

Carrier Bryant VRF Installation Checklist

Site Name:

Address:

City, State:

Zip:

Contact:

Phone:

**Carrier Enterprise
Technical Services**

**NOTE: Please fill one checklist out per system to be started up and commissioned.
Check boxes and fill in fields if applicable.**

Heat Pump System:

Heat Recovery System:

Qty. of Indoor Units:

Qty. of MDC Boxes:

Total Number of VRF systems to be commissioned at time of request:

Centralized control type. If two, list both.

Use separate Centralized Control Checklist for startup request.

Local Controls Used:

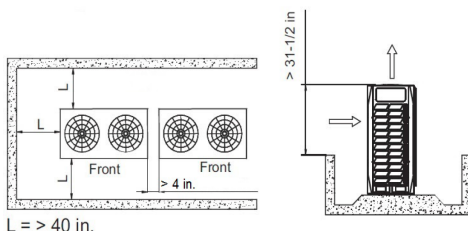
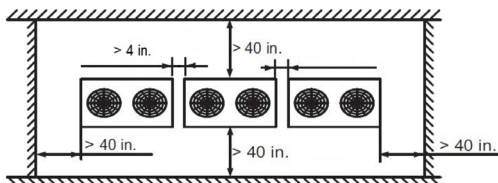
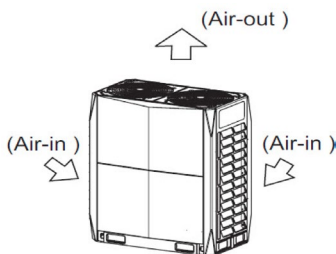
Select Type and qty.

Prior to startup we recommend you walk the job site referencing the Refrigerant Piping and Control Wiring layout (from Selection Software), supplied by Carrier Enterprise. Note any changes on the selection software drawing and return the drawing to the designer for review. This is necessary to verify that any changes will not break the piping rules and/or alter the corrected capacity of the equipment. This is also what we will use to calculate the additional refrigerant charge for the system. After verification, a revised drawing will be provided. It is important to have the additional refrigerant charge calculation before the end of the evacuation process, see Section 9.3. Please plan accordingly.

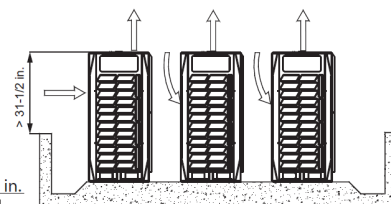
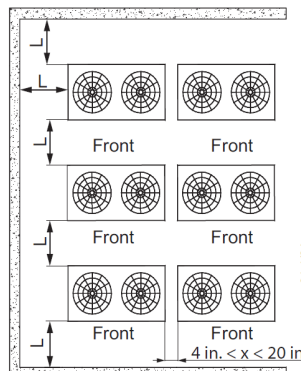
1.1 Outdoor Unit – Placement:

Clearances - Enter actual measurements below:

Front	Inches	Back	Inches
≥ 40" service & air flow clearance.		≥ 40" service & air flow clearance.	
Sides	Inches	Top	Inches
≥ 4" service & air flow clearance.		> 80" clearance to any obstacle above unit.	
Between Unit(s):	Inches		
Recommend 8", Can be as little as 4".			
Wall height around unit (If within 40" of unit) – height	Inches		



More than two rows



Contractor:

Address:

City, State:

Contact:

Zip:

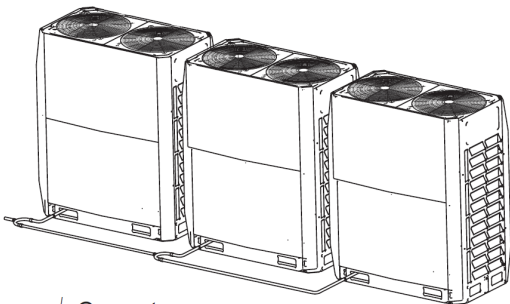
Phone:

1.2 Outdoor Unit – Placement Heat Pump Only:

If Heat Recovery skip to Section 2.

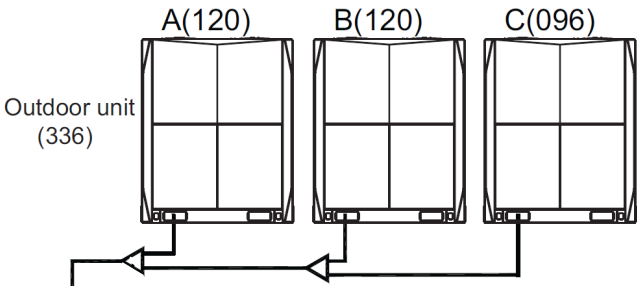
Heat Pump systems with more than one outdoor unit is sequenced from the highest capacity to the lowest.

Confirm all units are on the same level. Yes No



✓ Correct way

- If there is an obstacle above the outdoor unit, leave a space of 80" or more to the top end of the outdoor unit.
- If there is a wall around the outdoor unit, make sure that its height does not exceed 31.5".



Header Unit (A):

Follower Unit (B):

Follower Unit (C):

- The Header unit (A) is ≥ the capacity of the Follower unit (B)
- The Follower unit (B) is ≥ the capacity of the Follower unit (C)

2. Outdoor Units – Mounting:

The outdoor unit(s) are level.

The mounting base fully supports the unit across front and back.

All four anchor bolts have been installed and secured.

There is adequate water drainage, for defrost operation.

The mounting base height is more than the expected snow level.

Are the refrigerant lines installed underneath the outdoor unit.

If YES, enter the mounting base height. inches (Recommended > 8" clearance)

Yes

No

Yes

No

Yes

No

Yes

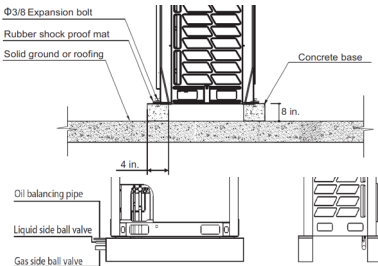
No

Yes

No

Yes

No



3. General Refrigerant Piping:

There are NOT any added refrigerant components - driers, sight glasses, solenoid valves, etc.

Full port ball valves may be used for future component isolation during service. Were ball valves installed.

If yes, verify all ball valves are in the open position.

Ball valves are installed in the correct configuration per their Installation instructions.

Nitrogen was purged through the system during all brazing.

Enter the pressure setting used to purge nitrogen.

Yes No

Yes No

Yes No

Yes No

Yes No

PSI

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3. General Refrigerant Piping (cont.):

- 15% brazing rods must be used for all brazed joints.
- During brazing, a wet cloth was wrapped around valves.
- A R-410A rated flaring tool to form all flare connections.
- A back up wrench and torque wrench were used on all flare fittings.

Yes

No

Yes

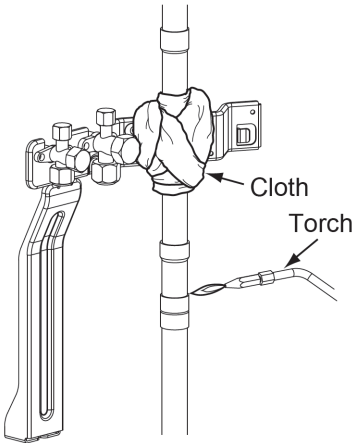
No

Yes

No

Yes

No



OUTSIDE DIAMETER (in.)	RECOMMENDED TORQUE (ft-lb)
1/4	15
3/8	26
1/2	41
5/8	48

4. Heat Pump Only – Combined Unit Y-Shaped Branching Joint Kits:

Heat Recovery systems skip to Section 5.

Branching Kits for Heat Pump:
40VM9000021 - 40VM9000022
Y Branches mounted
Horizontal $\pm 10^{\circ}$.

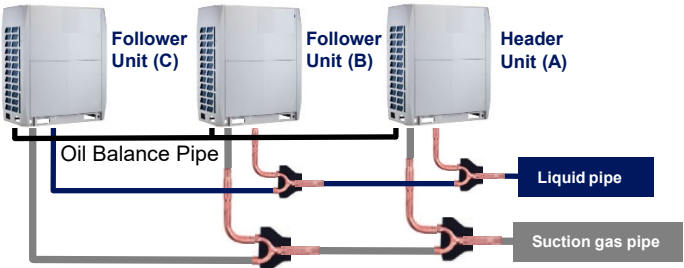
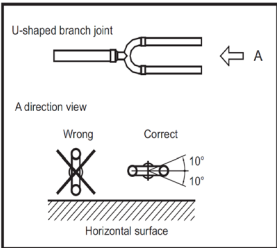
Yes

No

Y Branches are not vertical.

Yes

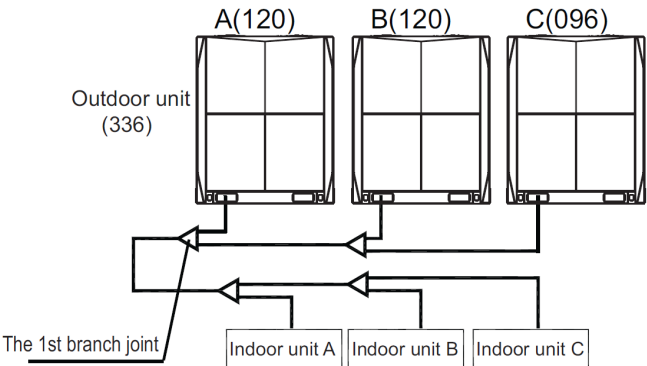
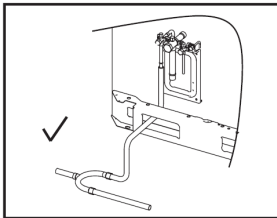
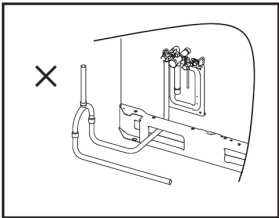
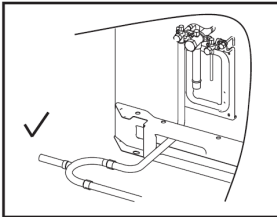
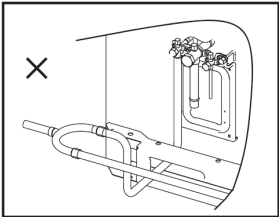
No



Confirm the Y branching piping matches allowable designs from the Installation Manual.

Yes

No



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5. Outdoor Unit – Refrigerant Piping:

Piping can exit the unit from the FRONT or BOTTOM .
(Bottom recommended on all installs, best for future service access)

Factory supplied rubber piping gasket installed.

Field installed refrigerant lines are connected per the outdoor unit Install Manual.

Field installed refrigerant lines are within the allowable length & height differences.
Outdoor Unit Install Instructions, H/P pages 14 thru 18, HR pages 15 thru 18.

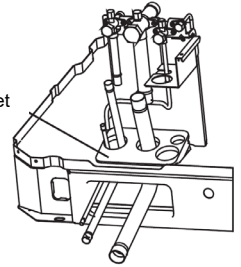
The field installed refrigerant line sizes and lengths, match the Selection Report*

*If at anytime there is a change in the actual piping installation from the design layout, it must be reported back to the designer for verification.

All refrigerant lines are insulated separately with min. 3/4" insulation.

Check local code, some municipalities require thicker insulation.

Rubber Gasket



Yes	No
Yes	No
Yes	No
Yes	No
Yes	No

6. Multiport Distribution Controller (MDC) – 40VMD006-016:

Heat Recovery Systems Only – Heat Pumps Systems go to Section 7.

Unit is located in an area where the operating sound will not be objectionable.

Unit is hanging in the horizontal position.

Clearance over unit (24" recommended).

Unit is installed with proper clearances and service access.

The field installed refrigerant line sizes and lengths to the MDC match the Selection Report.

If at anytime there is a change in the actual piping installation from the design layout, it must be reported back to the designer for verification.

Nitrogen was purged through the system during all brazing.

A wet cloth was used during brazing to protect the unit's internal components from overheating/damage.

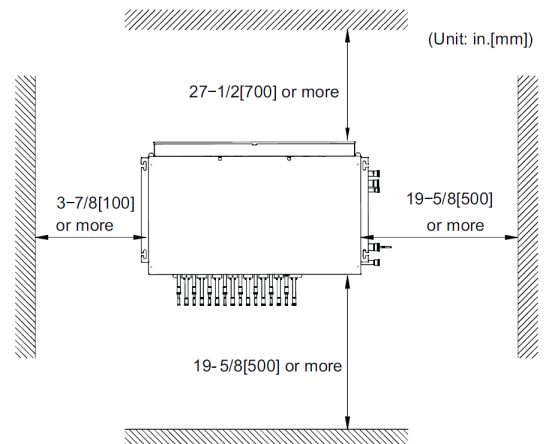
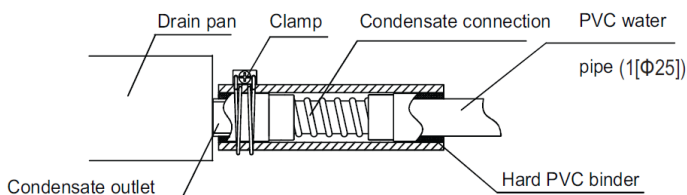
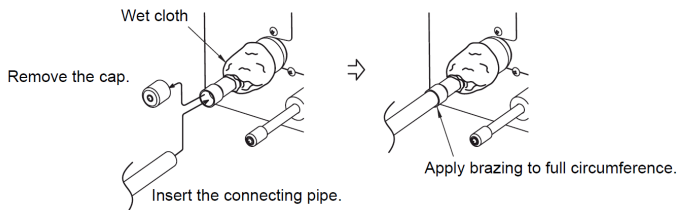
Refrigerant piping and connectors were installed correctly per the unit's Installation Manual.

Condensate drain is connected per the Installation Manual.

Yes	No
Yes	No
	Inches
Yes	No

Yes	No
Yes	No
Yes	No
Yes	No

Be sure to wrap the pipe with wet cloth when applying brazing.



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7. Indoor Unit – Mounting:

All indoor unit locations have been verified by Model/Size, site plans & Selection Report.

Yes No

All indoor units are mounted and secured per their installation instructions.

Yes No

All indoor units are level.

Yes No

8. Refrigerant Piping – Y Branching Joints:

Branching Joints Heat Recovery – 40900041, 042, 043

Branching Joints Heat Pump – 40900031, 032, 033, 034, 035

Heat Recovery kits will have three Y's, Heat Pump will have two.

Horizontal within $\pm 10^\circ$ per instructions.

Are there any "Ys" installed vertically.

Installed with single end always towards outdoor unit.

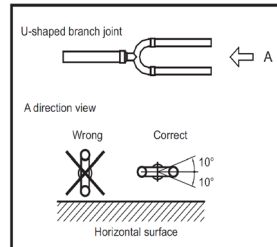
Y Joints are supported before and after.

Sockets, joints and insulation were installed per instructions.

"Y" joints are the correct size and match the locations as shown on the Selection Report.

Maintain a minimum distance of 20" between branching joints, headers, elbows and equipment.

Recommend horizontal runs to be 3 times that of the vertical when traps cannot be avoided.



Yes	No
Yes	No
Yes	No
Yes	No
Yes	No
Yes	No
Yes	No
Yes	No

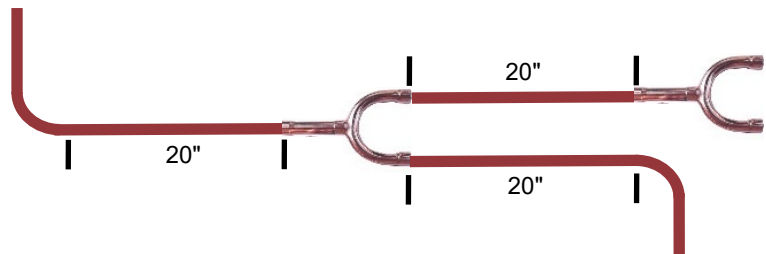
<Gas / Liquid side>

Install the branching pipes horizontally or vertically to make the flow split evenly.

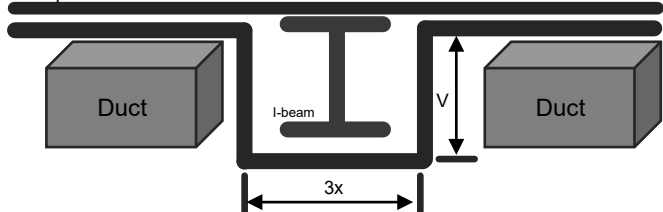


Vertical

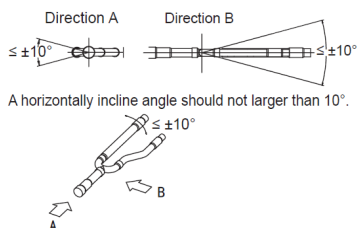
Installed with single end always towards outdoor unit.



Example:

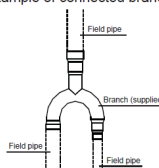


Horizontally Placing Branch Pipe

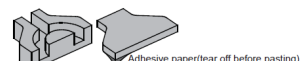


Heat insulation

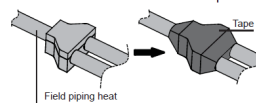
Be sure to insulate the branches against heat.
1) Example of connected branch.



2) Use the supplied heat insulation material to insulate the branches against heat.



3) Apply the heat insulation material and seal all connections with tape.





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9.1 Refrigerant Piping – Leak Check:

If Heat Recovery System connect to all three main refrigeration stop valves at outdoor unit.	Yes	No
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If Heat Pump System connect to the two main refrigeration stop valves at outdoor unit.	Yes	No
--	-----	----

Only use Dry Nitrogen.	Yes	No
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Enter indoor temp/outdoor temps during 24hr Pressure Test start: Inside °F Outside °F

Pressure tested for 24hrs. @ 540PSI.	Yes	No
--------------------------------------	-----	----

If not 540PSI enter your final pressure test. PS

If the pressure test resulted in a loss of pressure, locate and repair the leak(s). Then re-test as above while taken in to account the following. Compare temperature differences above - there could be an approximate 2.6 PSI difference for every 1°F of temperature change. i.e. - If there was a 10°F temperature rise from start to end, the pressure would have increased approx. 26 PSI. Likewise, if there was a 10°F temperature fall the pressure would have decreased by approx. 26 PSI.

9.2 Refrigerant Piping – Evacuation:

Note 1: If power was applied to indoor, MDC or outdoor units, you must use Evacuation mode, see Section 14.

Note 2: Do NOT open service valves until the deep vacuum of 500 microns or below has been achieved and the additional charge has been added! See Section 9.3 for additional charge instructions.

If Heat Recovery System connect to all three main refrigeration stop valves at outdoor unit.	Yes	No
--	-----	----

A micron gauge was used.	Yes	No
--------------------------	-----	----

Verify that the micron gauge is connected at a point where it can read the system's pressure at all times during this process, even when the vacuum pump is not running during the hold test.

All refrigeration piping has held below 500 microns for 1 hour. Enter final reading. Yes No

Enter Triple Evacuation readings and times below.

Step 1	Microns	Day/Time	Length of Time
--------	---------	----------	----------------

Step 2	Microns	Day/Time	Length of Time
--------	---------	----------	----------------

Step 3	Microns	Day/Time	Length of Time
--------	---------	----------	----------------

Vacuum was broken with additional refrigerant charge.	Yes	No
---	-----	----

If not with what, please explain.

9.3 Refrigerant Piping – Additional Refrigerant Charge:

Do NOT open unit service valves until additional refrigerant charge has been calculated, added and recorded. The selection software calculates the additional refrigerant charge based on the refrigerant piping layout. If at anytime there is a change in the actual piping installation from the design layout, it must be reported back to the designer for verification.

Has the updated copy of Refrigerant Piping & Wiring Layout been sent into CE.	Yes	No
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If not send your revised version to your sales representative for updating.

Enter additional refrigerant charge amount - R410A. Lbs. Oz.

Above is the preferred method of determining the additional refrigerant charge. Refer to the outdoor unit installation instructions for an alternate method. If the alternate method is used, please use the notes page of this document to show how the above amount was calculated. With the system at 500 microns or less the majority (or all) of the additional refrigerant charge can be added at this time breaking the vacuum.

Digital refrigerant scale used to weight in the additional charge on the liquid side of the system.	Yes	No
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Was the total additional charge added at this time. Yes No

If NO, enter the amount of charge added at this time. Lbs. Oz.

The remainder of the additional charge can be added during the system start up process.

Record additional charge amount inside the outdoor unit using a permanent marker.

Open the unit service valves - Suction, Discharge, Liquid and Balance (if combined units).	Yes	No
--	-----	----

10. Refrigerant Piping – Insulation:

All refrigerant lines are insulated individually.

Yes No

Pipe insulation has temperature rating > 248°F and $\geq 3/4$ " wall thickness.

Yes No

Check local codes where job site is located, some areas by code require 1.5" thickness or greater.

Indoor unit line connections are insulated individually.

Yes No

Heat insulators supplied with branching "Y" joints are installed per their instructions.

Yes No

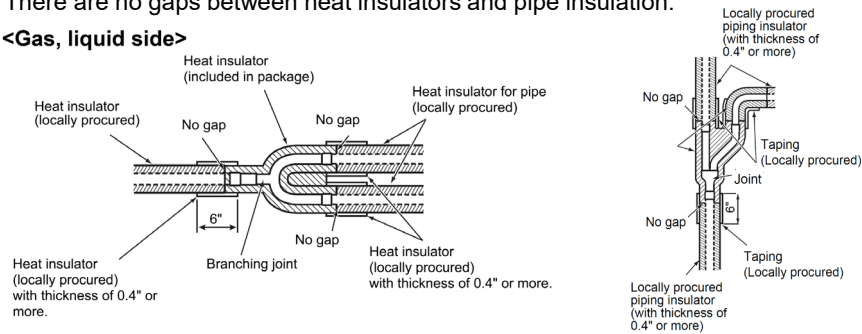
Heat insulators supplied with indoor units are installed per their instructions.

Yes No

There are no gaps between heat insulators and pipe insulation.

Yes No

<Gas, liquid side>



11. Indoor Unit – Condensate Drain Lines:

The following units either have an internal pump or the drain is located on the positive side of the blower.
High Wall; Compact 4 Way Cassette; 4 Way Cassette; Under Ceiling - Floor; Slim Duct; Medium Duct; High Static Duct (024~054kbtu - ONLY); Outside Air and Floor Console Units - Do Not require an external condensate trap.

Verify there are no external traps on the above indoor listed units.

Yes No

Condensate lift pump accessories are available for most indoor units.

Were any accessory pumps required for this application.

Yes No

If YES, verify these accessories have been installed per their instructions.

Yes No

Are there condensate pump safety switch(s) wired to the indoor unit.

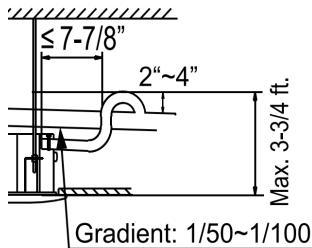
Yes No

Cassette's; Slim, Medium & High Static Ducted (024-054) units have a built-in condensate lift pump.

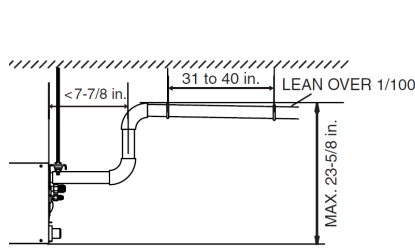
Verify the drain line is installation within the limitations shown in the installation instructions.

Yes No

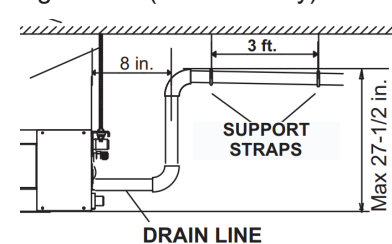
3x3 Cassette



2x2 Cassette



Slim Ducted & Med. Ducted
High Static (024-054 only)



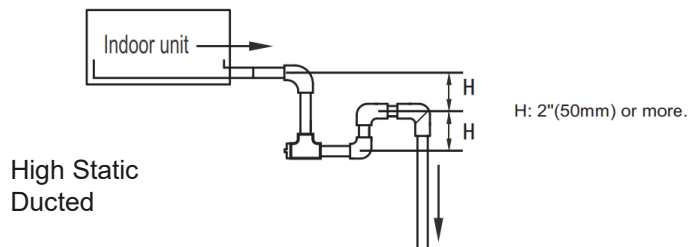
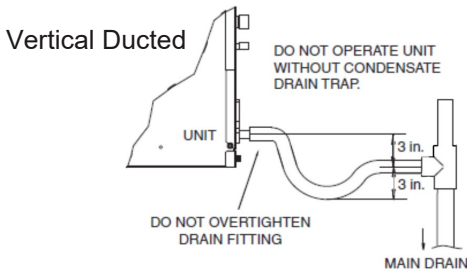


**Go Above.
Think Beyond.**

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11. Indoor Unit – Condensate Drain Lines(cont.):

The following units require an external condensate trap.
Vertical & High Static Ducted (072-096).



All drains have been insulated.	Yes	No	All drains are sloped properly.	Yes	No
All drains have been checked for leaks.	Yes	No	All drains are supported properly.	Yes	No
All drains installed per instructions and local codes.				Yes	No

12. Indoor Unit – External Condensate Safety Connection:

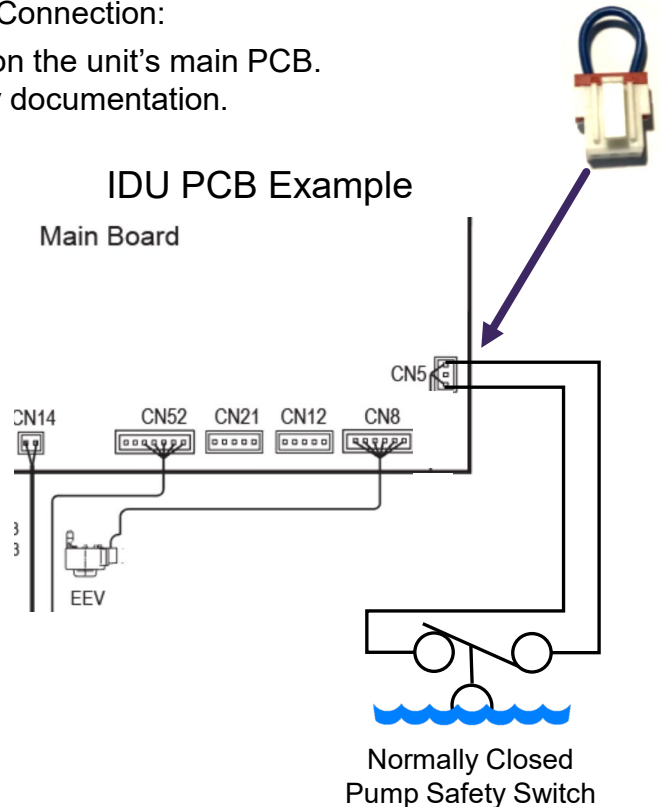
The following Indoor Units have a connection on the unit's main PCB.

NOTE: Some of these may not show in factory documentation.

40VMA Outside Air	}	CN5
40VMC Compact Cassette		
40VMF Cassette		
40VMH High Static		
40VML Low Static		
40VMM Med Static		
40VMR Floor Console		
40VMU Under Ceiling/Floor		
40VMV Vertical		
40MVI 1-Way Cassette		
40VMW High Wall	}	CN19
40VMD – Multi-Port Box	}	CN27



Attention:
Zero Volt Connection



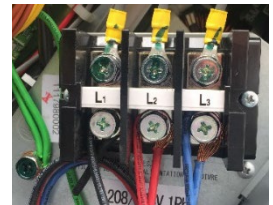
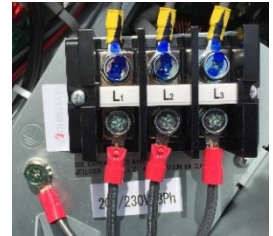
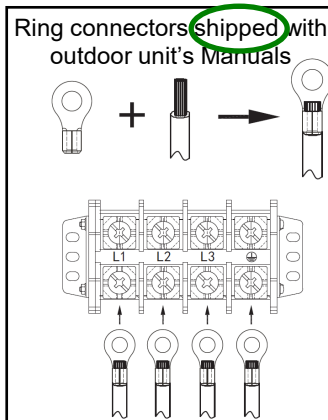
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13.1 Electric Wiring – Power Wiring Outdoor Unit:

Every outdoor unit must have a dedicated power supply.
Power supply wiring shall be installed in compliance with NEC and local codes.

- Header Unit (A) circuit breaker size.
- Follower Unit (B) circuit breaker size.
- Follower Unit (C) circuit breaker size.
- Header Unit (A) Wire Size.
- Follower Unit (B) Wire Size.
- Follower Unit (C) Wire Size.
- L1, L2, L3 wiring connected.
- Crimp style ring connectors used.
- Ring crimp connectors used.
- Ground wire connected.
- Strain relief wire strap is tight.

AMP
AMP
AMP
AWG
AWG
AWG
No
No
No
No
No
No



13.2 Electric Wiring – Power Wiring Indoor Unit & MDC:

The power supply for the indoor units must be separate from the outdoor unit.

- Enter circuit breaker size. AMP
- Enter line voltage wire size. AWG
- Number of units on same circuit (include MDC's).
- MDCs on same circuit as indoor units.

- L1, L2 wiring connected.
- Ground wire connected.
- Strain relief wire clamp is tight.

13.3 Electric Wiring – Control Wiring:

Reference the Selection Report's for Control Wiring layout drawing.

- All Control wiring is stranded, 2-conductor, non-polarity, shielded wire 16 AWG.

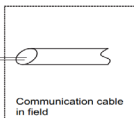
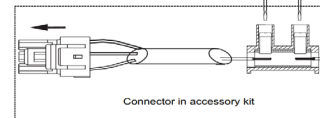
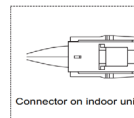
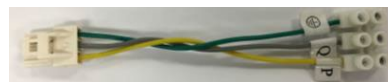
If not, enter what was used here.

- Wiring shield is connected to the "Earth" screw.

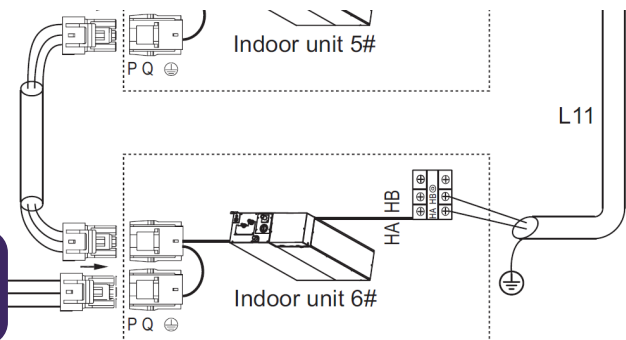
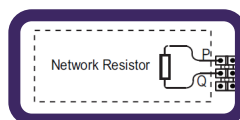
- P & Q control wiring is connected from the Header outdoor unit and daisy chained to each indoor unit and stopping at the last indoor unit on this refrigerant circuit.

- Twinned or Triple Outdoor Unit Combinations has control wiring is connected from the outdoor Header unit (A) H1 & H2 to the outdoor Follower unit (B) & (C) H1 & H2.

- Heat Pumps ONLY – Install network resistor on last fan coil. (shipped with Outdoor unit manuals)



Heat Pumps ONLY →





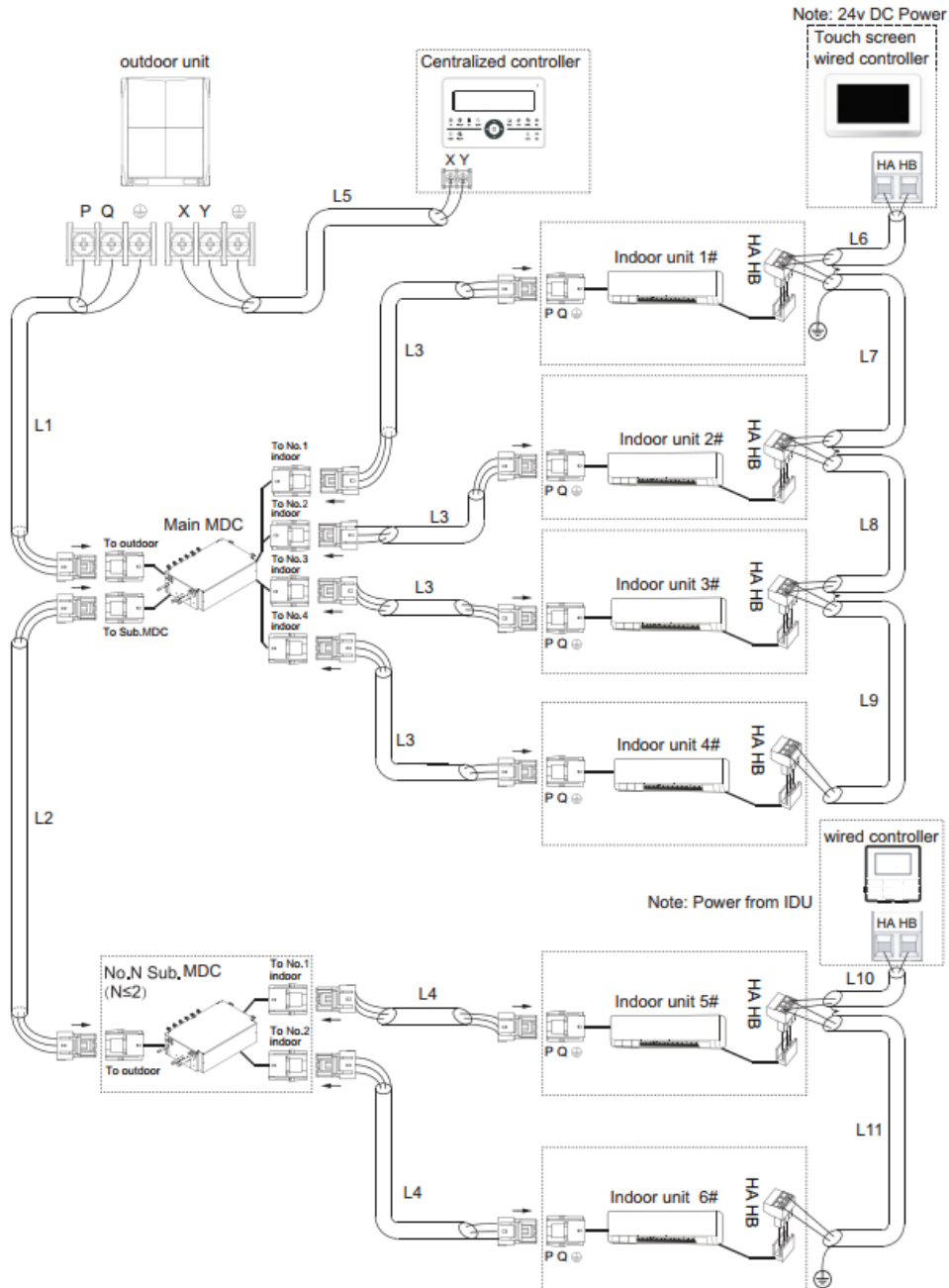
Go Above.
Think Beyond.

System Tag #

Carrier Bryant VRF Installation Checklist

13.4 Electric Wiring – Heat Recovery Control Wiring Example:

Heat Pump Example can be found in the Installation Manual that shipped with Outdoor Unit.
Reference the Selection Report's for Control Wiring layout drawing.



Carrier Bryant VRF Installation Checklist

13.5 Electric Wiring – Control Wiring Wired Remote Controller:

Reference the Selection Report's for Control Wiring layout drawing.

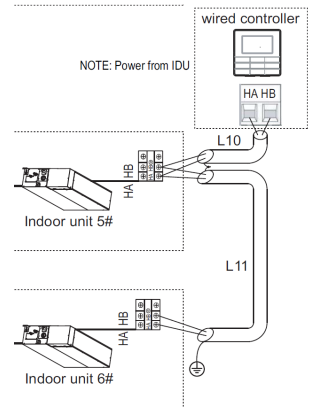
Remote Controller wiring is stranded, 2-conductor, non-polarity, 16 AWG wire. Yes No
The remote controller does not have to be shielded.

If the remote controller wire is different then above, enter type of wire used.

Remote controller is connected to HA & HB on corresponding indoor unit. Yes No

For group control of indoor units, HA & HB wiring is connected to the header indoor unit of the group and daisy chained to the follower unit's HA & HB terminals. Yes No

Are there any group controlled. Yes No

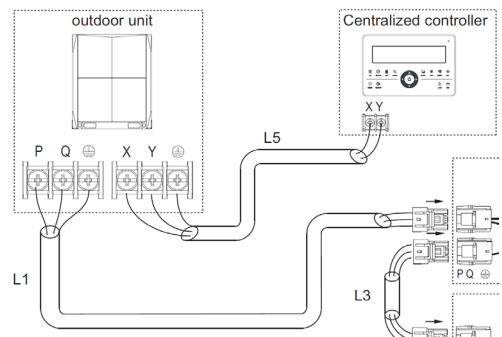


13.6 Electric Wiring – Control Wiring Outdoor Unit:

Indoor Unit / MDC daisy chain connected to P, Q. Yes No

Control wire shield connected to "Earth". Yes No

Follower Units B & C daisy chained to H1, H2. Yes No



14. Final Installation Checks:

All indoor units, flow selectors and outdoor units are installed per the installation instructions.	Yes	No
All condensate lines have been installed, insulated and supported per indoor unit installation instructions, local codes and state codes.	Yes	No
All refrigerant piping has been installed, insulated and supported per indoor unit, flow selector & outdoor unit installation instructions, local and state codes.	Yes	No
All control and power wiring has been installed and secured per indoor & outdoor unit installation instructions, local codes and national codes.	Yes	No
All wired controllers have been installed per the installation instructions.	Yes	No
All outdoor units stop valves are open.	Yes	No
All shipping supports (blue tape) have been removed from the indoor blower wheels.	Yes	No
All equipment covers and panels have been re-installed.	Yes	No
After the additional refrigerant charge has been added and all of the outdoor unit service valves have been fully opened, power should be applied to the outdoor unit only - for a minimum of 24 hours. If this is not done start up will not be able to be performed.	Yes	No



**Go Above.
Think Beyond.**

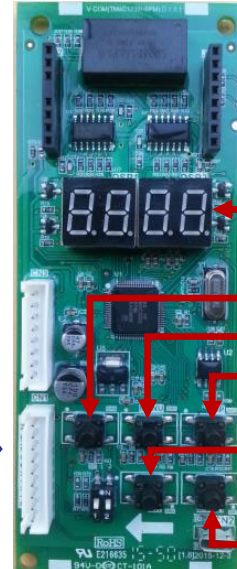
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15. Evacuation Mode – All Indoor EEV Valves Open:

More detailed information can be found in the Service Manual.

These settings can also be done on the Main Control PCB. We will use the control under the left corner panel. The control cover slides up.

1. Press the MENU(SW6) button for five seconds to enter the parameter setting function. n11 Displayed
2. Press UP(SW3) once. n21 displayed
3. Press OK(SW4) once. Cursor moves under "1"
4. Press UP (SW3) twice. n23 displayed
5. Press OK (SW4) once. Mode is ON
6. To end, recycle power to outdoor unit(s)



Display

SW5 – Snow

SW6 – Menu

SW3 – Up

SW4 –
OK/Confirm

SW7 – Down

Table 48 - "SW4" Setting Parameter

Symbol	Function	Item	Description
n2_	Refrigerant recycle function	n21	Refrigerant recycled to outdoor unit
		n22	Refrigerant recycled to indoor units
		n23	Refrigerant recycled to piping (Field vacuum to open valves)

16. Start Up Assistance Request:

For start-up assistance - coordinate with CE Technical Support a minimum of 2 weeks prior to the expected start-up date. Send us this fully completed form for each system requiring an assisted commissioning. If you have a Centralized Control such as a Touch Screen, BACnet or LonWorks, please fill out a Controls Installation Checklist as well.

1st Choice Scheduled Date:

2nd Choice Scheduled Date:

Once received our VRF Specialist will call to review these forms, once reviewed CE will confirm a date for commissioning.

Forms must be completed by Installing Contractor.

Today's Date:

Company Name:

Technician / Installer:

Signature:

By signing this the contractor confirms all information provided is correct. If CE arrives on site and system is not ready for commissioning additional fees may be charged.