

Carrier Enterprise

Technical Services

Carrier Toshiba Mini VRF Installation Checklist

Site Name: Address: City, State: Contact:

Zip: 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:

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.

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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.



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Contractor: Address: City, State: Contact:



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Correct

Absorb vibration with

2. Outdoor Units – Mounting:

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0			vibration-proof rubber
The outdoor unit is level.	Yes	No	Fixing leg
The mounting base fully supports the unit across front and back.	Yes	No	Foundation
All four anchor bolts have been installed and secured.	Yes	No	ion with Sottom plate of outdoor unit
There is adequate water drainage, for defrost operation.	Yes	No	
The mounting base height is more than the expected snow level.	Yes	No	Foundation

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 14. More detail can be found in the Service Manual, page 82.

There are NOT any added refrigerant components - driers, sight glass	ses, solenoid v	valves,	etc.	Yes	s No
Full port ball valves may be used for component isolation during service	ce.				H
Were ball valves installed.			Yes	No	- BAR DE
If yes, verify all ball valves are in the open position.			Yes	No	Cloth
Ball valves are installed in the correct configuration per their installation	on instructions	i.	Yes	No	Torch
Nitrogen was purged through the system during all brazing.			Yes	No	Home
Enter the pressure setting used to purge nitrogen.				PSI	
15% brazing rods must be used for all brazed joints.	Yes	No	,		Unit: ft•lbs (N•m)
During brazing, a wet cloth was wrapped around valves.	Yes	No		Outer dia. of copper pipe	Tightening torque
A P 410A roted floring tool to form all flore connections	Voo	No		Ø1/4 (6.4 mm) Ø3/8 (9.5 mm)	10 to 13 (14 to 18) 24 to 31 (33 to 42)
A R-4 TOA Taleu hanny loof to form an hare connections.	Tes	INO	ŀ	Ø1/2 (12.7 mm)	37 to 46 (50 to 62)
A back up wrench and torgue wrench were used on all flare fittings.	Yes	No]	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 exits the unit from the REAR, BOTTOM or SIDE.	
Field installed refrigerant lines are connected per the outdoor unit Install Manual.	Yes
Field installed refrigerant lines are within the allowable length & height differences. Outdoor Unit Install Instructions, pages EN18 thru EN20.	Yes
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.	Yes
<u>All</u> refrigerant lines are insulated separately with min. $\frac{1}{2}$ " insulation. Check local code, some municipalities require thicker insulation.	Yes





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5. 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





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7. Refrigerant Piping – Min. Distances & Traps:

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Sockets, joints and insulation were installed per instructions.	Yes	No
Maintain a minimum distance of 18" 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:	Outdoor unit	Max. number of indoor units
Indoor unit can connect 50% to 135% of Outdoor unit capacity	MCY-MAP0367HSUL	6
*MCY-MAP0367HS-UL is 80% to 135% The number of indoor unit has not exceeded max.	MCY-MAP0487HSUL	8
Yes No	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 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: 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.

A micron gauge was used 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.			Yes	No
All refrigeration piping ha	as held below 500 microns for 1	hour. Enter final reading	Yes	No
Enter Triple Evacuation	readings and times below			
Step 1	PSI	Day/Time	Length	of Time
Step 2	PSI	Day/Time	Length	of Time
Step 3	PSI	Day/Time	Length	of Time
Vacuum was broke with	additional refrigerant charge		Yes	No

If not with what, please explain

Lbs.

Oz.



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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 in to CE.YesNoIf not send your revised version to your sales representative for updating.YesYes

Enter additional refrigerant charge amount - R410A.

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. The remainder of the additional charge can be added during the system start up process.	Lbs.		Oz.
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 $\geq \frac{1}{2}$ " wall thickness. Check local codes where job site is located, some areas by code require 1.5" thickness.	Yes	No
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





Yes

Yes

No

No



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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 - <u>Do Not</u> require an external condensate trap.

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

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



Vertical Ducted Fan Coil & High Static Duct 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.



Yes

All drains have been insulated.

All drains have been checked for leaks.

All drains installed per instructions and local codes.

 No
 All drains are sloped properly.
 Yes
 No

 No
 All drains are supported properly.
 Yes
 No

 Yes
 No
 Yes
 Yes

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12.2 Electric Wiring – Power Wiring Indoor Unit(s):

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

Enter circuit breaker size.	AMP			L1, L2 wiring connected.	Yes	No
Enter line voltage wire size.	AWG			Ground wire connected.	Yes	No
Strain relief wire clamp is tight.		Yes	No	All indoor units on same circuit.	Yes	No

12.3 Electric Wiring – Control Wiring:

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





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comfort excellence	Indoor unit	
12.4 Electric Wiring – Control Wiring Wired Remote Controller: Reference the Selection Report's for Control Wiring layout drawing.	Ground	
Remote Controller wiring is stranded, 2-conductor, non-polarity, 16 AWG wire. Yes No The remote controller does not have to be shielded.	nect	AIB
If the remote controller wire is different then above, enter type of wire used.		Remote control
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.	No.7	No.8
Are there any group controlled. Yes No Remote control		
12.5 Electric Wiring – Control Wiring Outdoor Unit:	0	
Indoor Unit daisy chain connected to U1, U2. Yes No	þ	
Control wire shield connected to "S". Yes No		=
White Molex connector CN10 is left unplugged. Yes No		4
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.		emmunication emminal board
13. 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.

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.



Yes

Yes

No

No



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14. 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.

15. 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 and send both to:

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.