TOSHIBA Carrier

System Tag #

Go Above. Think Beyond.

Carrier Toshiba VRF Installation Checklist

Carrier Enterprise Technical Services

Site Name:

Address:

City, State: Zip:

Contact: Phone:

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: Select System

Qty. of Indoor Unit(s): Qty. of Shut-Off Valve Box(s):

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. Select Device Select Device

Local Controls Used:
Select type and qty.

Select Device	Enter Qty.	Select Device	Enter Qty.
Select Device	Enter Qty.	Select Device	Enter Qty.

The VRF system's total releasable A2L refrigerant charge is with in the application limits.
If unsure check the Install manual for the Outdoor Unit being installed.

Prior to startup we recommend you walk the job site referencing the Refrigerant Piping and Control Wiring layout (from V-Pro Software), supplied by Carrier Enterprise. Note any changes on the V-Pro 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. Outdoor Unit – Placement:

Clearances - Enter actual measurements below:

Front Inches
≥ 40" service & air flow clearance.

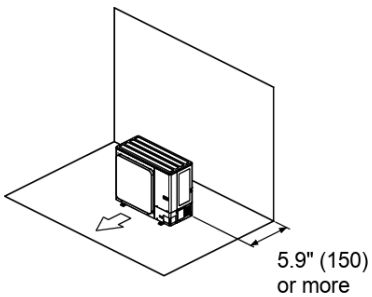
Back Inches
≥ 6" service & air flow clearance.

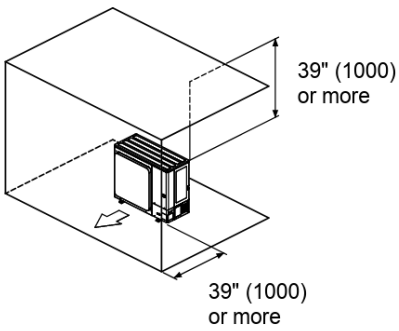
Sides Inches
≥ 12" service & air flow clearance.

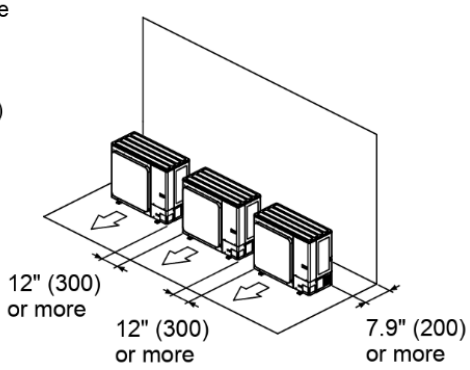
Top Inches
> 20" clearance to any obstacle above unit.

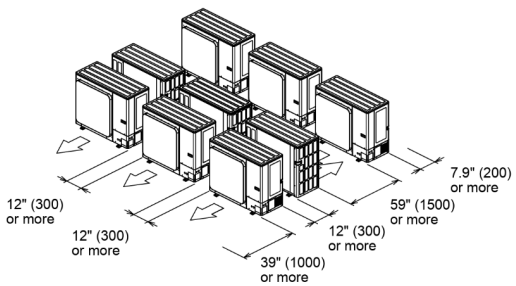
Between Unit(s): Inches
≥ 12" service & air flow clearance.

Wall around unit (If within 3FT of unit) – height Inches









TOSHIBA Carrier

System Tag #

Go Above. Think Beyond.

Carrier Toshiba VRF Installation Checklist

Carrier Enterprise Technical Services

Contractor:

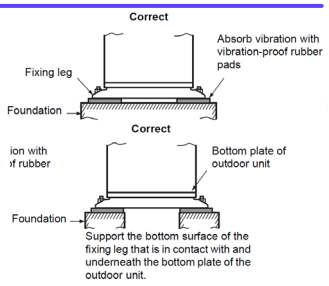
Address:

City, State: Zip:

Contact: Phone:

2. Outdoor Units – Mounting:

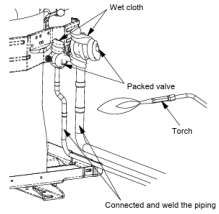
The outdoor unit is level.	☐ Yes	☐ No
The mounting base fully supports the unit across front and back.	☐ Yes	☐ No
All four anchor bolts have been installed and secured.	☐ Yes	☐ No
There is adequate water drainage, for defrost operation.	☐ Yes	☐ No
The mounting base height is more than the expected snow level.	☐ Yes	☐ No



3. General Refrigerant Piping:

Do not apply line voltage power to the indoor units until after, pressure test, evacuation and additional charge has been added. When power is applied to the indoor units, the PMV's will close blocking the flow of nitrogen through the system during brazing. Follow the "Pulse Motor Valve (PMV) Forced Open Function, See Section 15. More detail can be found in the Service Manual on HVACPartners.com.

There are NOT any added refrigerant components - driers, sight glasses, solenoid valves, etc.	☐ Yes	☐ No
Full port ball valves may be used for component isolation during service.		
Were ball valves installed.	☐ Yes	☐ No
If yes, verify all ball valves are in the open position.	☐ Yes	☐ No
Ball valves are installed in the correct configuration per their installation instructions.	☐ Yes	☐ No
Nitrogen was purged through the system during all brazing.	☐ Yes	☐ No
Enter the pressure setting used to purge nitrogen.	☐ PSI	
15% brazing rods must be used for all brazed joints.	☐ Yes	☐ No
During brazing, a wet cloth was wrapped around valves.	☐ Yes	☐ No
A R-454B rated flaring tool to form all flare connections.	☐ Yes	☐ No
A back up wrench and torque wrench were used on all flare fittings.	☐ Yes	☐ No



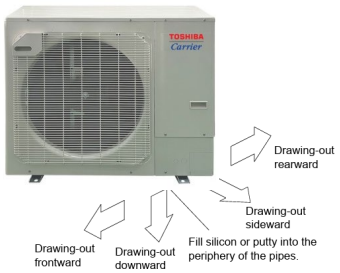
Unit: ft•lbs (N•m)

Outer dia. of copper pipe	Tightening torque
Ø1/4 (6.4 mm)	10 to 13 (14 to 18)
Ø3/8 (9.5 mm)	24 to 31 (33 to 42)
Ø1/2 (12.7 mm)	37 to 46 (50 to 62)
Ø5/8 (15.9 mm)	50 to 60 (68 to 82)
Ø3/4 (19.1 mm)	74 to 88 (100 to 120)

4. Outdoor Unit – Refrigerant Piping:

Piping can exit the unit from the REAR, BOTTOM or SIDE.

Field installed refrigerant lines are connected per the outdoor unit Install Manual.	☐ Yes	☐ No
Field installed refrigerant lines are within the allowable length & height differences.	☐ Yes	☐ No
The field installed refrigerant line sizes and lengths, match the V-Pro 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.	☐ Yes	☐ No
All refrigerant lines are insulated separately with min. ½" insulation. Check local code, some municipalities require thicker insulation.	☐ Yes	☐ No



TOSHIBA Carrier

System Tag #

Go Above. Think Beyond.

Carrier Toshiba VRF Installation Checklist

NOTE: Be careful not to apply power to Shut-Off Valve or Flow Selector Boxes prior to startup. If this happens all equipment must be wired fully and the system placed in Evacuation Mode prior to evacuation, see section 15 of this document.

6. Shut-Off Valve (Optional for Heat Pump) Boxes:

Shut-Off Valve Boxes (Heat Pump Only) ☐ Yes ☐ No One Battery Kit installed per PCB ☐ Yes ☐ No

Unit is located in an area where the operating sound will not be objectionable. ☐ Yes ☐ No

Unit is hanging in the horizontal position. ☐ Yes ☐ No

Unit is installed with proper clearances and service access. ☐ Yes ☐ No

The field installed refrigerant line sizes and lengths to the Shut-Off Valve Box matches the V-Pro Report. ☐ Yes ☐ No

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.

Confirm Port 1 was used. ☐ Yes ☐ No

If Ports were combined, list with Port #'s were used. Only 2 Ports can be combined, start with Odd Port. No PCB jumping.

1st Combination – Ports ☐ and ☐ were combined.

2nd Combination – Ports ☐ and ☐ were combined.

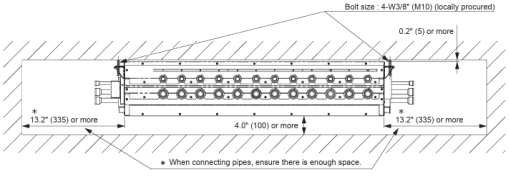
Nitrogen was purged through the system during all brazing.

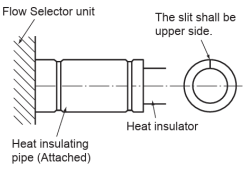
A wet cloth was used during brazing to protect the unit's internal components from overheating/damage. ☐ Yes ☐ No

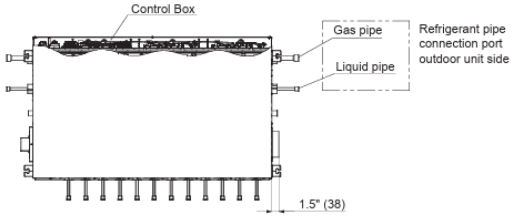
Refrigerant piping and connectors were installed correctly per the unit's Install Manual. ☐ Yes ☐ No

Drian Pipe connected per Install manual ☐ Yes ☐ No

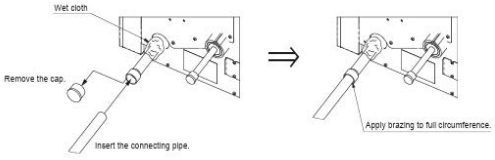
Ventilation Duct was connected (optional based on application requirements) ☐ Yes ☐ No







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



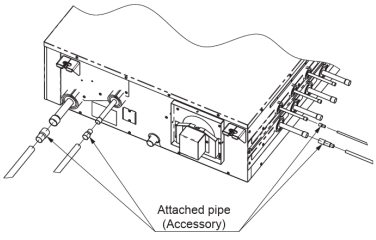
■ Heat insulating process

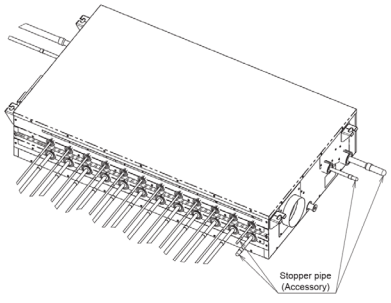
Perform heat insulating for each pipes separately.

In cooling time, temperature at both liquid and gas sides becomes lower.

Therefore, perform heat insulating process sufficiently to avoid dewing.

- For heat insulator of pipe at gas side, be sure to use one with heat-resisting temp. 248°F (120°C) or more.
- Using the attached heat insulating pipe, perform heat insulating process securely for pipe connecting part of the Flow Selector units without clearance.





5.2 Indoor Unit(s) – Mounting:

All unit locations have been verified by Model/Size, site plans & Selection Report. ☐ Yes ☐ No

All units are mounted and secured per their installation instructions. ☐ Yes ☐ No

All units are level. ☐ Yes ☐ No

TOSHIBA Carrier

System Tag #

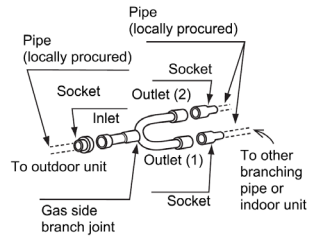
Go Above. Think Beyond.

Carrier Toshiba VRF Installation Checklist

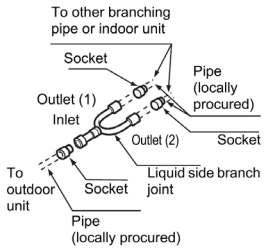
6.1 Refrigerant Piping – Y Joints:

<Gas / Liquid side>
Install the branching pipes horizontally or vertically to make the flow split evenly.

<Gas side>

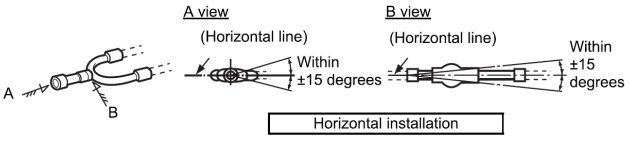


<Liquid side>



⚠ CAUTION

- When a branching pipe is installed horizontally, make its gradient within ± 15 degrees.



<Gas / Liquid side>
Install the branching pipes horizontally or vertically to make the flow split evenly.

Horizontal within ± 15° per instructions. ☐ Yes ☐ No

Are there any "Ys" installed vertically ☐ Yes ☐ No.

"Y" joints are supported on both ends. ☐ Yes ☐ No

Installed with single end always towards outdoor unit.

"Y" joints are the correct size and match the locations as shown on the V-Pro Report. ☐ Yes ☐ No

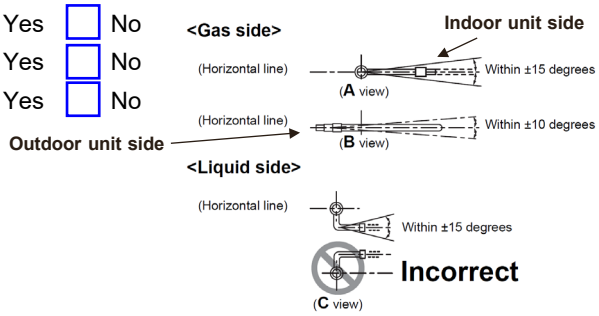
6.2 Refrigerant Piping – Header Joints:

- **Install the branching header so that it branches horizontally.**

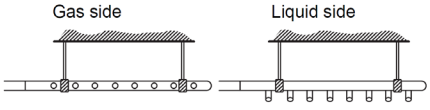
Gas side installed horizontal within ± 15° (indoor unit side). ☐ Yes ☐ No

Liquid side installed horizontal within ± 10° (outdoor unit side). ☐ Yes ☐ No

Header is supported on both ends. ☐ Yes ☐ No



- **Supporting branching header**
  After heat insulators are applied to the branching pipes, set some hanging metals (locally procured) as support.



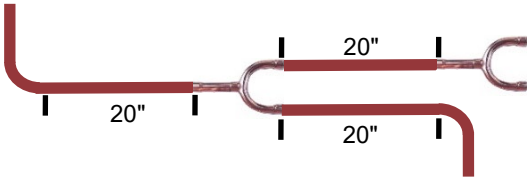
Header joints are the correct size and match the locations as shown on the V-Pro Report. ☐ Yes ☐ No

6.3 Refrigerant Piping – Min. Distances & Traps:

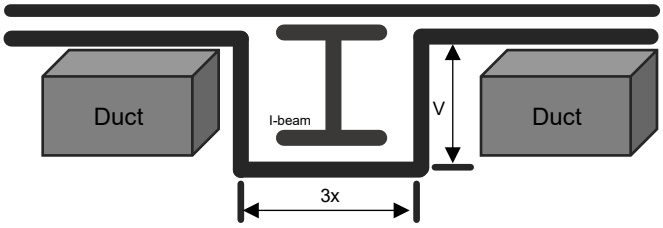
Sockets, joints and insulation were installed per instructions. ☐ Yes ☐ No

Maintain a minimum distance of 20" between branching joints, headers, elbows and equipment. ☐ Yes ☐ No

Recommend horizontal to be 3 times that of the vertical when traps cannot be avoided. ☐ Yes ☐ No



Example:



TOSHIBA Carrier

System Tag #

Go Above. Think Beyond.

Carrier Toshiba VRF Installation Checklist

7. Connectable Capacity:

Indoor unit(s) can connect 50% to 135% of Outdoor unit capacity.

The number of indoor unit has not exceeded max.

☐ Yes ☐ No

Outdoor unit	Max. number of indoor units
MCY-MUB0368HS2P-UL	6
MCY-MUB0488HS2P-UL	8
MCY-MUB0608HS2P-UL	9

8.1 Refrigerant Piping – Leak Check:

For Heat Pump Systems, connect to the two main refrigeration stop valves at outdoor unit ☐ Yes ☐ No

Only use Dry Nitrogen ☐ Yes ☐ No

Enter indoor temp/outdoor temps during 24hr Pressure Test start: Inside ____ °F Outside ____ °F

Pressure tested for 24hrs. @ 600PSI ☐ Yes ☐ No

If not 600PSI enter your final pressure test ____ PSI

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.

8.2 Refrigerant Piping – Evacuation:

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

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 ____

This space intentionally left blank

TOSHIBA Carrier

System Tag #

Go Above. Think Beyond.

Carrier Toshiba VRF Installation Checklist

8.3 Refrigerant Piping – Additional Refrigerant Charge:

Do NOT open unit service valves until additional refrigerant charge has been calculated, added and recorded. The V-Pro 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
If not send your revised version to your sales representative for updating.

Enter additional refrigerant charge amount – R-454B. 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.

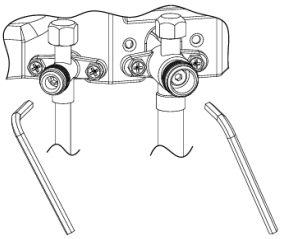
Digital refrigerant scale used to weight in the additional charge on the liquid side of the system. ☐ Yes ☐ No

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. ☐ Yes ☐ No

Open the unit service valves – Suction and Liquid. ☐ Yes ☐ No



9. Refrigerant Piping – Insulation:

All refrigerant lines are insulated individually. ☐ Yes ☐ No

Pipe insulation has temperature rating > 248°F and ≥ ½” wall thickness. ☐ Yes ☐ No
Check local codes where job site is located, some areas by code require 1.5” thickness.

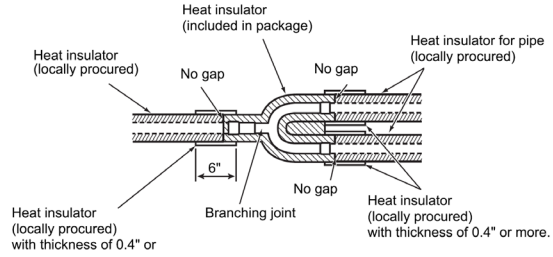
Indoor unit line connections are insulated individually. ☐ Yes ☐ No

Heat insulators supplied with branching “Y” & Header joints are installed per their instructions. ☐ Yes ☐ No

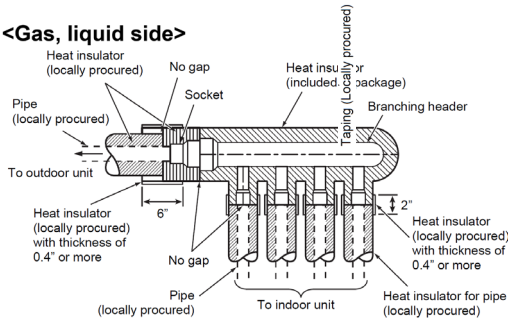
Heat insulators supplied with indoor units are installed per their instructions. ☐ Yes ☐ No

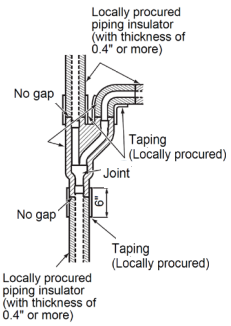
There are no gaps between heat insulators and pipe insulation. ☐ Yes ☐ No

<Gas, liquid side>



<Gas, liquid side>





TOSHIBA Carrier

System Tag #

Go Above. Think Beyond.

Carrier Toshiba VRF Installation Checklist

10. Indoor Unit – Condensate Drain Lines:

The following units either have an internal trap or the drain is located on the positive side of the blower.
High Wall; Compact 4 Way Cassette; 4 Way Cassette; Underceiling; Low, Med & High Static;
Outside Air and Floor Console Units - Do Not require an external condensate trap.

Verify there are no external traps on the above indoor units. ☐ Yes ☐ No

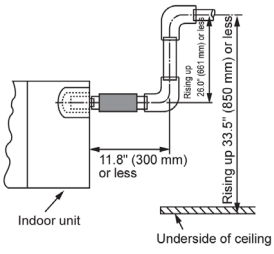
Condensate lift pump accessories are available for most indoor units.
Were any accessory pumps required for this application. ☐ Yes ☐ No

If YES, verify these accessories have been installed per their instructions. ☐ Yes ☐ No

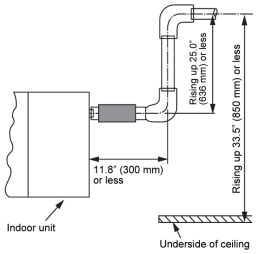
Are there condensate pump safety switch(s) wired to the indoor unit. ☐ Yes ☐ No

Cassette's; Low Medium High (2 to 4.5-ton) units have a built-in condensate lift pump. ☐ Yes ☐ No
Verify the drain line is install within the limitations shown in the installation instructions.

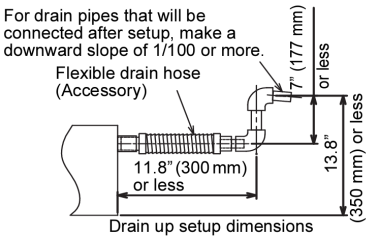
3x3 Cassette



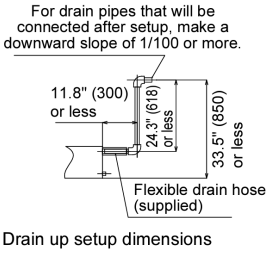
2x2 Cassette



Low Static

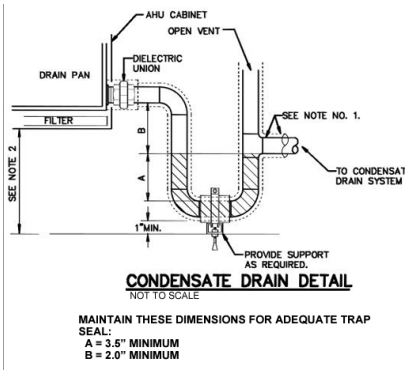


Med. Static
High Static (2 to 4.5-ton)

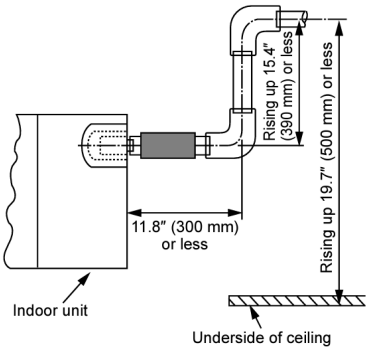


Vertical Ducted Fan Coil units - require an external trap

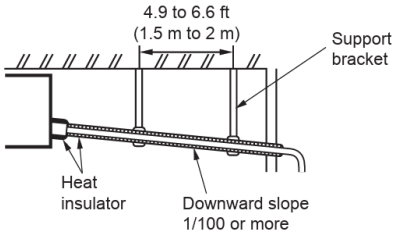
The drain is located on the negative side of the blower.
Verify the traps are formed per the unit installation instructions.



1-Way Cassette



Shut-Off Valve Boxes



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 code. ☐ Yes ☐ No

TOSHIBA Carrier

System Tag #

Go Above. Think Beyond.

Carrier Toshiba VRF Installation Checklist

11.1 Indoor Unit – Condensate Safety Connection:

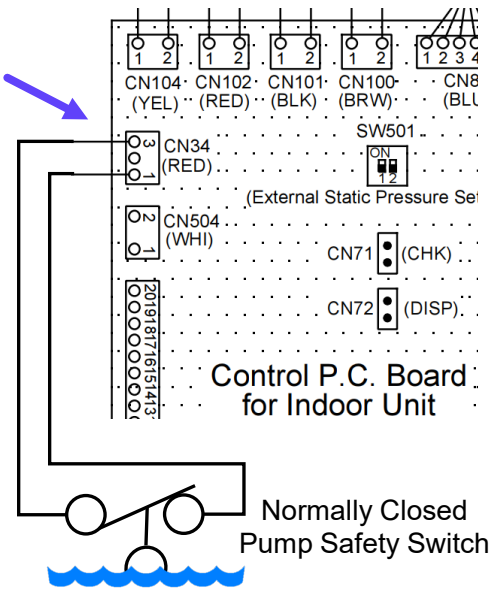
The following Indoor Units have a connection on the unit's main PCB.
NOTE: Some of these may not show in factory documentation.

RBM-SVB0611HUPUL Shut-Off Valve Box
MMD1-UB Outside Air
MMUM-UB Compact 4-way Cassette
MMU1-UB 4-way Cassette
MMUY-UB 1-way Cassette
MMDH-UB High Static
MMDB-UB Med Static
MMDP-UB Low Static
MMK1-UB High Wall
MMC1-UB Under Ceiling/Floor
MML1-U Floor Console – Exposed
MMLB-U Floor Console – Recessed

CN34

MMDV-UB Vertical – No Safety Connection, see next section

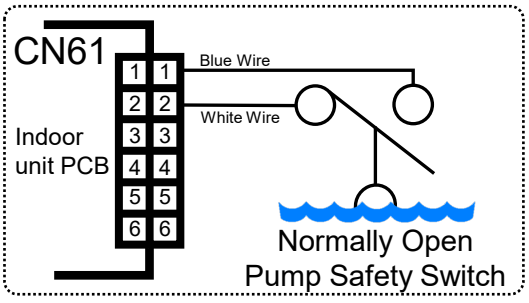
IDU PCB Example

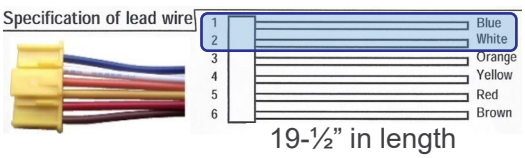


Attention:
Zero Volt Connection

11.2 Indoor Unit – Optional External Condensate Safety Connection:

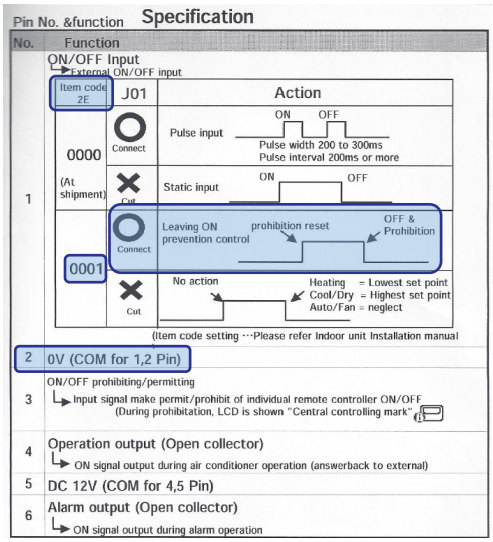
Optional Kit – TCB-KBCN61HAE
Available for all Carrier Toshiba Indoor Units





Change DN Code Setting 2E to "0001"

Attention:
Zero Volt Connection



TOSHIBA Carrier

System Tag #

Go Above. Think Beyond.

Carrier Toshiba VRF Installation Checklist

12.1 Electric Wiring – 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.

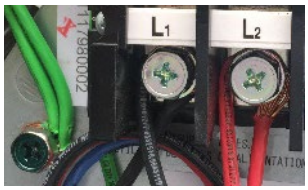
Outdoor Unit circuit breaker size. ☐ AMP

Outdoor Unit Wire Size. ☐ AWG

Use crimp style ring connectors for all wiring connections.

L1, L2, wiring connected.	☐ Yes	☐ No
Ring crimp connectors used.	☐ Yes	☐ No
Ground wire connected.	☐ Yes	☐ No
Strain relief wire strap is tight.	☐ Yes	☐ No

Correct



Not Acceptable

12.2 Electric Wiring – Wiring Shut-Off Valve Box(s):

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

Strain relief wire clamp is tight. ☐ Yes ☐ No

L1, L2 wiring connected. ☐ Yes ☐ No

Ground wire connected. ☐ Yes ☐ No

Other units on same circuit. ☐ Yes ☐ No

12.3 Electric Wiring – Wiring Indoor Unit(s):

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

Strain relief wire clamp is tight. ☐ Yes ☐ No

L1, L2 wiring connected. ☐ Yes ☐ No

Ground wire connected. ☐ Yes ☐ No

Other units on same circuit. ☐ Yes ☐ No

12.4 Electric Wiring – Uv (U1-U2) Daisy Chain Wiring:

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

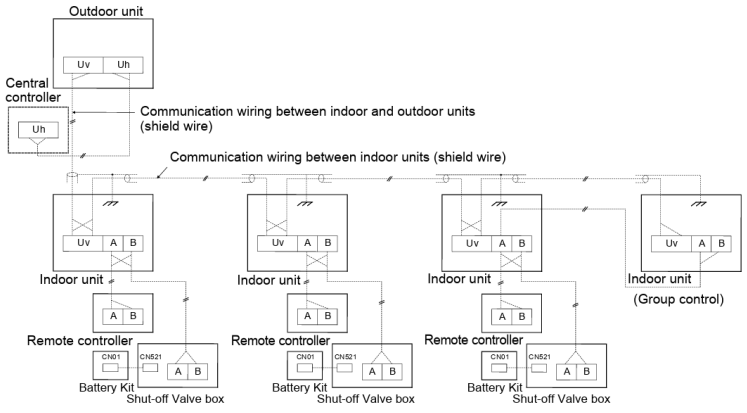
All Control wiring is stranded, 2-conductor. ☐ Yes ☐ No

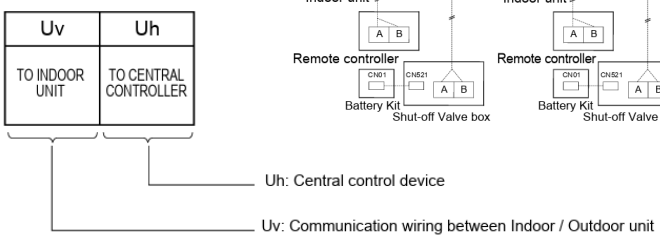
If not, enter what was used here. ☐

Wiring shield is connected to the "S" screw. ☐ Yes ☐ No

Uv 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. ☐ Yes ☐ No

All shields are connected to the "S" screw. ☐ Yes ☐ No





TOSHIBA Carrier

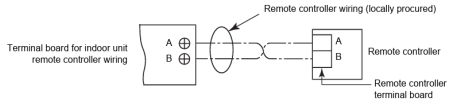
System Tag #

Go Above. Think Beyond.

Carrier Toshiba VRF Installation Checklist

13.5 Electric Wiring – Control Wiring Wired Remote Control:

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.

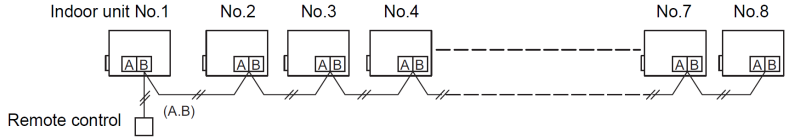
If the remote controller wire is different then above, enter type of wire used.

Remote controller is connected to A-B on corresponding indoor unit. ☐ Yes ☐ No

Shutoff Valve Box(s) are daisy chained on A-B with Remote Controls. ☐ Yes ☐ No

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

Are there any group controlled. ☐ Yes ☐ No



14. Final Installation Checks:

All indoor units 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, shutoff valve box & 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

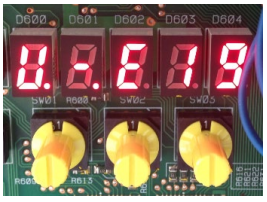
All wired controllers have been installed per the installation instructions. ☐ Yes ☐ No

All shipping supports (blue tape) have been removed from the indoor units and 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 12 hours. If this is not done start up will not be able to be performed. ☐ Yes ☐ No

Do NOT apply power to the indoor units at this time.
Verify SW01, SW02 & SW03 are all in position 1.
The control should display - U.-.E19.

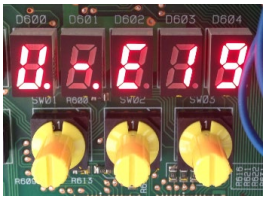


15. Evacuation Mode – Pulse Motor Valve (PMV) Forced Open Mode:

More detailed information can be found in the Outdoor Unit's Service Manual.

This function is provided to open or close forcedly PMV for 2 minutes in all the indoor units by the switch operation on the interface P.C. board of the outdoor unit. This function is also used to open PMV fully when turning off the power and executing an operation.

<Operation>



[Open fully] Set the switches SW01 / SW02 / SW03 on the interface P.C. board of the outdoor unit to [2/3/1] and press SW04 for 2 seconds or more.(Display appears on 7-segment display for 30 seconds as follows.) [P.] [FF]

[Clear] After 30 seconds (1 minutes for "Close fully") after setting up, the opening automatically returns to the normal opening.

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.