TOSHIBA Carrier

System Tag #

Go Above. Think Beyond.

Carrier Toshiba Mini 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.

Model Number of Outdoor Unit: Select System Quantity of Indoor Units:

Total number of Mini 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 Device Enter Qty. Select Device Enter Qty.
Select Type and qty. Select Device Enter Qty. Select Device Enter Qty.

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.

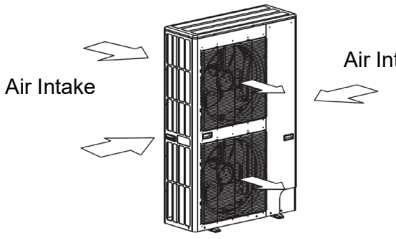
Back Inches
≥ 8" service & air flow clearance.

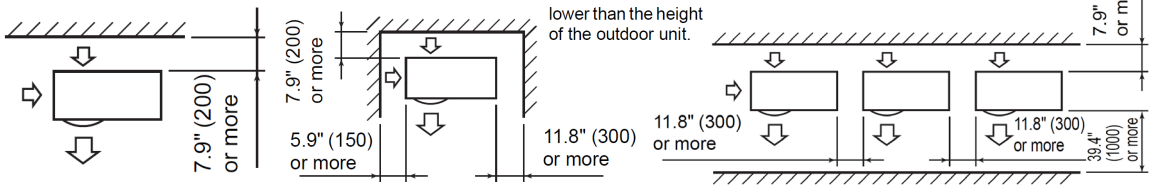
Sides Inches
≥ 12" service & air flow clearance.

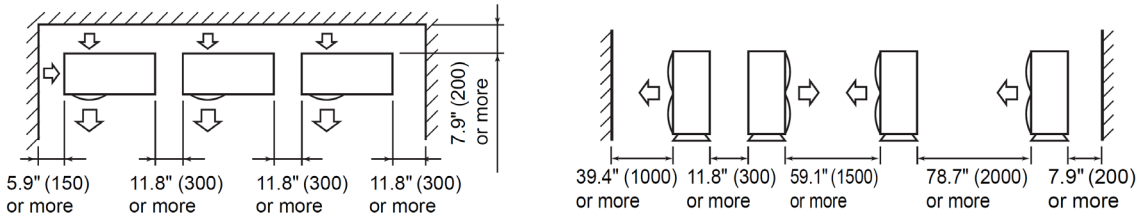
Top Inches
> 20" clearance to any obstacle above unit.

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 Mini VRF Installation Checklist

Carrier Enterprise Technical Services

Contractor:

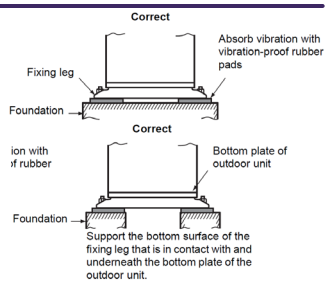
Address:

City, State: Zip:

Contact: Phone:

2. Outdoor Units – Mounting:

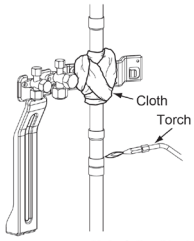
The outdoor unit is level.	☐ Yes	☐ No
The mounting base fully supports the unit <u>across front and back</u>.	☐ Yes	☐ No
All four anchor bolts have been installed and secured.	☐ Yes	☐ No
There is adequate water drainage, for defrost operation.	☐ Yes	☐ No
The mounting base height is more than the expected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

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-410A 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



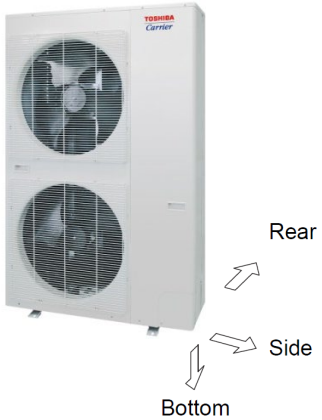
Unit: ft•lbs (N•m)

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. Outdoor Unit Install Instructions, pages EN18 thru EN20.	☐ 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
<u>All</u> refrigerant lines are insulated separately with min. ½" insulation. Check local code, some municipalities require thicker insulation.	☐ Yes	☐ No



5. Indoor Unit – Mounting:

All indoor unit locations have been verified by Model/Size, site plans & V-Pro Report. ☐ Yes ☐ No

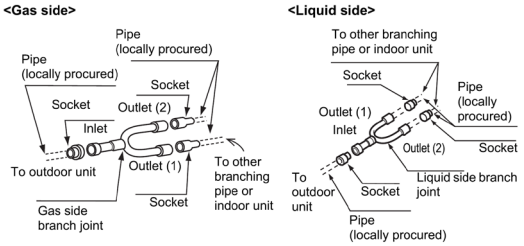
All indoor units are mounted and secured per their installation instructions. ☐ Yes ☐ No

All indoor units are level. ☐ Yes ☐ No

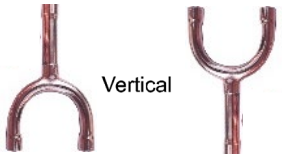
6. Refrigerant Piping – Y & Header Branching Joints:

Y type – Branching Joint:

Branching Joints Heat Pump – RBM-BY55UL



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



Installed with single end always towards outdoor unit.

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

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

"Y" joint is supported on both ends. ☐ Yes ☐ No

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

Header type – Branching Joint:

Header Joints Heat Pump – RBM-HY1043UL (4-branch header), HY1083UL (8-branch header)

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

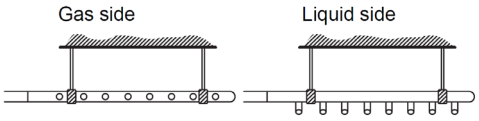
Liquid side installed horizontal within ± 10° (outdoor unit side). ☐ Yes ☐ No

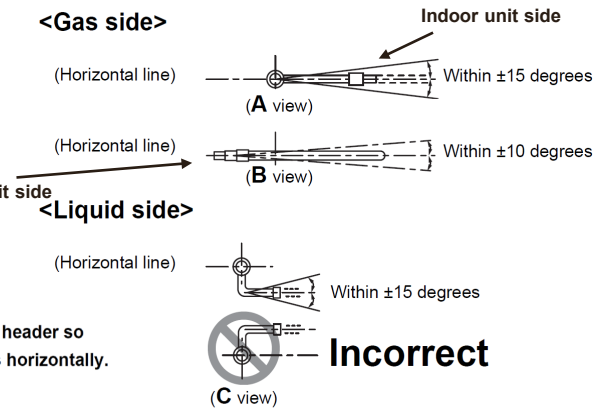
Header is supported on both ends. ☐ Yes ☐ No

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

- **Supporting branching header**

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





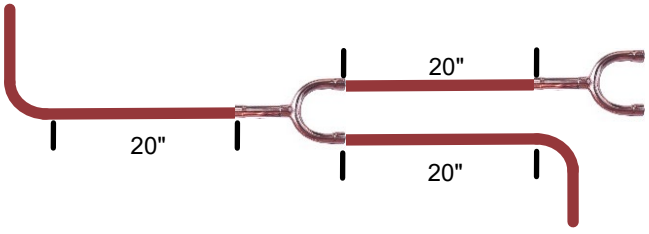
- **Install the branching header so that it branches horizontally.**

7. Refrigerant Piping – Min. Distances & Traps:

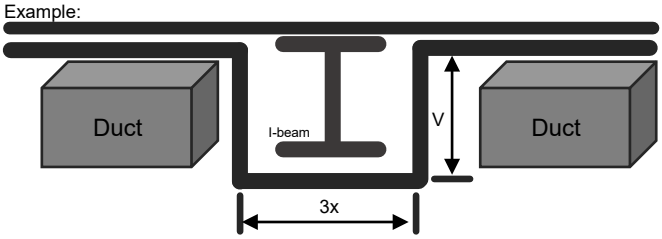
Sockets, joints and insulation were installed per instructions. ☐ Yes ☐ No

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:



8. Connectable Capacity:

Indoor unit can connect 50% to 135% of Outdoor unit capacity
*MCY-MAP0367HS-UL is 80% to 135%

The number of indoor unit has not exceeded max.

☐ Yes ☐ No

Outdoor unit	Max. number of indoor units
MCY-MAP0367HSUL	6
MCY-MAP0487HSUL	8
MCY-MAP0607HSUL	9

9.1 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 0.26 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. 2.6 PSI. Likewise, if there was a 10°F temperature fall the pressure would have decreased by approx. -2.6 PSI.

9.2 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 ☐

9.3 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 - 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.

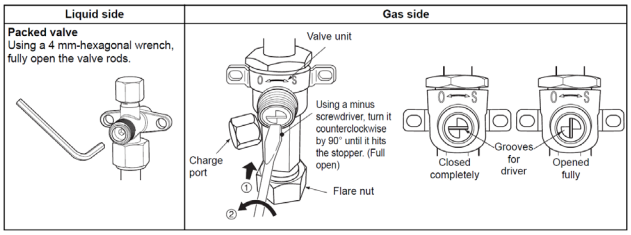
Digital refrigerant scale used to weight in the additional charge on the liquid side of the system. ☐ Yes ☐ No

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



10. 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.

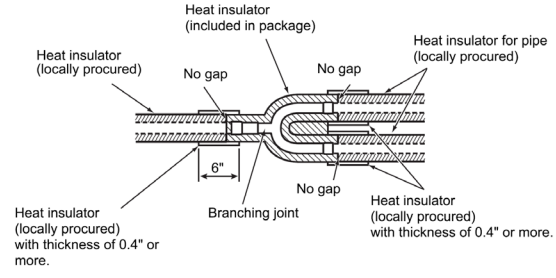
Indoor unit line connections are insulated individually. ☐ Yes ☐ No

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

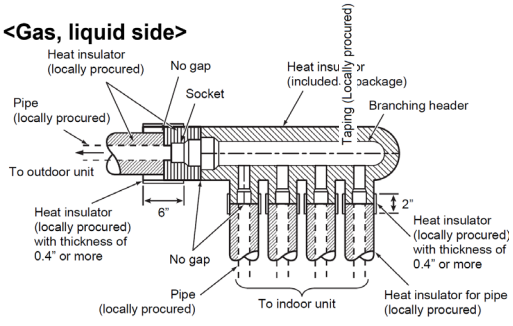
Heat insulators supplied with indoor units are installed per their instructions. ☐ Yes ☐ No

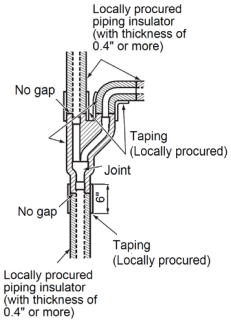
There are no gaps between heat insulators and pipe insulation. ☐ Yes ☐ No

<Gas, liquid side>



<Gas, liquid side>





11. 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; Under Ceiling; Slim Duct; Concealed Duct;
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

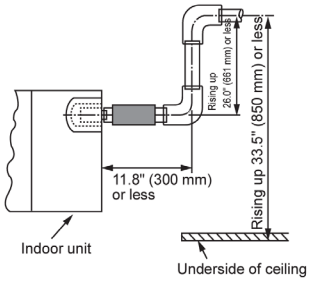
Condensate lift pump accessories are available for most indoor units.
Were any accessory pumps required for this application. ☐ Yes ☐ No

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

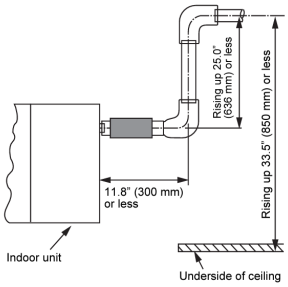
Are there condensate pump safety switch(s) wired to the indoor unit. ☐ Yes ☐ No

4 Way Cassette's; Slim Duct and Medium Duct units have a built-in condensate lift pump. ☐ Yes ☐ No
Verify the drain line is installation within the limitations shown in the installation instructions.

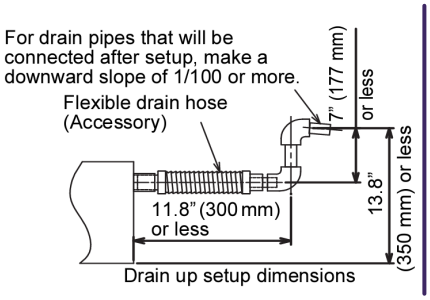
3x3 Cassette



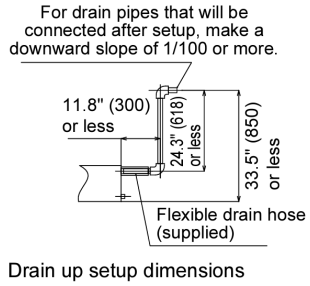
2x2 Cassette



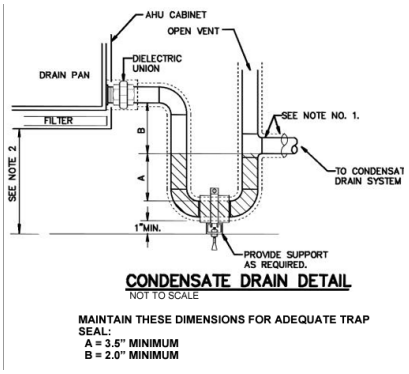
Low Ducted



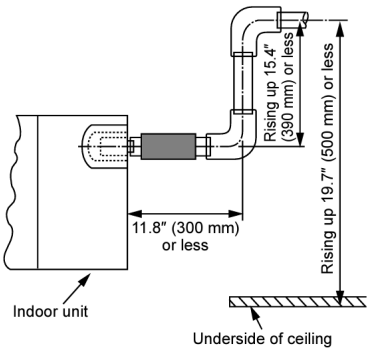
Med. & High Ducted (2 to 4.5-ton) & Outside Air unit 481



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



All drains have been insulated. ☐ Yes ☐ No
All drains have been checked for leaks. ☐ Yes ☐ No
All drains installed per instructions and local codes.

All drains are sloped properly. ☐ Yes ☐ No
All drains are supported properly ☐ Yes ☐ No
☐ Yes ☐ No

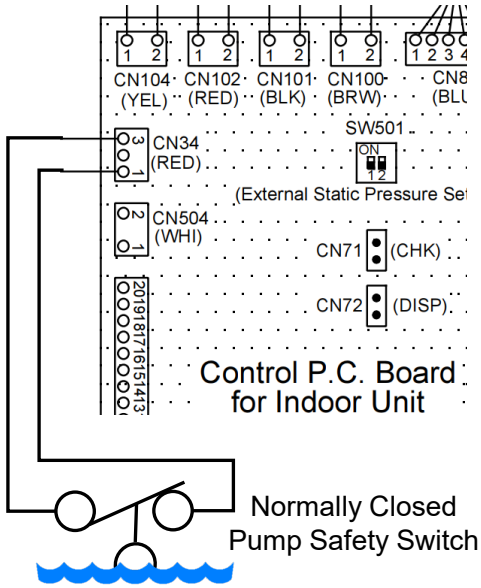
12.1 Indoor Unit – Condensate Safety Connection:

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

MML1-U Floor Console Exposed
MMLB-U Floor Console Recessed
} CN30

MMD1-U Outside Air Duct
MMDV-U Vertical Duct
MMC1-U Underceiling
MMUM-U Compact Cassette
MMU1-U Cassette
MMUY-U 1-Way Cassette
40QQ-U Rooftop
MMDP-U Low Static Duct
MMDB-U Med Static Duct
MMDH-U High Static Duct
MMD1-U Outside Air
MMK1-U High Wall
} CN34

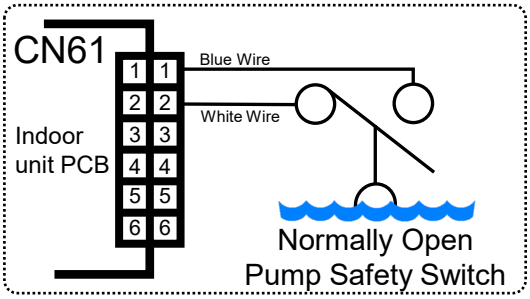
IDU PCB Example

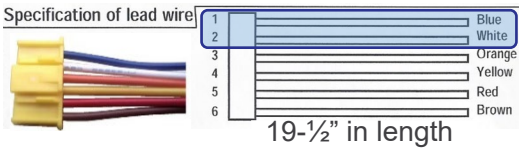


Attention:
Zero Volt Connection

12.2 Indoor Unit – Optional Condensate Safety Connection:

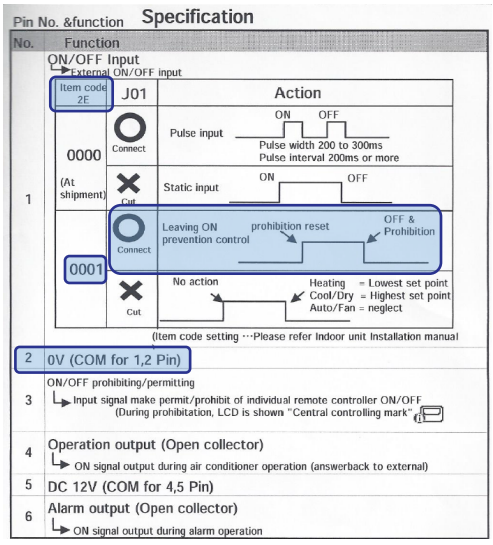
Optional Kit – TCB-KBCN61HAE
Available for all Carrier Toshiba Indoor Units





Change DN Code Setting 2E to "0001"

Attention:
Zero Volt Connection



13.1 Electric Wiring – Power Wiring Outdoor Unit:

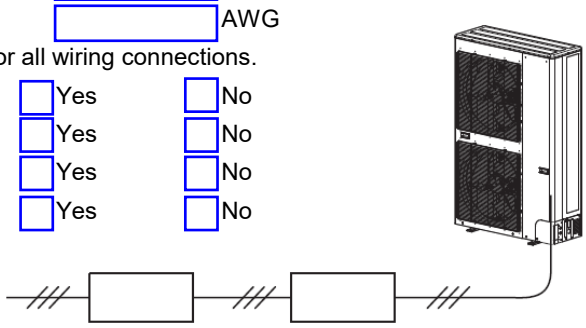
Every outdoor unit must have a dedicated power supply.
Power supply wiring shall be installed in compliance with NEC and local codes.

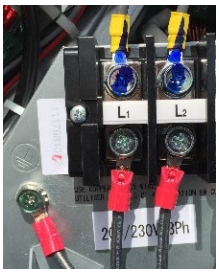
Outdoor Unit circuit breaker size. ☐ AMP

Outdoor Unit Wire Size. ☐ AWG

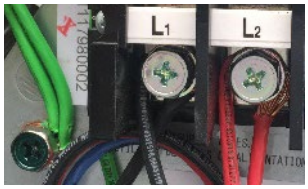
Use crimp style ring connectors for all wiring connections.

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

13.2 Electric Wiring – Power 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

All-indoor units on same circuit. ☐ Yes ☐ No

13.3 Electric Wiring – Control Wiring:

Reference the V-Pro Report's for Control Wiring layout drawing.

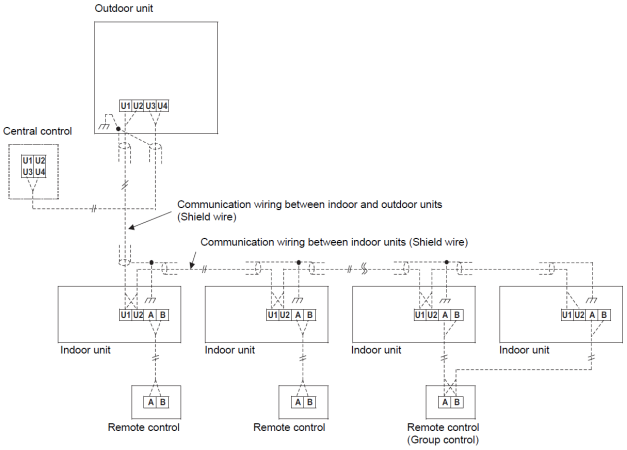
All Control wiring is stranded, 2-conductor, non-polarity, shielded wire 16 AWG. ☐ Yes ☐ No

If not, enter what was used here. ☐

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

U1 & U2 control wiring is connected from the Header outdoor unit and daisy chained to each indoor unit, stopping at the last indoor unit on the refrigerant circuit. ☐ Yes ☐ No

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



13.4 Electric Wiring – Control Wiring Wired Remote Controller:

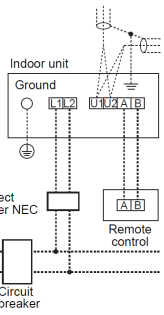
Reference the V-Pro Report's for Control Wiring layout drawing.

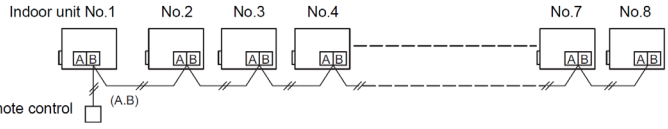
Remote Controller wiring is stranded, 2-conductor, non-polarity, 16 AWG wire. ☐ Yes ☐ No
The remote controller does not have to be shielded.

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

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.





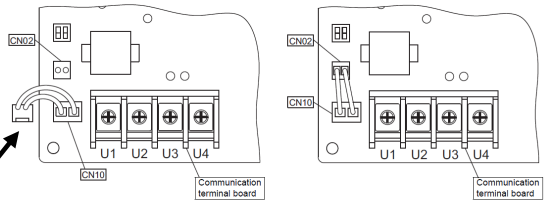
Are there any group controlled. ☐ Yes ☐ No

13.5 Electric Wiring – Control Wiring Outdoor Unit:

Indoor Unit daisy chain connected to U1, U2. ☐ Yes ☐ No

Control wire shield connected to "S". ☐ Yes ☐ No

White Molex connector CN10 is left unplugged. ☐ Yes ☐ No



Note: Outdoor unit(s) - leave white plug CN10 connection disconnected as shipped, until addressing procedure has been completed. This is only used for Central Control applications.

14. Final Installation Checks:

All indoor units and outdoor units are installed per the installation instructions.

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

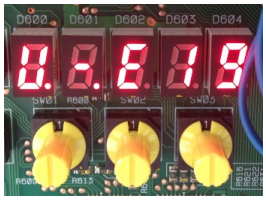
All wired controllers have been installed per the installation instructions. ☐ Yes ☐ No

All 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 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.

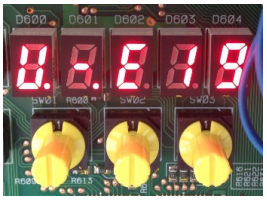


15. Evacuation Mode – Pulse Motor Valve (PMV) Forced Open Mode:

More detailed information can be found in the Service Manual, page 82.

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.