference City: uilding Orientation	1:	Hartford, C	CT Albany, Front do	New York or faces Wes	st			
Data		Daily Temperature Range: Medium Latitude: 42 Degrees Elevation: 275 ft. Altitude Factor: 0.990								
	E									
e load		titude Factor: evation Sensible	Adi, Factor:	0.9						
	EI	evation Total Adj	Factor:	1.0						
		evation Heating / evation Heating /		1.0						
			Outdoor	Outdoor	Outdoor	Indoor	Indoor	Grains		
	141	inter:	Dry Bulb -10	Wet Bulb -10.4	Rel.Hum 81%	Rel.Hum n/a	Dry Bulb 70	Difference n/a		
ad HP		ummer:	93	-10.4	36%	50%	75	20		
all indoor	C	heck Figures				1000				
	To	otal Building Supp	bly CFM:		708	CFM P	er Square ft.:		0.5	32
		Oute		l e e	leer		n al a a r	ា	Crains	
	door	Outc			door		ndoor		Grains	
y Bulb Wet	Bulb	Rel.H	lum	Rel.	lum	Dry	/ Bulb	Diffe	erence	
10	11	8	1%		n/a		70		n/a	
93	72	2	6%	L	50%		75		20	
00			070				10	J	20	
		elize to ealest a	unit that most	hoth eansible	and latent !	oade accordin	a to the man	ufacturare por	formance data at	
		our design conditi		s bour sensible	and latent i	uaus accordin	ig to the man	unacturers per	ionnance data al	



Example – ODU Heat Pump Sizing – Block Load

- The information in the load calculation report must be checked against the equipment's capacity tables and operation range
- When consulting the product data books, exact temperatures may not be available, and some interpretation may be required.

		Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	10	11	81%	n/a	70	n/a
Summer:	93	72	36%	50%	75	20

Building LoadsTotal Heating Required Including Ventilation Air:24,717 Btu/hTotal Sensible Gain:15,426 Btu/hTotal Latent Gain:3,200 Btu/hTotal Cooling Required Including Ventilation Air:18,626 Btu/h



Winter: 10 11 81% Summer: 93 72 36%		70	n/a 20
---	--	----	-----------

Example – ODU Heat Pump Sizing – Block Load

- In Cooling @ 93°F DB outdoor temp & 75°F DB indoor set point
- Required Cooling BTU's
 - 15,426 Btu/h Sensible CoolingCapacity
 - 3,200 Btu/h Latent Gain
 - 18,626 Btu/h Total Cooling Capacity
- Since 93°F Outdoor
 - Use set point: 75.2°F
 - Use next higher Outdoor Temp: 95°F
- In this series the 018 makes sense it meets the cooling requirements, traditionally we would size our equipment from the cooling load but not with ductless we need to size from the highest load

Now let's check Heating

Building Loads Total Heating F

Total Heating Required Including Ventilation Air: Total Sensible Gain: Total Latent Gain: Total Cooling Required Including Ventilation Air:

24,717 Btu/h 15,426 Btu/h 3,200 Btu/h 18,626 Btu/h

COOLING PERFORMANCE NON-DUCTED

Table 8 — COOLING PERFORMANCE NON-DUCTED COMBINATIONS

COOLING MODEL INDOOR CONDITIONS DB								00	ITDOOR C	ONDITION	S (DB)				
MODEL	INDOOR CO	NDITIONS 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	1	(-25 °C)	(-20.0)	(-17-0)	(-15.0)	(-0.0)	(0.0)	(25.0)	(30.0)	(35-0)	(40 °C)	(45 C)	(30.0)
	69.8°F	59°F	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
	(21°C)	(15°C)	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	62.6°F	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
	(2490)	(17°C)	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
18			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	66.2°F	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
	(27°C)	(19°C)	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	73.4°F	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
	(32°C)	(23°C)	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
	69.8°F	59°F	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
	(21°C)	(15°C)	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
24			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	62.6°F	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
	(24°C)	(17°C)	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		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
		(19°C)	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	89.6°F	73.4°F	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
	(32°C)	(23°C)	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
	69.8°F	59°F	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
	(21°C)	(15°C)	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		3.13	3.25	2.66
	75.2°F	62.6°F	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
	(24°C)	(17°C)	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
30			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	66.2°F	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
	(27°C)	(19°C)	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	73.4°F	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
	(32°C)	(23°C)	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



LEGEND

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

AP	PL	ICAT	ION
AP	ΓL		

Building Loads

Total Heating Required Including Ventilation Air:	
Total Sensible Gain:	
Total Latent Gain:	
Total Cooling Required Including Ventilation Air:	

Table 9 — HEATING PERFORMANCE NON-DUCTED COMBINATIONS

24,717 Btu/h 15,426 Btu/h 3,200 Btu/h 18,626 Btu/h

Example – ODU Heat Pump Sizing – Block Load

- In Heating @ 10°F DB outdoor temp & 70°F DB indoor set point HEATING PERFORMANCE NON-DUCTED
- Required Heating BTU's
 - 24,717 Btu/h Total HeatingCapacity
- Since 10°F Outdoor
 - Use set point: 69°F
 - Use next lowest Outdoor Temp: 5°F
 - · Less than one degree makes very little impact
- Size the unit from its highest load requirement in our example it was the heating requirement.

	HEATING						0	TDOOR CO	NDITIONS (E	DB)				
MODEL	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)
		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
	59°F (15°C)	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
	(10 0)	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	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
	(18°C)	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
18	(10 0)	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
10	69°F	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
	(20.5°C)	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
	(2010-04)	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	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
	(22°C)	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
	(22 0)	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
	59°F	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
	(15°C)	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	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
	(18°C)	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
24	(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	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
	(20.5°C)	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	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
	(22°C)	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
	(22 0)	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
	59°F	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
	(15°C)	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	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
	(18°C)	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
30	(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	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
	(20.5°C)	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	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
	(22°C)	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
	1	70	00.00	00.07	00.70	00.04	00.00	00.00	00.04	11.15	10.10	10 30	FC 00	00.05



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

Example – Room by Room Heat Pump Sizing

- The information in the load calculation report must be checked against the equipment's capacity tables and operation range
- When consulting the product data books, exact temperatures may not be available, and some interpretation may be required.

OutdoorDry BulbWinter:10Summer:93	Outdoor <u>Wet Bulb</u> 11 72	Outdoor <u>Rel.Hum</u> 81% 36%	Indoor <u>Rel.Hum</u> n/a 50%	Indoor Dry Bulb 70 75	Grains <u>Difference</u> n/a 20	
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Building Loads	
Total Heating Required Including Ventilation Air:	5,721 Btu/h
Total Sensible Gain:	3,173 Btu/h
Total Latent Gain:	<mark>340</mark> Btu/h
Total Cooling Required Including Ventilation Air:	3,513 Btu/h



EQUIPMENT CONSIDERATIONS FOR SIZING & APPLICATION

PERFORMANCE

SYSTEM	SIZE		18	24	30	36	48	1
STOLEM	OUTDOOR MODEL		38MGRQ18B3	38MGRQ24C3	38MGRQ30D3	38MGRQ36D3	38MGRQ48E3	1
	Max. Number of Zones		2	3	4	4	5]
	Energy Star		YES	YES	YES	YES	YES	1
	Cooling System Tons		1.5	2.0	2.5	3.0	4.0	1
	Cooling Rated Capacity	Btu/h	18,000	24.000	30,000	36,000	48,000	1
	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	1
	SEER		22.5	23.0	23.8	21.5	22.4	1
	EER		12.5	12.5	12.5	13.5	12.5	1
Performance Non-Ducted	Heating Rated Capacity (47°F)	Btu/h	19,000	24,000	28,000	36,000	48,000	1
Non-Ducted	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	

Table 6 — Performance

- Select equipment to meet the highest load requirement, in our example heating had the highest requirement of 24,717 Btuh, Cooling had 15,426 Btuh (for cooling use sensible Btuh as your requirement)
- Ductless equipment BTU output varies based on conditions
- All Carrier Inverter Ductless equipment have variable output

Compressors have a minimum run time at Fmax (Max compressor speed / RPS / Hz): 7 minutes on the high-tier product and a minimum run time of 3 minutes on the mid-tier and comfort series inverter driven equipment.

- The BTY capacity output on a 40MAHB06B--3 ranges between 3,000 ~9,000 Btu's, depending on your ODU.
- Even though Inverter equipment spins down, equipment can still be oversized due to the minimum BTU output of each model. In this case the minimum output is 6,010 BTU's in heating & 7,880 BTU's in cooling.



Example – Room by Room Heat Pump Sizing – Remember

- These are at design conditions of 10F & 93F.
- The Btu requirements will be less when you have more mild conditions such as an OD temp of 50 degrees in the heating mode or an OD temp of 85 when in cooling mode. And could contribute to quick temperature swings, Over-heating/Over-cooling in a space/area.

	Outdoor	Outdoor	Outdoor	Indoor	Indoor	Grains
	Dry Bulb	Wet Bulb	Rel.Hum	Rel.Hum	Dry Bulb	Difference
Winter:	10	11	81%	n/a	70	n/a
Summer:	93	72	36%	50%	75	20

Building Loads	
Total Heating Required Including Ventilation Air:	5,721 Btu/h
Total Sensible Gain:	3,173 Btu/h
Total Latent Gain:	<mark>340</mark> Btu/h
Total Cooling Required Including Ventilation Air:	3,513 Btu/h



MG*R Turn Down

	HEAT PUMP										
System	Size		18	24	30	36	48				
	Outdoor Model	38MGRQ18B3	38MGRQ24C3	38MGRQ30D3	38MGRQ36D3	38MGRQ48E3					
	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		5810~21940	7880~33510	8090~41470	8560~ 45020	8560~ 53160				
Performance	SEER		22.5	23	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	23,000	28,000	36,000	48,000				
Non-Ducted	Heating Rated Capacity (17°F) Btu/h		12,000	13,600	17,400	23,200	29,600				
	Heating Maximum Capacity (5° F) Btu/h		13,900	23,000	28,000	36,000	36,000				
	Heating Cap. Range Min – Max Btu/h		5760~24480	6010~36180	6350~ 41950	7210~ 50350	7210~ 55820				
	HSPF		10.3	9.8	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				



40MAQ Min-Max

Indoor Model		40MAQB09B1	40MAQB12B1	40MAQB09B3	40MAQB12B3	40MAQB18B3	40MAQB24B3	40MAQB30B3	40MAQB36B3
Energy Star		YES	YES	YES	YES	YES	YES	NO	NO
Cooling Rated Capacity	Btu/h	9,500	12,000	9,000	12,000	17,000	24,000	30,000	36,000
Cooling Cap. Range Min – Max	Btu/h	3500~11000	4000~13000	3500-13000	4000~13800	4500~18800	5500~24500	8000~30500	8000~36200

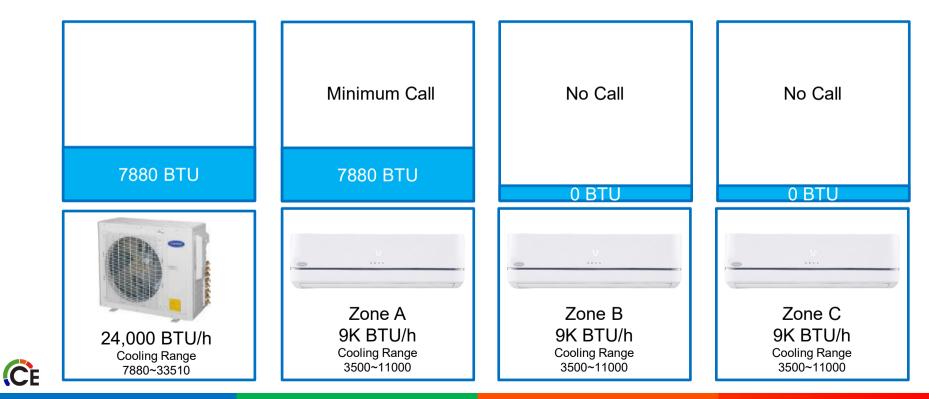
6k 40MAH not in documents yet but engineering has given us numbers

What happens if the load of the space is less than the minimum turn down?

Now the concern, Why does the room overheat and overcool?

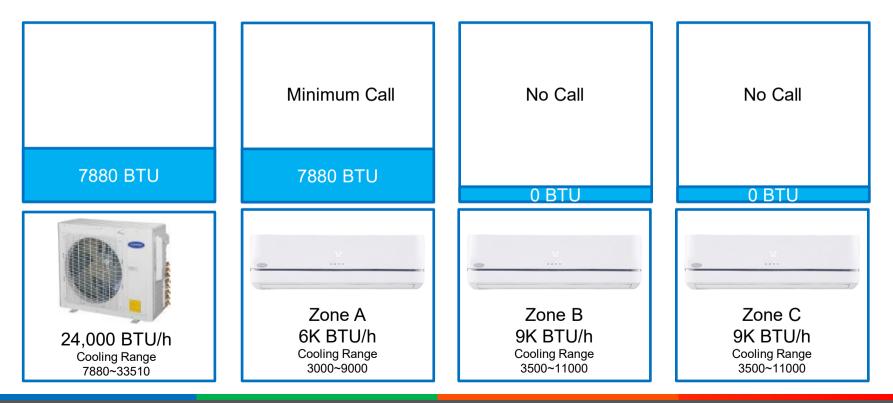


Remember at peak conditions outside @ 93 the smallest space only needed 3513 Btuh of cooling



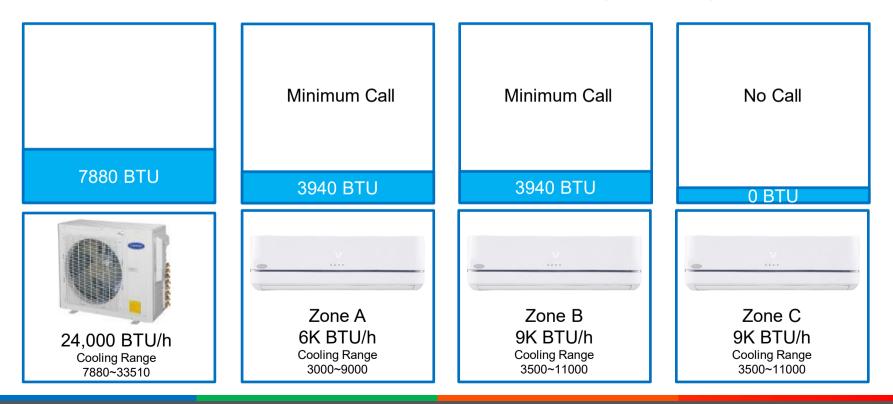
CE

Will the new 6k for multi-head solve the issue? Only 1 head calling for cooling



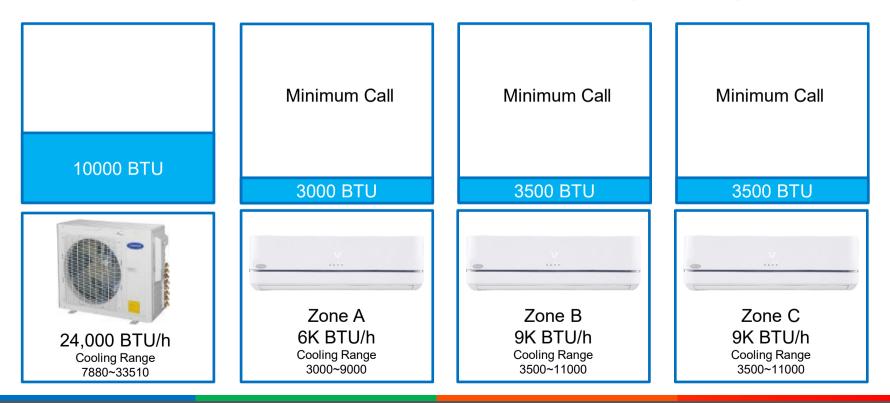
CE

Will the new 6k for multi-head solve the issue? 2 heads calling for cooling



CE

Will the new 6k for multi-head solve the issue? All 3 heads calling for cooling

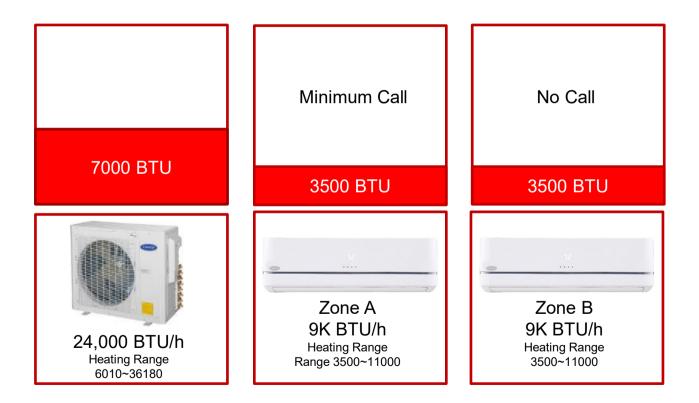


Heating operation has the same concern





Heating operation has the same concern





INSTALLATION INSTALLATION MANUALS

A set of installation instructions come with each indoor & outdoor unit, wireless remote control, wired control & kits.

Please save them at the unit and use them at installation.

They will also be needed for future troubleshooting.





INSTALLATION PRE-PLANNING

- Unit Placement
- Electrical Power
- Sizing and Connection
- Refrigerant Piping
- Condensate Handling
- Service and Maintenance







INSTALLATION GENERAL CONSIDERATIONS

ELECTRICAL POWER

Follow all local codes and regulations when installing electrical wiring and refer to all requirements specified in the installation instructions.

SERVICE AND MAINTENANCE CLEARANCES

Make sure there are adequate clearances for future maintenance and service. Allow enough room to access the condensate pump, electrical control box, and any other clearances specified in the installation instructions.





PIPING CONNECTION

- Deburr inside and outside before flaring
- Use the flare nuts that come with the equipment
- No Leak Lock or 3rd party sealers on flares
- Lubricate with oil
- Use backup wrench
- Torque properly









FLARES

So... what's the difference?







FLARES

PIPE DIAMETER INCH (mm)	TIGHTENING TORQUE		
	Ft—lb	N-m	
Ø1/4" (6.35)	10 to 13	13.6 to 17.6	
Ø3/8" (9.52)	24 to 31	32.5 to 42.0	
Ø1/2" (12.7)	37 to 46	50.1 to 62.3	
Ø5/8" (15.88)	50 to 60	67.7 to 81.3	







CE







BAD FLARES











Installing a system without a nitrogen purge while brazing Sample Strainer can be detrimental to system performance due to the oxidation / scaling of the copper

plugging the strainers

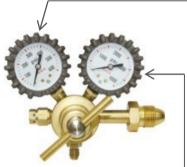
(Filter(s)).

filter fan 六 A heat exchanger fi de la Ifilte outdoor heat exchange 4-way valve B heat exchanger B3 1 filter B2 high pressure switch Note: Not available for discharge silencer C heat exchanger <u>C3</u> discharge temperature sensor filter D heat exchanger D3 gas -liquid separator te: Not available for 18K mode IDU ODU

Each outdoor unit will have at least two strainers(filter). This is to protect the metering device which is an electronic expansion valve (valve body with stepper motor).



✓ 600 PSI nitrogen regulator (min)



This is how much pressure is in the bottle





This is output pressure capabilities through the regulator

Carrier Enterprise requires at least a 500 psi dry nitrogen pressure test on <u>all</u> DLS system refrigerant piping. You may find some manuals stating a 150 psi pressure test, this is a cooling only system guideline and should technically still have a 500 psi pressure test.



LEAK TEST

Pressure test piping to 500 psig for 1 hour

Deep Vacuum Method

Or

TRIPLE EVACUATION:









Deep Vacuum Method

The deep vacuum method requires a vacuum pump capable of pulling a vacuum of 500 microns and a vacuum gage capable of accurately measuring this vacuum depth. The deep vacuum method is the most positive way of assuring a system is free of air and liquid water. A tight dry system will hold a vacuum of 1000 microns after approximately 7 minutes. (See Fig. 8.)

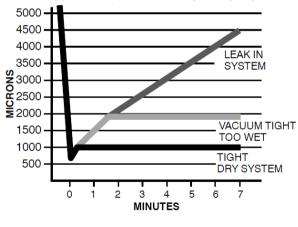


Fig. 8 – Deep Vacuum Graph

A95424

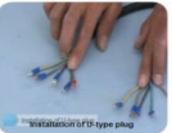




POWER WIRING

Inverter systems typically use 14 gauge stranded, 4-wire cable: one wire is green ground





CONTROL WIRING

Stranded wire only





ALL WIRING MUST BE SIZED PER NEC OR CEC AND LOCAL CODES

Wire Type

- 14/3 600v rated power or 14/4 Mini-split rated
- Typically, THHN or THWN



Not Acceptable: SJ Cord SO Cord SJO Cord SJOW Cord SJOOW Cord **BX** Cable Romex



- Verify **solid ground connection** (only connect if dedicated circuit)
- Always use **color coded** or **labeled wire**
- All wiring sizes, breaker sizes, disconnect requirements should be done in accordance with NEC, CEC or Local Code

DUCKT-14-04-CPK-50 DUCKT-14-04-CPK-100 DUCKT-STRIP-5-CPK-100 DUCKT-STRIP-5-CPK-250







ELECTRICAL

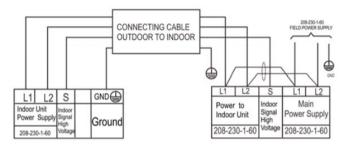
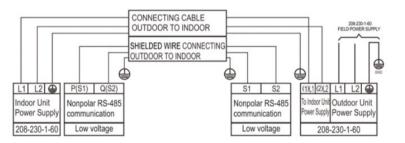


Fig. 29 - Connection Diagrams 09 to 24





mini split cable (L1,L2,S, ground)

14/3 power or 14/4 600v stranded

ODU to IDU

Power ODU to IDU 14/2 w/ground stranded: L1,L2, ground *Communication* 16awg stranded shielded





Products

DUCTED UNIT INSTALLATION

UP FLOW CONVERSION 9, 12, 18

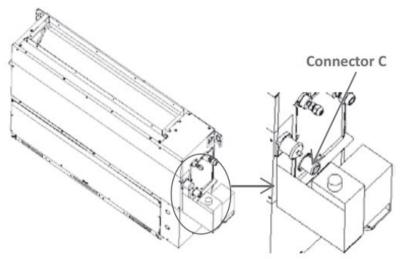
External Lift Pump

- Remove external pump
- Connect piping to connector C
- Jumper float switch CN5 with provided connector

UP FLOW CONVERSION 24, 36, 48, 58

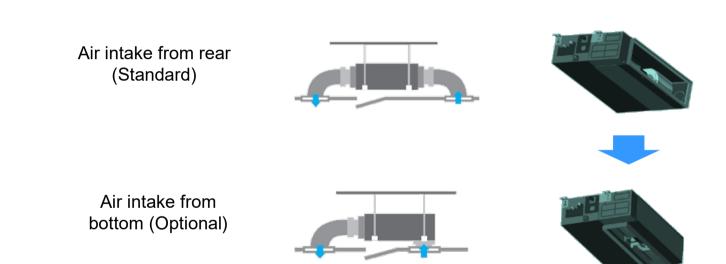
Internal Lift Pump

- Disable pump by unplugging "PUMP"
- Jumper float switch CN5 with provided connector
- Connect condensate to connector C





DUCTED UNIT INSTALLATION





DUCT DESIGN FOR DUCTED MODEL'S

The ductwork needs to be properly sized. A ductulator should always be used when sizing ductwork and the static pressure drop shouldn't exceed 0.1 in W.G. per 100ft. There is a chart below showing size and airflow recommendations.

Flex ductwork should be used sparingly; on size 9k and 12k flex duct should only be used to make the final connection to the register or grill. On the larger sizes no more than 10' of flex duct should be used.

When flex duct is used it should be pulled tight and properly supported. Ensure not to pinch the flex as this caused airflow restriction. Compression is the enemy of flex duct and can cause the static pressure loss to be up to 10X greater than hard duct. Flex duct should never be used for elbows or transitions.

Plenum boxes are okay, but take-offs from a plenum box should be done out the front rather than the top or bottom to avoid air direction change. Field accessories are available to offer multiple duct collar connections off the front of the unit similar to the one pictured below.



DUCT DESIGN FOR DUCTED MODEL'S

Let's start to break down the external static pressure on a ducted unit. External static pressure is measured by the worst case run on a ducted system. Typically this is the furthest duct run from the indoor unit, but depending upon the loss in a trunk line this may not be the case. Almost all systems will include the following in a single trunk line when calculating external static pressure:



Adding all of these together will provide the total external static pressure seen by a ducted unit. If this value exceeds the max external static pressure value than the design airflow cannot be delivered. Below are some typical ranges for properly sized grilles, ductwork, and fittings in in. W.G.

Supply/Return Grille	Supply/Return Plenum	Hard duct sized for airflow	Filters	Hard ducted Elbows and transitions
.0406 supply .0406 return	.02 supply .01 return	.08/100ft	.0815	.01 each



DUCT DESIGN FOR DUCTED MODEL'S

As you can see the pressure drop is anywhere from 4 to 5 times greater when the flex isn't properly stretched. This assumes the ductwork is properly sized and doesn't include elbows or pinching of the flex duct. Installations like the one shown below where an excessive amount of flex duct was used will ultimately result in a poorly preforming system that may not cool or heat properly.



Utilizing proper ductwork design and installation methods is crucial to ensuring that the system is delivering the correct airflow and space conditioning. Poorly design duct systems result in less efficient systems, customer complaints, and reduced system longevity.



INSTALLATION DUCTED UNIT

AUTOMATIC AIRFLOW ADJUSTMENT

- Must have dry coil. If not, run in FAN ONLY for 2 hours
- Make sure dampers are not shut and verify air filter
 - Turn indoor unit off
 - Press Copy
 - Press "+" or "-" to select AF
 - Press Confirm.
 - \square will flash during airflow adjustment
- Process takes 3-6 minutes. Once complete unit will stop
- Do not run with outside air is being introduced

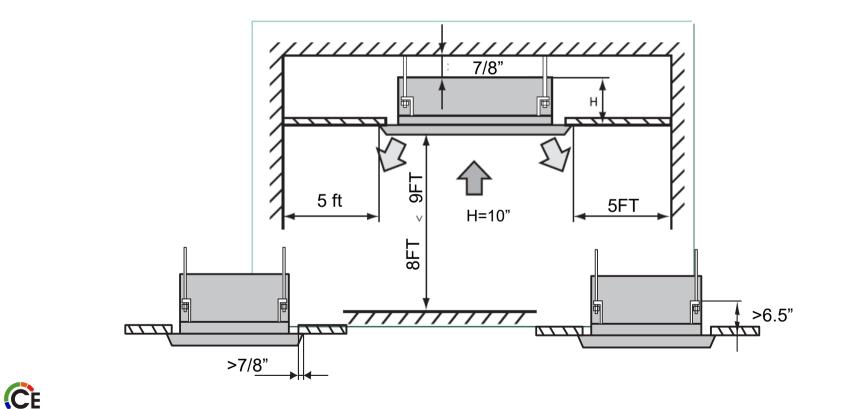


INSTALLATION AUTOMATIC AIRFLOW ADJUSTMENT

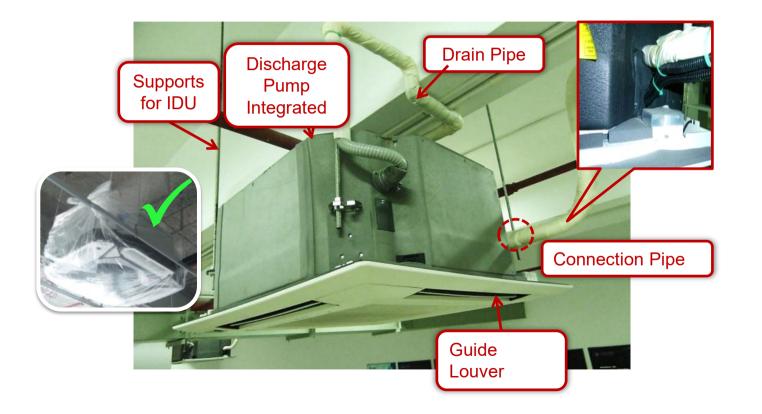




CASSETTE UNIT INSTALLATION



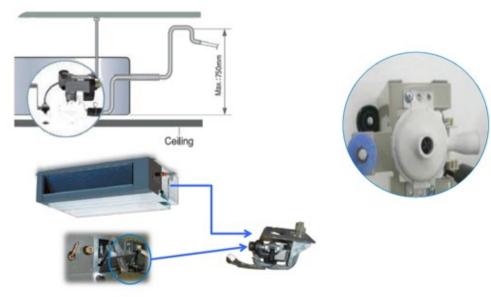
CASSETTE UNIT INSTALLATION





Cassette and Ducted Only

Built In Condensate Pump



• 30" Condensate Lift



INSTALLATION CASSETTE

TRIM PANEL TIPS

Align the indication marks " \bigtriangleup " on the decoration panel to the indication marks " \bigtriangleup " on the unit

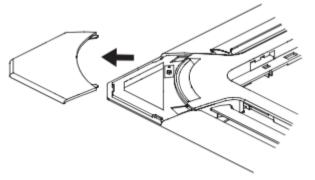
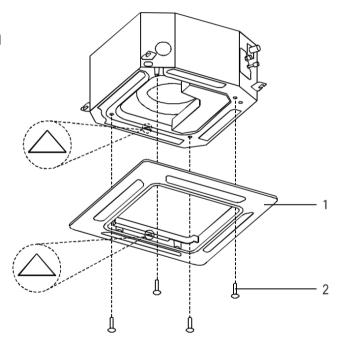


Fig. 22 - Removal of Covers (Sizes 24-48)





INSTALLATION CASSETTE - GRILL CONNECTION

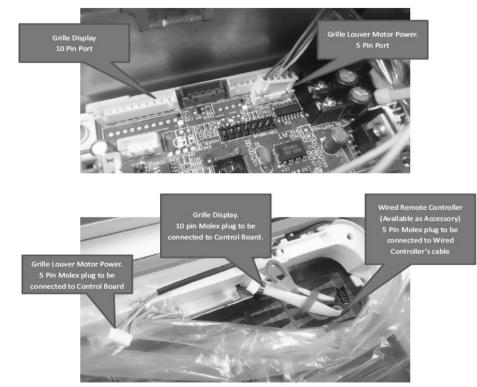
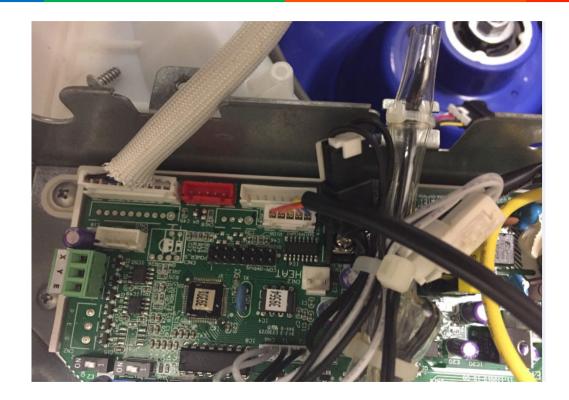




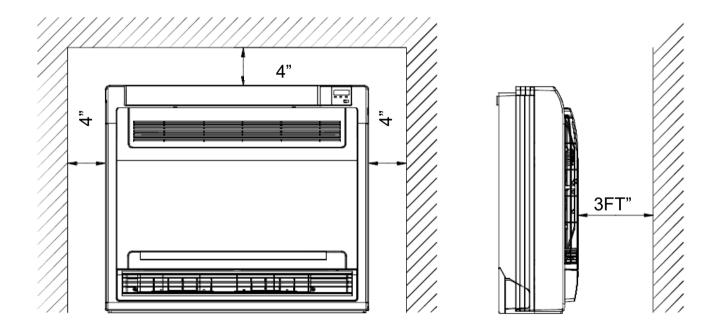
Fig. 30 - Panel Cassette

INSTALLATION CASSETTE – MBQB*C GRILL





FLOOR CONSOLE INSTALLATION





INSTALLATION CONDENSATE SWITCH INSTALLATION

Never break L2 or S for pumps or switches, disconnects or safety's L1 is the only wire that can be broken for switches, or you will get the E1 code.

On ducted models use the remote shutdown switch for external safety switches.





INSTALLATION 24V INTERFACE KIT(Hybrid application)

DUCTLESS 24V INTERFACE WIRING SINGLE AND MULTI-ZONE

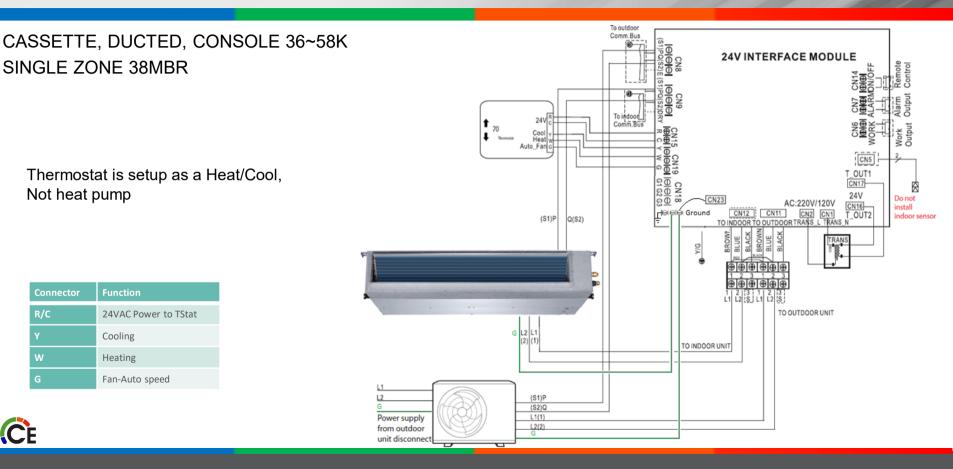
HIGH WALL 9~36K CASSETTE, DUCTED, CONSOLE 09~24K SINGLE ZONE 38MA*R MULTI-ZONE 38MGR

Thermostat is setup as a Heat/Cool, Not heat pump

24V INTERFACE MODULE HOROWAY WOOD HOROWAY WOOD HOROWAY WOOD HOROWAY WOOD HOROWAY WOOD HOROWAY WOOD HOROWAY WOOD HOROWAY WOOD HOROWAY HOROWAY WOOD HOROWAY WOOD HOROWAY HOROWAY WOOD HOROWAY	
L1 L2 G Power supply from outdoor unit disconnect	

ConnectorFunctionR/C24VAC Power to TStatYCoolingWHeatingGFan-Auto speed

DUCTLESS 24V INTERFACE WIRING LIGHT COMMERCIAL

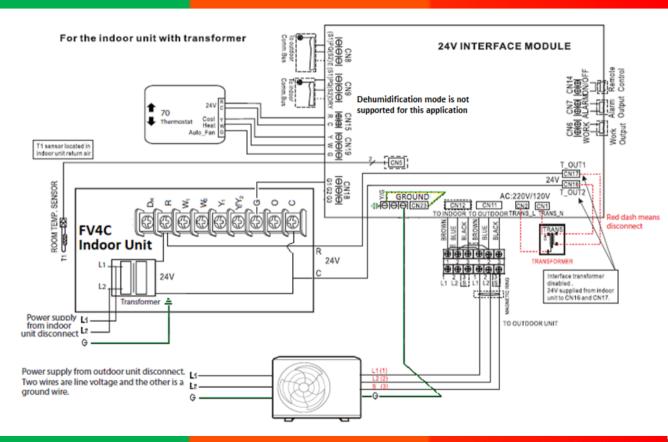


FV4 – 38MA*R PERFORMANCE WIRING DIAGRAM

Connection from W2 on a 2-Stage Heat thermostat to W2 on the FV4C Easy Select board is all that is needed with KFCEH Electric Heat accessory.

Thermostat is setup as a Heat/Cool, Not heat pump

Connector	Function
R/C	24VAC Power to TStat
Y	Cooling
W1	Heating – Heat Pump
W2	Heating – Electric Heat
G	Fan-Auto speed



DUAL FUEL – 24V INTERFACE WIRING DIAGRAM

Thermostat is setup as a Heat Pump system. The heat pump thermostat controls dual fuel switching.

Connect O from thermostat to a field installed SPDT relay on the 24v coil. This relay is energized based on cooling or heating mode of the 24v control.

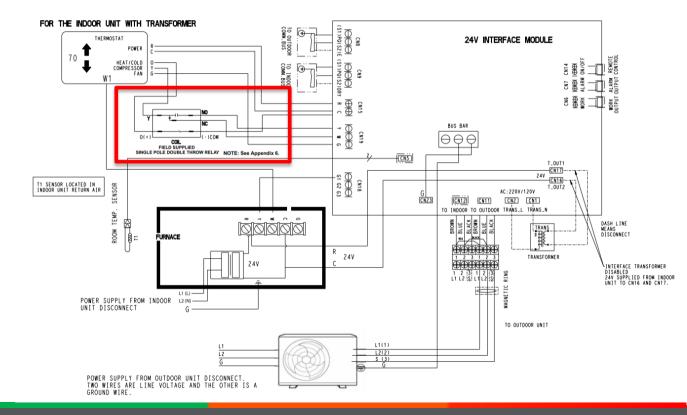
Y from the thermostat then connect to the (Common pole) of the NC/NO terminal. The NO terminal connects to Y of the 24v Interface

The NC terminal connects to W of the $24 \nu \ensuremath{\text{Interface}}$

This tells the DLS ODU to run in Heating mode or cooling mode. When Y is energized from the thermostat

W connects directly to the furnace

Connector	Function
R/C	24VAC Power to TStat
γ	Cooling /Heating based on O output
W1	Heating – Gas Furnace Stage 1
G	Fan-Auto speed



DUAL-FUEL – 24V INTERFACE WIRING DIAGRAM COOLING MODE

Thermostat is setup as a Heat Pump system. The heat pump thermostat controls dual-fuel switching.

Connect O from thermostat to a field installed SPDT relay on the 24v coil. This relay is energized based on cooling or heating mode of the 24v control.

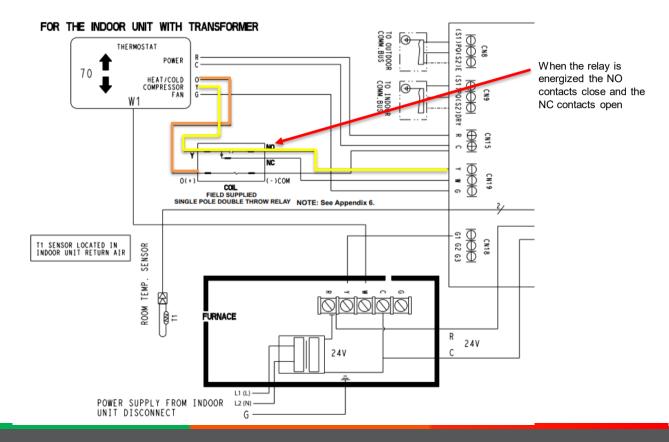
Y from the thermostat then connects to the (Common pole) of the NC/NO terminal. The NO terminal connects to Y of the 24v Interface

The NC terminal connects to W of the $24 \nu \ensuremath{\text{NC}}$ Interface

This tells the DLS ODU to run in Heating mode or cooling mode. When Y is energized from the thermostat

W from the thermostat connects directly to the furnace

Connector	Function
R/C	24VAC Power to TStat
Υ	Cooling /Heating based on O output
W1	Heating – Gas Furnace Stage 1
G	Fan-Auto speed



DUAL-FUEL – 24V INTERFACE WIRING DIAGRAM HEATING MODE

Thermostat is setup as a Heat Pump system. The heat pump thermostat controls dual-fuel switching.

Connect O from thermostat to a field installed SPDT relay on the 24v coil. This relay is energized based on cooling or heating mode of the 24v control.

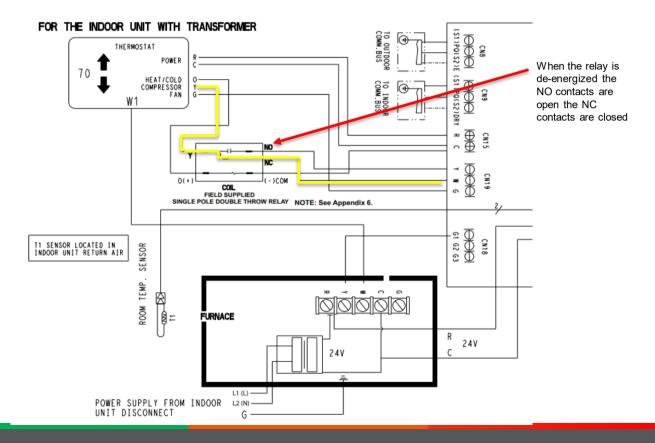
Y from the thermostat then connects to the (Common pole) of the NC/NO terminal. The NO terminal connects to Y of the 24v Interface

The NC terminal connects to W of the $24 \nu \ensuremath{\text{Interface}}$

This tells the DLS ODU to run in Heating mode or cooling mode. When Y is energized from the thermostat

W from the thermostat connects directly to the furnace

Connector	Function
R/C	24VAC Power to TStat
γ	Cooling /Heating based on O output
W1	Heating – Gas Furnace Stage 1
G	Fan-Auto speed



START UP

START UP HOW MUCH REFRIGERANT TO ADD?

PIPING REQUIREMENTS: Both refrigerant lines must be insulated separately.

	SYSTEM SIZE		18K	24K	30K	36K	48K
	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)
Piping	Max. Piping Length with no additional refrigerant charge per System (Standard Piping length x No. of Zones)	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	3/8*2	3/8*3	1/2*1+3/8*3	1/2 *2+3/8*2	1/2 *2+3/8*3
	Liquid Pipe Size	in	1/4 *2	1/4 *3	1/4 *4	1/4 *4	1/4 *5
Defrigerent	Refrigerant Type		R410A	R410A	R410A	R410A	R410A
Refrigerant	Charge Amount	Lbs (kg)	4.41 (2.0)	6.17 (2.8)	6.61 (3.0)	10.14 (4.6)	10.14 (4.6)

The minimum refrigerant line length between the indoor and outdoor units is 10 ft.

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





STEP 1 STEP 1 Apply power to the outdoor disconnect from the house electrical breaker panel



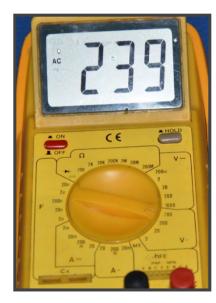
NOTE: When power is applied you should hear a series of clicking from the outdoor unit. These noises are the board and the electronic valves being energized.







EXAMPLE: 208/230 volt unit needs a supply power of 187-256 AC volts







STEP 3 Check power supply at the indoor unit Terminals L1 and L2. Power will read between 210-240 Volts AC



STEP 4 4-Check the power at the outdoor unit. There should be the same supply voltage to L1 and L2 as power supply to the outdoor unit.

NOTE: Be sure to check between Terminals L1 and L2 and not each leg to the ground





Turn the unit on with the remote by pressing the power button. It will be a large orange button

- The unit will beep to let you know it received the signal from the remote
- The display will come on and the air louvers will open







Set up the unit to one of the following modes:

- Cool (snowflake)
- Heat (sun)

After the indoor unit is turned on there will be a 30 second time delay for the outdoor until to come on

Wait 5 minutes for the compressor to reach full speed





Check the TD in "COOL". If the TD is between 20-30 degrees, your charge is correct (TD= Temp in – Temp out) Temperature Differential





Check the TD in "HEAT" mode.

If the TD is between 30-40 degrees, your charge is correct. You will see this when temperature is above 30° F.



STEP 9 Test the unit in both heating and cooling, if weather permits

- After selecting the mode, select the desired room temperature
- For testing purposes: lower the temperature all the way in cooling or raise it all the way for heating
- Set the fan to "High" by pressing the "Fan" Button



Document everything!! Start date, charge amount, refrigerant line set length, the more you document today, the easier it will be to troubleshoot in the future.



Single Zone & Multi-Zone Systems: Service Functions:

Take time to read and understand the Service Functions in <u>advance</u> before making changes.

- Turn **OFF** the **IDU** with the remote.
- Turn **OFF** power to **ODU** for **2** minutes then return power **ON**.
- Remove batteries from controller and wait for screen to clear.
- Within 30 seconds of replacing the batteries press (MODE + TIMER ON) or (MODE + FAN) for 5 seconds.

RG57F3(B)/BGEFU1, RG66B9(2H)/BGEFU1

DEFAULT VALUES OF INDOOR UNITS

Table 2—Default	Values of Indoor Units
-----------------	------------------------

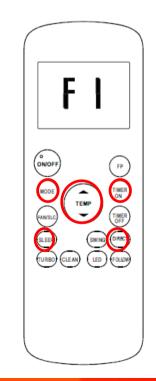
Description	Remote Code	High Wall	Cassette	Ducted	Floor Console
Auto-Start Function	F1	ON	ON	ON	ON
Heating Temperature Compensation	F2	2C	6C	6C	0C
Anti–Cold Air Function	F3	NORMAL	NORMAL	NORMAL	NORMAL
Indoor Fan Motor Speed Control after Set Temperature is Reached	F4	LOWEST SPEED	SET SPEED	SET SPEED	SET SPEED
Louver Angle Memory Function	F5	ON	N/A	N/A	N/A
Heating Only or Cooling and Heating Setting	F6	СН	СН	СН	СН
Cooling Temperature Compensation	F7	-2C	-2C	-2C	-2C
Refrigerant Leakage Detection	F8	ON	ON	ON	ON
Cleaning Filter Reminder	F9	OFF	OFF	OFF	OFF
Filter Replacement Reminder	E1	OFF	OFF	OFF	OFF
Lowest Temperature Setting	E2	17C	17C	17C	17C
Highest Temperature Setting	E3	30C	30C	30C	30C
Special Anti–Cold Air Function Setting	E4	N/A	N/A	N/A	N/A
Priority Setting of Heating or Cooling (Multi–Zone Systems only)	E5	Н	Н	Н	Н
Network Address Setting	E6	N/A	N/A	N/A	N/A
Capacity Code Selection	E7	N/A	N/A	N/A	N/A
Twins Setting	E8	N/A	N/A	N/A	N/A
Static Pressure Setting	E9	N/A	N/A	0	N/A



Single Zone & Multi-Zone Systems: Service Functions: (cont.)

- You are now in the **Service Function** mode and the remote display reads **F1**.
- 6. Use **TEMP UP/DOWN** to find desired value.
- 7. When value desired is displayed, press MODE.
- 8. To change value press **TEMP UP/DOWN**
- 9. Press **TIMER ON** to transmit and confirm the new value to the **IDU**. It will briefly display "**LL**".
- Repeat steps **6** thru **9** for other Service Function changes.
- When all changes are complete press **SLEEP** and **DIRECT** for **2** seconds until the display beeps.

RG57F3(B)/BGEFU1





- Remove the remote batteries and wait 1 minute before replacing. Wait an additional 30 seconds after display returns to set the temperature.
- The remote is back to normal function, and you can operate the system. No need to cycle power again!

Common service functions are:

- **F2** Heating Temperature Compensation
- **F7** Cooling Temperature Compensation
- F9- Cleaning Filter Reminder
- **E1** Filter Replacement Reminder
- **E9** Static Pressure Setting for ducted units

DEFAULT VALUES OF INDOOR UNITS

Table 2—Default Values of Indoor Units

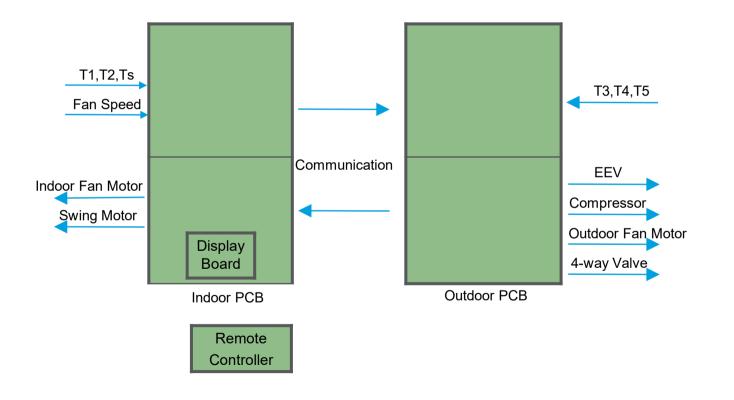
Description	Remote Code	High Wall	Cassette	Ducted	Floor Console
Auto-Start Function	F1	ON	ON	ON	ON
Heating Temperature Compensation	F2	2C	6C	6C	0C
Anti–Cold Air Function	F3	NORMAL	NORMAL	NORMAL	NORMAL
Indoor Fan Motor Speed Control after Set Temperature is Reached	F4	LOWEST SPEED	SET SPEED	SET SPEED	SET SPEED
Louver Angle Memory Function	F5	ON	N/A	N/A	N/A
Heating Only or Cooling and Heating Setting	F6	СН	СН	СН	СН
Cooling Temperature Compensation	F7	-2C	-2C	-2C	-2C
Refrigerant Leakage Detection	F8	ON	ON	ON	ON
Cleaning Filter Reminder	F9	OFF	OFF	OFF	OFF
Filter Replacement Reminder	E1	OFF	OFF	OFF	OFF
Lowest Temperature Setting	E2	17C	17C	17C	17C
Highest Temperature Setting	E3	30C	30C	30C	30C
Special Anti–Cold Air Function Setting	E4	N/A	N/A	N/A	N/A
Priority Setting of Heating or Cooling (Multi–Zone Systems only)	E5	Н	Н	Н	Н
Network Address Setting	E6	N/A	N/A	N/A	N/A
Capacity Code Selection	E7	N/A	N/A	N/A	N/A
Twins Setting	E8	N/A	N/A	N/A	N/A
Static Pressure Setting	E9	N/A	N/A	0	N/A





CE

Electrical Control System – How does it operate?





FUNCTION AND CONTROL THERMISTORS

Single Zone and Multi-zone ODU:

- Indoor room Temperature
- Evaporator Coil Temperature
- Condenser Coil Temperature
- Outdoor Air Temperature
- Discharge Temperature

Multi-zone & Light Commercial ODU:

• Evaporator Suction Temperature

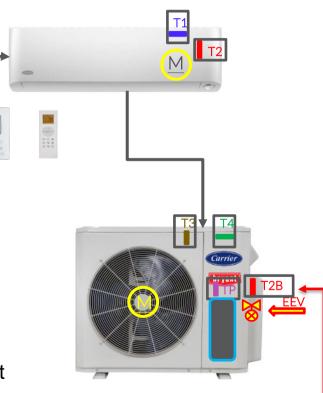


In ductless single and multi-zone system there are <u>multiple</u> thermistors that provide running temperatures back to the main board, so it knows how the system is operating.

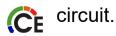
Abbreviation

Table 14 — Unit Element Abbreviations		
ABBREVIATION ELEMENT		
T1	Indoor room temperature	
T2	Evaporator Coil temperature	
Т3	Condenser Coil temperature	
T4	Outdoor ambient temperature	
Tsc	Adjusted setting temperature	
TP	Compressor discharge temperature	

With Multi-head systems, each IDU will have a T1 & T2 sensor, the outdoor unit will also have a T2B sensor for each refrigerant



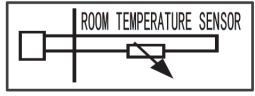
Tsc



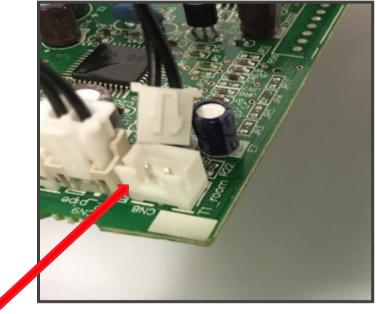
FUNCTION AND CONTROL INDOOR ROOM TEMPERATURE THERMISTOR



Wire Schematic Label

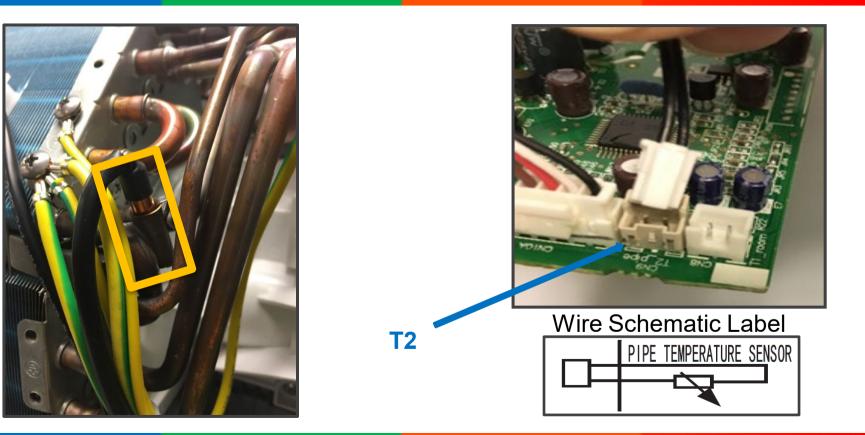


T1



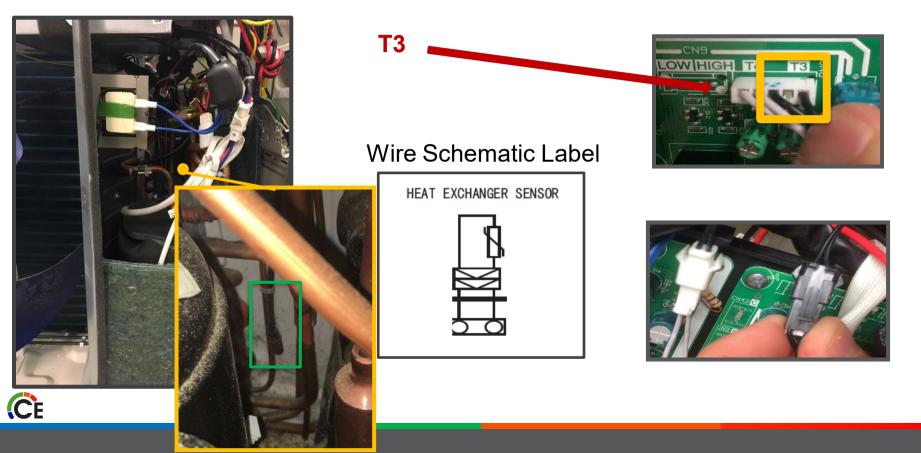
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FUNCTION AND CONTROL EVAPORATOR COIL TEMPERATURE THERMISTOR



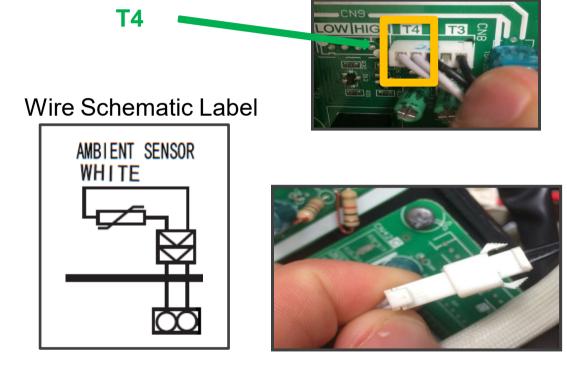
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FUNCTION AND CONTROL CONDENSOR COIL TEMPERATURE THERMISTOR



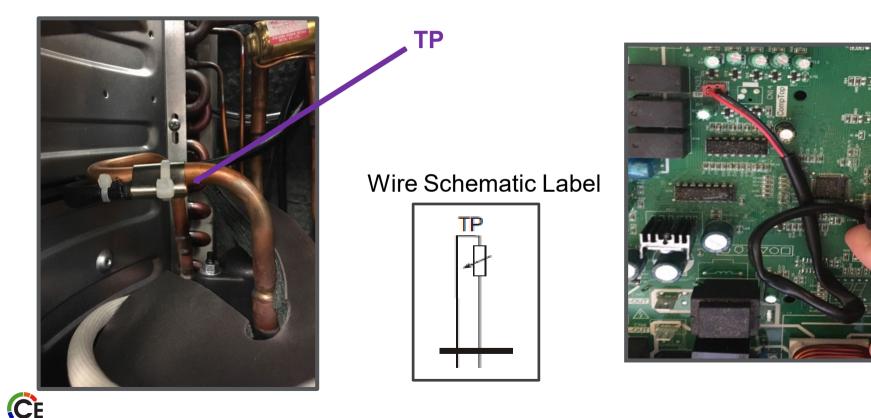
FUNCTION AND CONTROL OUTDOOR AIR TEMPERATURE THERMISTOR



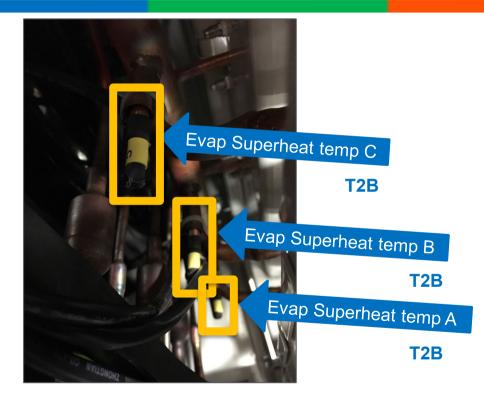




FUNCTION AND CONTROL COMPRESSOR DISCHARGE TEMPERATURE THERMISTOR



FUNCTION AND CONTROL EVAPORATOR THERMISTOR – MULTI-HEAD ONLY T2B





Take T2B - T2 temperature = superheat of the Evaporator. On average around 7SH

When there is only one malfunctioning temperature sensor, the air conditioner keeps working yet displays the error code, in case of any emergency use.

When there is more than one malfunctioning temperature sensor, the air conditioner stops working.



Sequence of Operation

Demand call from the wireless/ wired controller or Wi-Fi app initiated.

When a unit is set to COOL, HEAT or DRY mode, the Electronic Expansion Valve (EEV) is initialized first then opens to a target angle after the compressor starts.





In ductless single and multi-zone system there are <u>multiple</u> thermistors that provide running temperatures back to the main board so we know how the system is operating and can control it.

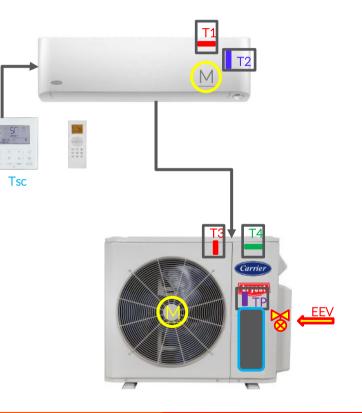
EEV is adjusted and opens to a target angle <u>before</u> the compressor starts.

Compressor and the outdoor fan <u>start</u> operation <u>only after</u> the EEV is initialized first.

Abbreviation

Table 14 — Unit Element Abbrevia	ations
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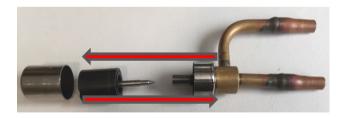


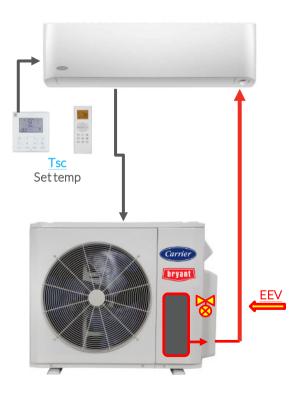


After the compressor is initiated and the EEV opens to the target angle.

The main board receives Indoor Unit (IDU) coil temperature, discharge temperature and the capacity request information.

The compressor changes speed and the EEV pulses open or close to meet the capacity request of the IDU.



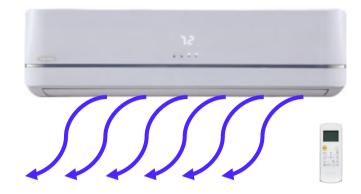




COOL & HEAT Mode: Indoor Fan Running Rules

The indoor fan can run in the MANUAL or AUTO mode. If no factory settings have been changed most of the time when the fan is in AUTO mode, the speed is determined by comparing room temperature to set point.

When set point is satisfied all IDU fan speeds are reduced and are <u>not de-energized</u>.



In **COOL** and **HEAT** mode the indoor fan are in continuous operation, users can select speeds: HIGH, MEDIUM, LOW and AUTO or Mute.

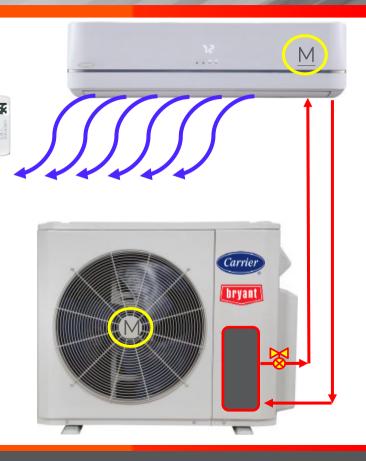
Compressor stops when indoor temps reach set temp, indoor fan runs at minimum speed or setting speed.



HEAT Mode: Indoor Fan Running Rules

When the indoor unit coil temperature is low, the **anti-cold air function** starts and the indoor fan motor runs at a <u>low speed</u> and the speed <u>cannot be changed</u>.

When the temperature is lower than the setting value, the indoor fan motor stops.





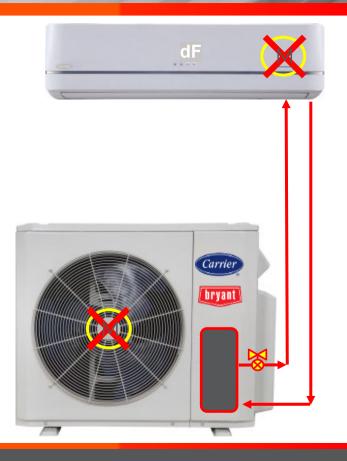
FUNCTION AND CONTROL DEFROSTING MODE

HEAT Mode: Indoor Fan Running Rules

Defrost Cycle:

The compressor keeps running to maximize the heat transfer surface area available for defrost operation even if IDU's are off or in standby mode before the defrost cycle on a Multi-zone system.

During the **Defrost Cycle**, the compressor keeps running however the IDU and ODU <u>fan motor may</u> <u>stop</u>.





Outdoor Fan Control: HEAT and COOL Mode

In normal operating conditions, the system chooses fan speed according to T3 and T4 ambient temperature sensor. For different outdoor units, the fan speeds differ. Refer to the Service Manual for details on ODU Fan running rules.



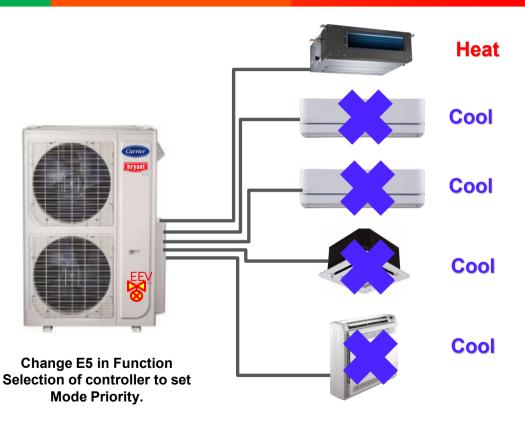


Multi-zone

HEAT priority is standard on a Multi-zone system. This controls the operation mode for the remaining indoor units connected to the same outdoor unit.

All unit must be set to COOL or FAN for system to cool the space.

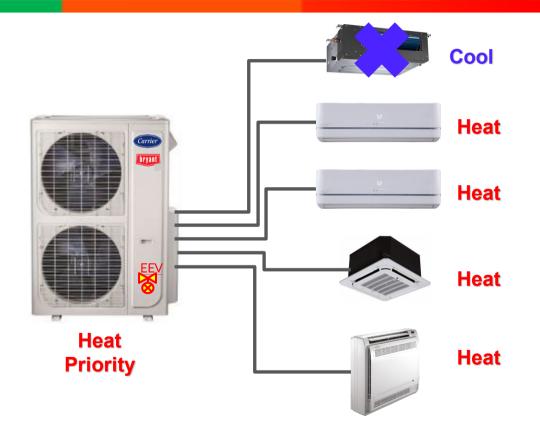
In COOL mode if any IDU in the system is set to the HEAT mode, the <u>system</u> switches to HEAT if Mode Priority is set to HEAT.





In HEAT mode if any IDU is in COOL mode, then it will cause Mode confusion "- -" since HEAT is the standard primary mode.

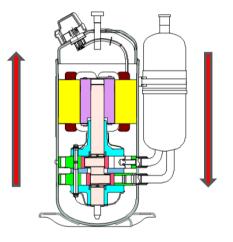
All energized IDU's are monitored and the position of the EEV is <u>adjusted</u> to ensure each IDU has the appropriate amount of refrigerant to <u>maintain required</u> <u>superheat</u>.

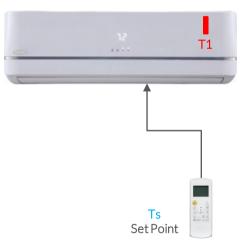




When system is in COOL, HEAT or DRY mode, the compressor speed varies by comparing the indoor air temperature with the set point.

Indoor Room Temp

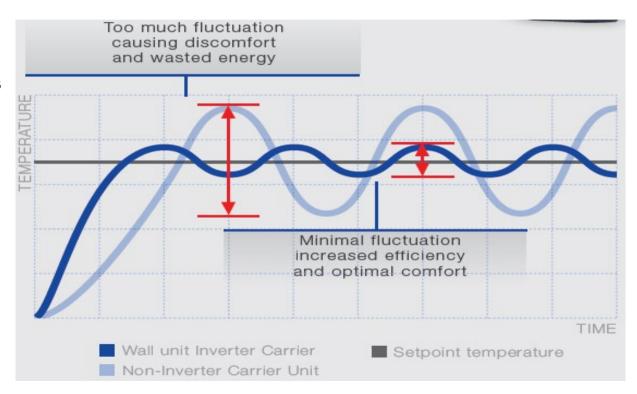




To maintain the greatest comfort possible the compressor will continuously adjust speed (keeping the compressor running if possible).



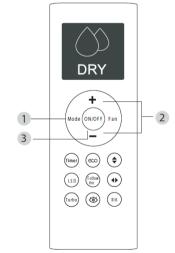
The goal of Carrier Ductless is to operate the compressor at the desired mode and drive the room temperature to the desired state as efficiently as possible. Exceptions will be the safety parameters.







With smart sensor technology, not only can the system detect the temperature, but it can also detect humidity level of the room. Using the wireless controller, users can customize the humidity level from 35%-85% (30%-90% using the Wi-Fi[®] application)



- 1. Press **MODE** to select the **DRY** mode.
- Set your desired temperature using Temp + or Temp -.
- 3. Set the desired room humidity using **RH** to a range of 35%~85% in 5% increments.



BUILT-IN OCCUPANCY SENSOR



When you are away for 30 minutes, the system automatically lowers the frequency to save energy When you are away for 2 hours, the system automatically shuts down When you return to the room, the system automatically turns ON

Note: This function is disabled when the occupancy sensor in is OFF or the light sensor detects the light in the room is turned off.



BUILT-IN OCCUPANCY SENSOR



Wind flow away from people

Wind flow follow people

Stronger airflow when more people are in the room Gentler airflow when less people are in the room

The occupancy sensor can detect activity in the room and adjust the horizontal angle of airflow to implement the **Wind Flow Follow People** feature and **Wind CE**Flow Away from People feature.

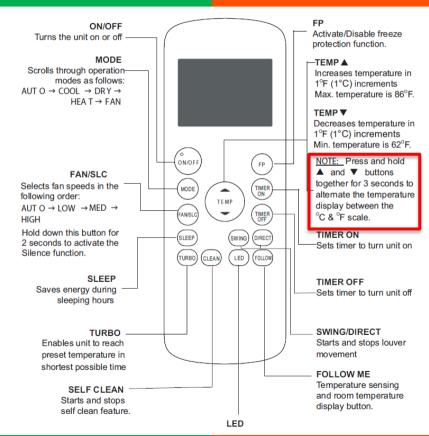
BUILT-IN OCCUPANCY SENSOR



The system has a built-in light sensor to detect the space's ambient brightness. When light in the space is turned off, the display will dim down gradually, saving energy and offering you additional comfort.



FUNCTION AND CONTROL GENERAL CONTROLS





FUNCTION AND CONTROL GENERAL CONTROLS

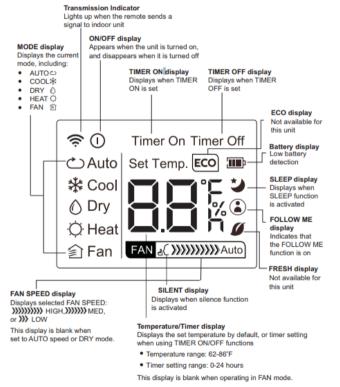




Fig. 5 – Unit Display

FUNCTION AND CONTROL SELF CLEAN MODE

The Self Clean function will dry the indoor coil to prevent organic growth.

- Press (I) to activate/deactivate this function.
- Runs for 30 minutes, then deactivates
- Self Clean function enables drying the indoor coil after Cool or Dry mode to help prevent organic growth.
- Press CLEAN button in Cool(including cooling in auto mode and forced cooling mode) or Dry mode to enable self clean function, "SC" will show in indoor display.

ON/OFF

MODE

FAN/SLO

SLEEP

(TURBO)

TIMER

DIRECT

LED) (FOLLOW

TE MP

- Under self clean function, the unit will run fan mode for 13 minutes at low speed, then run heating mode for 1 minutes at low speed, then run fan mode for 2 minutes at low speed, finally the unit will turn off.
- Under clean processing, *no response from other buttons* besides the CLEAN button and OFF button. Hit one of those buttons to exit the process.



The Silent Mode function reduces IDU and ODU noise.

- Hold of for 2 seconds to activate/deactivate
- Decrease fan speed
- Decrease compressor speed
- May result in insufficient capacity





FUNCTION AND CONTROL LED LIGHT

The LED light function turns on/off the IDU display.

 Press the
 button to turn the display light on and off



ON/OFF

MODE

FAN/SLO

SLEEP

(TURBO) (CLEAN)

TE MP

FP

DIRECT

LED FOLLOW



Turbo mode will try to satisfy set point as quick as possible.

- Press wood to activate/deactivate
- Indoor fan is fixed at Turbo fan speed (anti-cold-air function is still valid in heating mode)
- The unit will automatically quit turbo mode:
 - 30 minutes runtime
 - Power off:
 - Mode change





Press (to activate/deactivate

Available in cooling, heating and auto mode.

In cooling mode, the setpoint will increase 2° F, every hour for 2 hours (not to exceed 85° F). Indoor fan is fixed at low speed.

In heating mode, the setpoint will decrease 2° F, every hour for 2 hours (not to exceed 62° F). Indoor fan is fixed at low speed, and anti-cold-air function has priority.

In auto mode: the first hour the system remains in auto mode, the second hour heating set point will decrease by 2° F and cooling set point will increase by 2° F or If the system is in between those 2 temperatures the system remains in fan mode.

After 7 hours in sleep mode, the system will return to original set point and fan speed.





The Follow Me function allows the unit to sense temperature from the wireless controller.

- Sends temperature ever 3 minutes
- If IDU doesn't see communicated value within 7 minutes, follow me is deactivated.

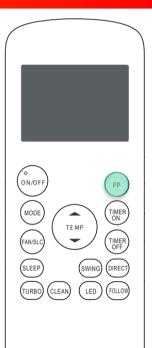


FUNCTION AND CONTROL FREEZE PROTECTION

Freeze Protection also known as 46° F (8° C) setback.

Unit must be in "HEAT" mode.

- Indoor unit displays "FP"
- Unit operates at high fan speed
- Set point 46° F (8° C) minimum heating setpoint is 60° F
- This mode can also be deactivated by pressing the "On/Off", "Sleep", "Mode", "Fan", or either of the "Temp" buttons





If *is* pressed too soon after unit stops, the compressor will not start for 3 to 4 minutes. This limits frequent compressor cycling and allows equalization.



If the unit is in HEATING mode, there is a delay when the fan starts. The fan starts only after the coil is warmed up to prevent cold air blowing on occupants.





If the power fails while the unit is operating, the unit stores the operating condition, and it will start operation automatically under those conditions when the power is restored.

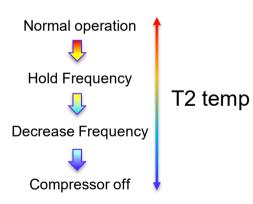
"Follow Me" will not restart if power is cycled.



Evaporator Temperature Protection

The evaporator anti-freezing protection in **COOLING** mode.

- Monitors T2 sensor. If lower than 32°F the compressor will stop.
- Compressor will restart when T2 is above 41°F
- If IDUs are freezing on multi-split, check for cross wire



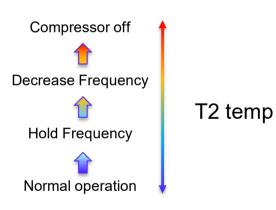
T2 > 44.6° F, free from the frequency limit and will run at target frequency T2 < 39° F, start to limit frequency, then decrease frequency one grade every 1 min Frequency will not increase if T2 is between $39^{\circ}-43^{\circ}$ F T2 < 32° F for 10s, compressor stops When T2 > 41° F, the compressor restarts



Evaporator Temperature Protection

High temperature protection for the evaporator in **HEATING** mode.

- Monitors T2 sensor. If higher than 145°F the compressor will stop.
- Compressor will restart when T2 goes below 118°F



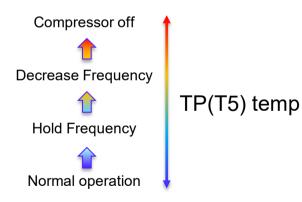
If T2 > 145° F in heating mode, the corresponding indoor capacity demand will be reduced to zero and will not resume operation until T2 < 118° F



Compressor Temperature Protection

Compressor Discharge protection

- Monitors the TP(T5) sensor. If higher than 239°F the compressor will stop.
- Compressor will restart when TP(T5) goes below 194°F



 $TP(T5) < 230^{\circ}$ F, free from the frequency limit and run at target frequency $TP(T5) > 230^{\circ}$ F, start to limit frequency, then decrease frequency one grade every 2 mins $TP(T5) > 239^{\circ}$ F for 10s, compressor stops When TP < 194° F, compressor restarts



FUNCTION AND CONTROL EMERGENCY MODE

FORCED AUTO & COOLING MODE

Tap manual button once for forced auto mode. Hold manual button again for 5 seconds to force cooling mode.

Operating Rules

- Forced auto mode set point is 75°F
- Forced cooling sets the compressor speed to F2. IDU runs in the "breeze" mode. After 30 minutes, unit will shift to forced auto.





Refrigerant Leak Detection Function



• The indoor unit will show error code "EC" and stop automatically when refrigerant leakage is detected. This function can better protect compressor being damaged by high temperature due to refrigerant leakage.



Protection: High Pressure

• When the discharge pressure is higher than 638 PSI, the outdoor will stop, and when the pressure is lower than 464 PSI, the outdoor will restart.

Protection: Low Pressure

• When the suction pressure is lower than 20 PSI, the outdoor will stop, and when the pressure is higher than 44 PSI, the outdoor will restart.



End of Deck 1, Change to Deck 2

Any Questions?







Heating & Cooling Systems