FUJITSU

Halcyon HFI
Hybrid Flex Inverter

Quick Installation Guide

for Halcyon HFI Systems

Use this Quick Installation Guide to install Halcyon HFI Systems. Use the Installation Manual provided in the box only where this Guide asks you to refer to it for more information. To download the newest full Installation Manual, go to http://portal.fujitsugeneral.com.

*This is an Installation Guide and is **not** a replacement for proper system design. Please refer to the Design & Technical Manual for complete design limitations and capacity tables.*

1 Checklist

- ❑ AOU48RLXFZ Outdoor Condensing Unit
- ❑ Separation Tube Assemblies
  – when using more than one branch box
- ❑ Branch boxes
  – primary used for 1-3 indoor units
  – secondary used when installing more than 3 units
- ❑ Correctly sized line sets (both lines insulated separately)
- ❑ 2 to 8 Indoor units Halcyon HFI type (RLF)
- ❑ Pipe, wire, fittings, and mounting hardware
- ❑ R410a adaptor(s) Part# K9R410A55
- ❑ Nitrogen & regulator to purge lines
- ❑ Vacuum pump, micron gauge and torque wrench
- ❑ Normal tools for mini-split installation

2 Things to Note

- This is a quick installation guide not intended to replace the actual installation manual. For complete instructions follow the installation manual that is included with **each** piece of equipment.
- Don't take shortcuts and Don't follow any "rule of thumb"
- Always follow Local, State & Federal codes during installation
- Don't connect power to the equipment until you are ready to start and test.
- Adhere to all safety and installation warnings on the installation instructions for this equipment.
- Long piping can limit capacity. Please refer to the Design & Technical Manual for details.

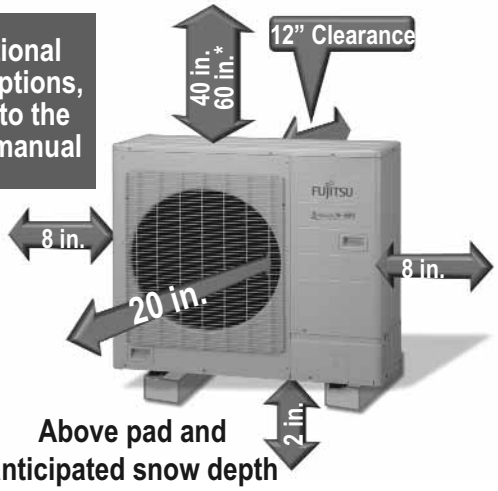
3 Branch Boxes

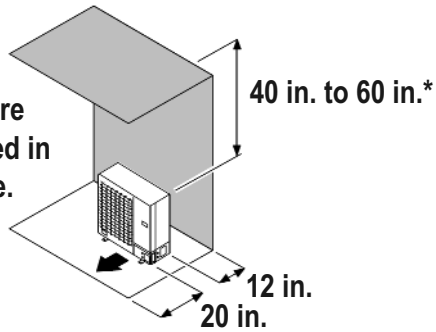
When installing Branch Boxes:

- Always install and tighten required flare adapters **BEFORE** installing or attaching Branch Box to the wall or ceiling especially in a confined space.
- Always tighten any flare caps on unused circuits.
- If you use pre-flared refrigerant pipes: Remember to remove the rubber end plug before attaching!
  - Unless line set flares are R410a rated, cut them off and re-flare using R410a rated flare nuts.

4 Unit Placement

For 16 additional placement options, please refer to the installation manual





5a Branch Boxes: Special Precautions

WHEN WIRING

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to branch boxes or outdoor unit until refrigerant charging is completed.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause accidental injury or death.
- Ground the unit following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

5b Knock Out Holes

- Knock out holes are provided for wiring (Fig. A)
- Knock out holes are provided 2 each in the same size in front, lateral, and rear sides (Fig. B)

Fig. A

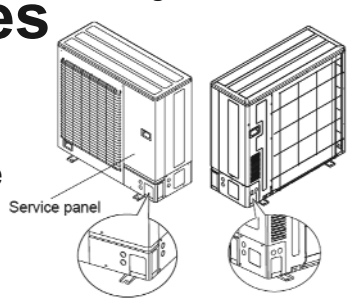
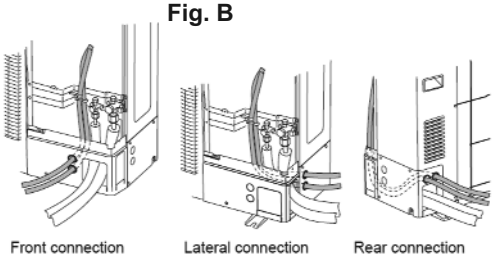


Fig. B



6 Basic Wiring Overview

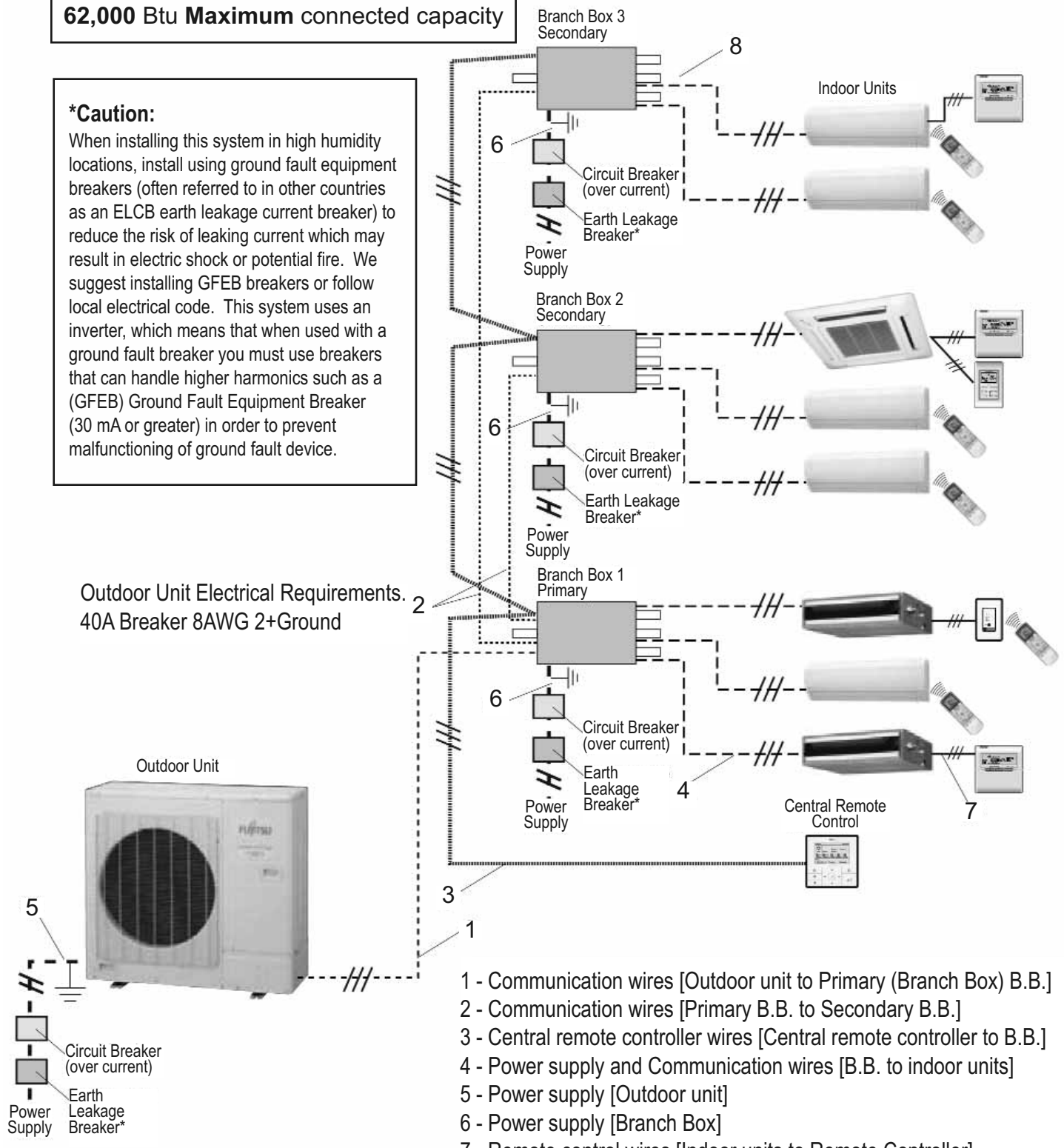
Refer to installation manual for complete wiring and design criteria.

WARNING!
Do not turn on power to system or branch boxes before completing full evacuation and refrigerant charging!

39,000 Btu **Minimum** connected capacity
62,000 Btu **Maximum** connected capacity

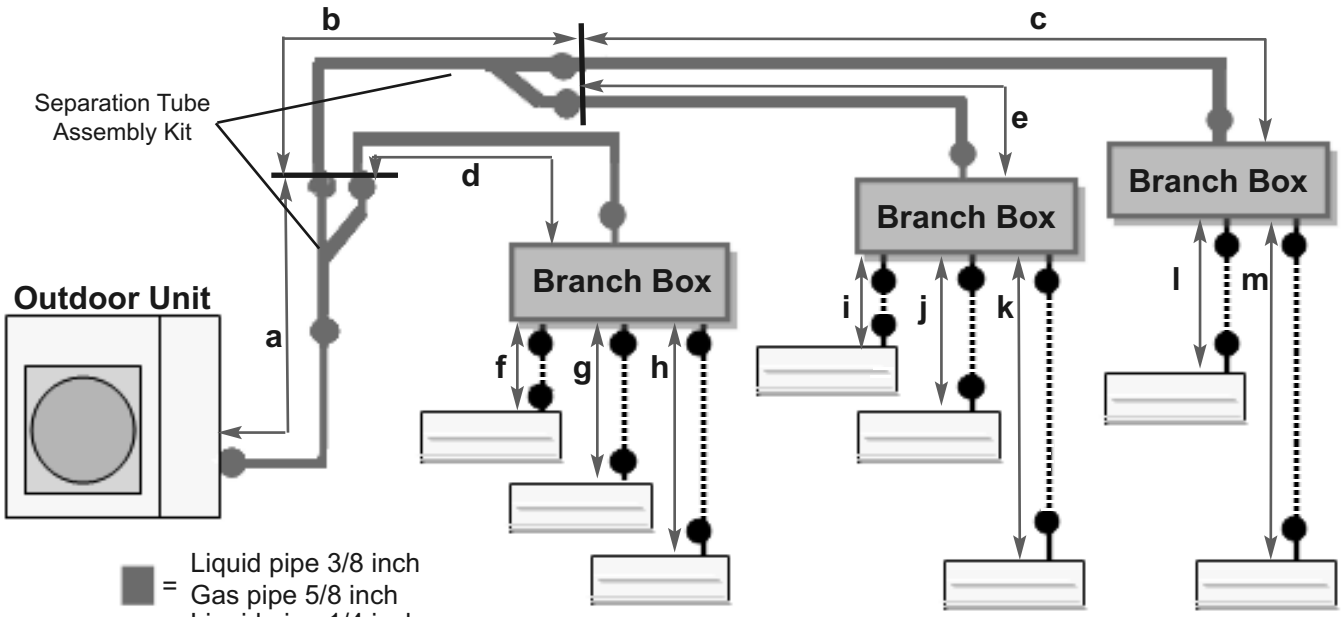
***Caution:**
When installing this system in high humidity locations, install using ground fault equipment breakers (often referred to in other countries as an ELCB earth leakage current breaker) to reduce the risk of leaking current which may result in electric shock or potential fire. We suggest installing GFEB breakers or follow local electrical code. This system uses an inverter, which means that when used with a ground fault breaker you must use breakers that can handle higher harmonics such as a (GFEB) Ground Fault Equipment Breaker (30 mA or greater) in order to prevent malfunctioning of ground fault device.

Outdoor Unit Electrical Requirements.
40A Breaker 8AWG 2+Ground



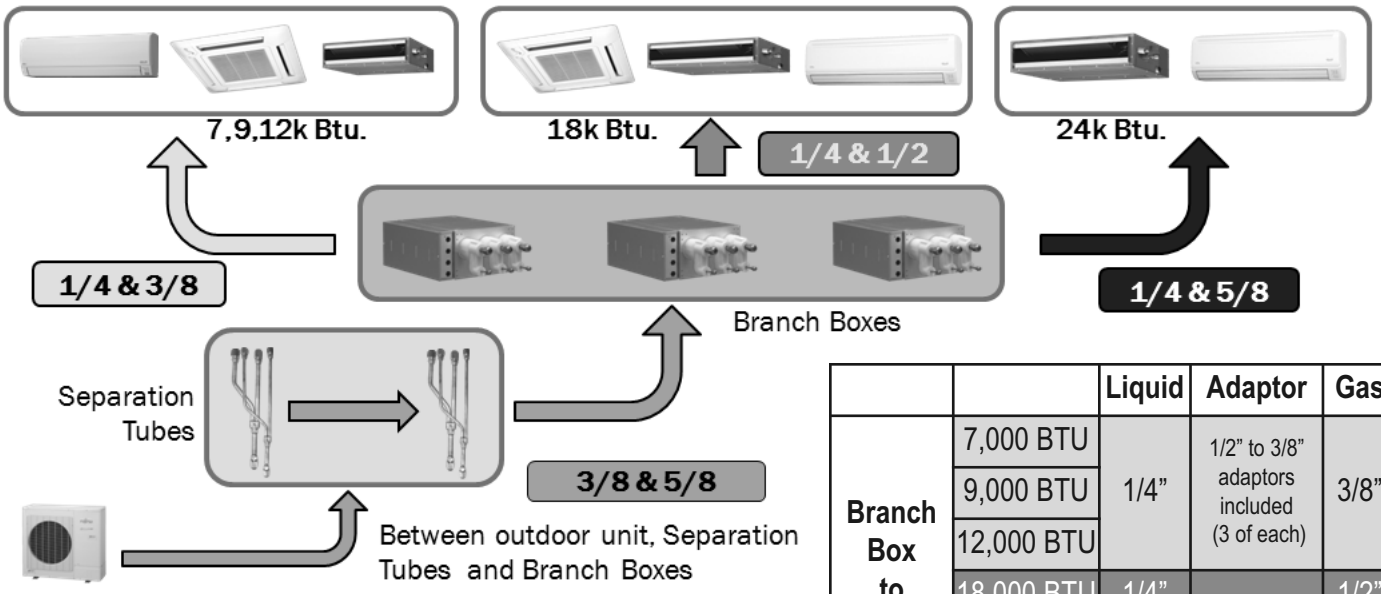
1 - Communication wires [Outdoor unit to Primary (Branch Box) B.B.]
2 - Communication wires [Primary B.B. to Secondary B.B.]
3 - Central remote controller wires [Central remote controller to B.B.]
4 - Power supply and Communication wires [B.B. to indoor units]
5 - Power supply [Outdoor unit]
6 - Power supply [Branch Box]
7 - Remote control wires [Indoor units to Remote Controller]

7 Piping Restrictions



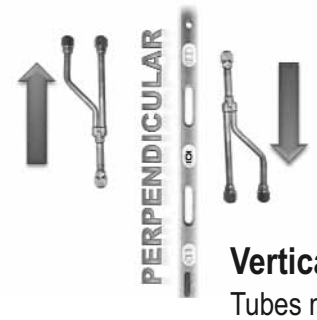
*Branch box outlets are all 1/2" on gas pipe connections.
1/2" to 3/8" adaptors and 1/2" to 5/8" adaptors included (3 of each).

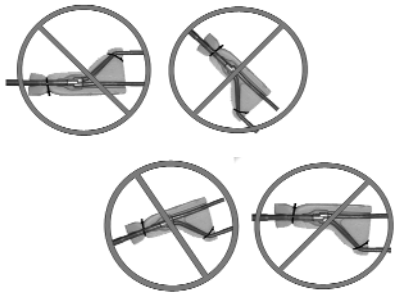
8 Refrigerant Pipe Sizes



		Liquid	Adaptor	Gas
Branch Box to Indoor Unit	7,000 BTU	1/4"	1/2" to 3/8" adaptors included (3 of each)	3/8"
	9,000 BTU			
	12,000 BTU			
	18,000 BTU	1/4"		1/2"
	24,000 BTU	1/4"	1/2" to 5/8" adaptors included (3 of each)	5/8"

9 Separation Tube Assembly



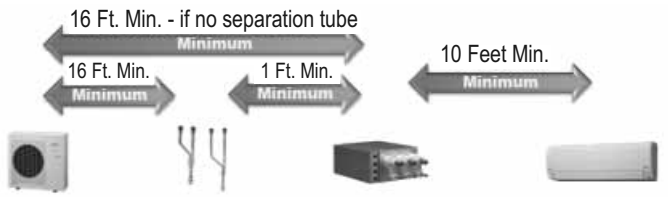


Vertical Positioning:
Tubes must stand straight up or down. They **CANNOT** be tilted or angled more than 10% off perfectly vertical.

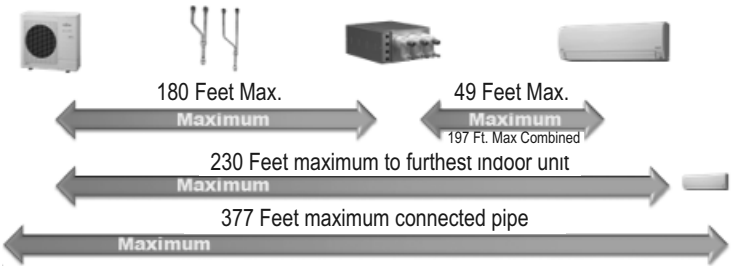
Horizontal Positioning:
Tubes must lay flat horizontal They **CANNOT** be tilted or angled more than 10% off Flat and Level in either direction.

10a Pipe Length

MINIMUM Allowable Pipe Lengths



MAXIMUM Allowable Pipe Lengths



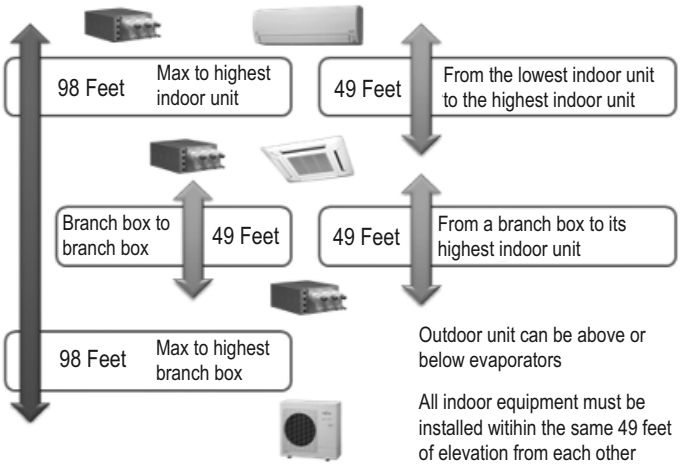
Note: Pipe lengths must include fitting losses.

Pipe Limitation			Limitations
Allowable pipe length (actual pipe length)	Total Pipe Length		Up to 377 ft.
	Between outdoor unit and the farthest indoor unit		Up to 230 ft.
	Between outdoor unit and branch boxes		Up to 180 ft.
	Between branch boxes and indoor unit	Total	Up to 197 ft.
		Ea. Unit	10 ft. to 49 ft.
	Between outdoor unit and the first separation tube		16 ft. or more
	Between outdoor unit and branch box (no separation tube)		16 ft. or more
	Between outdoor unit and branch box (if separation tube used)		17 ft. or more

10b Elevation

Maximum allowable height difference
Height = Elevation, not pipe length

Pipe Limitation		Limitations
Allowable height difference	Between outdoor unit and indoor unit	Up to 98 ft.
	Between outdoor unit and branch box	Up to 98 ft.
	Between branch box and branch box	Up to 49 ft.
	Between indoor unit and indoor unit	Up to 49 ft.



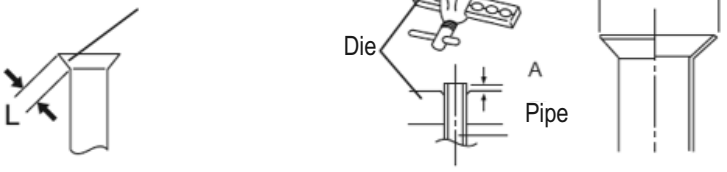
Outdoor unit can be above or below evaporators

All indoor equipment must be installed witihin the same 49 feet of elevation from each other

11 Flaring

- Cut pipe with a sharp tube cutter
- Deburr & clean out shavings
- Flare with quality tool
- Set depth properly for good flange
- Make sure nut pulls easily over flange not scraping threads. Too big and it will leak.
- Place a thin film of correct refrigerant oil on male bevel.
- Hand tighten keeping line straight.
- Tighten correctly using a torque wrench according to the, “Tightening torque” chart.

Check if (L) is flared uniformly and is not cracked or scratched.

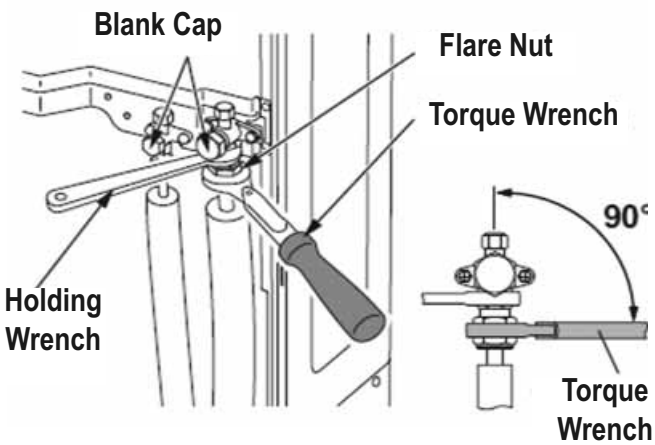


Pipe outside diameter in.(mm)	Dimension A in. (mm) Flare tool for R410A, clutch type	Dimension B in. (mm)
1/4 (6.35)	0 to 0.0197 (0 to 0.5)	23/64 (9.1)
3/8 (9.52)		33/64 (13.2)
1/2 (12.7)		21/32 (16.6)
5/8 (15.88)		25/32 (19.7)

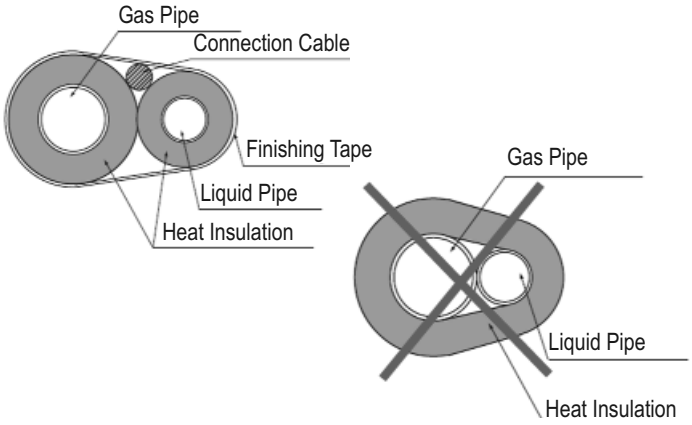
12 Pipe Size Torque

Flare nut (lbf) Tightening torque
1/4 - 16 to 18
3/8 - 32 to 42
1/2 - 49 to 61
5/8 - 63 to 75

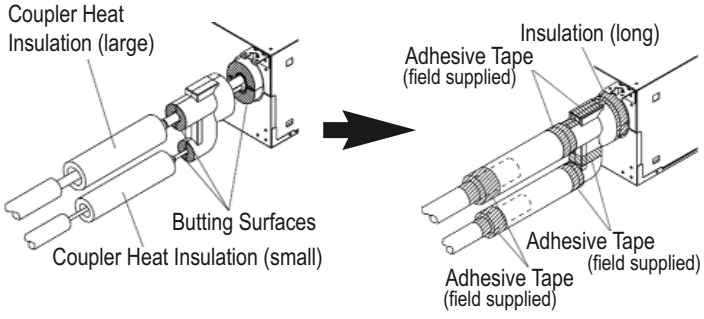
Flare nut (N·m) Tightening torque
6.35 - 142 to 159
9.52 - 283 to 372
12.70 - 434 to 540
15.88 - 558 to 664



13 Insulation

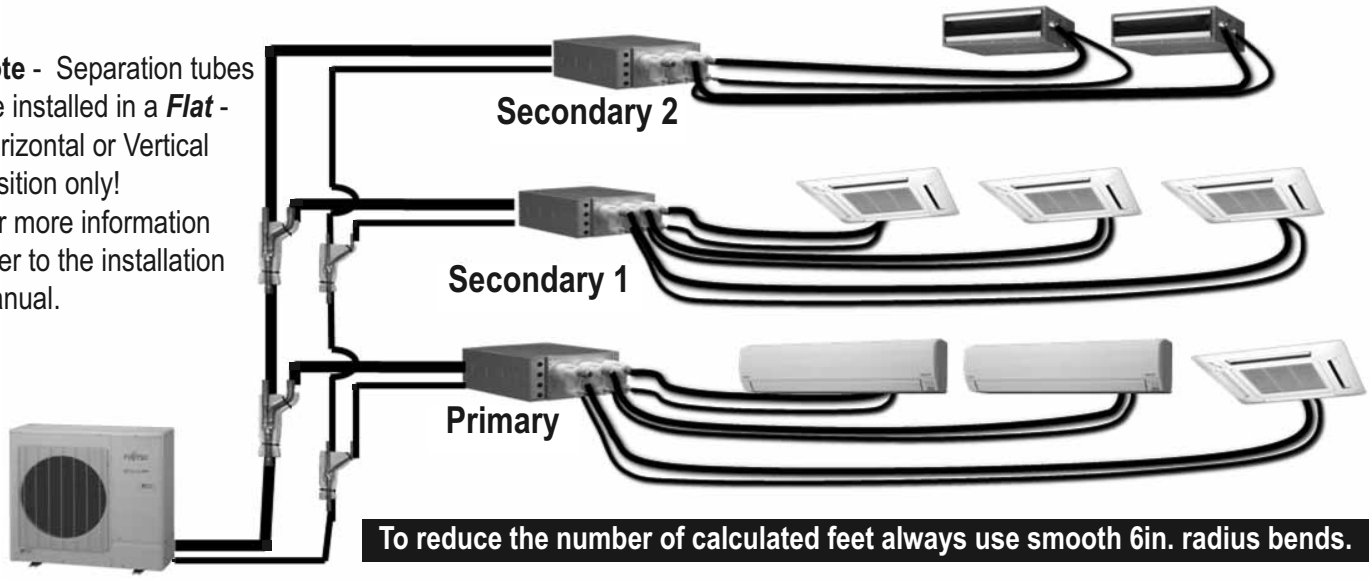


All refrigerant pipes and connections
MUST BE INSULATED SEPARATELY



14 Refrigerant Pipe - Example Layout

Note - Separation tubes are installed in a ***Flat*** - Horizontal or Vertical position only!
For more information refer to the installation manual.



To reduce the number of calculated feet always use smooth 6in. radius bends.

15a Equivalent Pipe Length

An onsite bend of less than 6 in. radius is calculated at .35 Equivalent Feet.

Halcyon HFI system requires any bends tighter than a 6 in. radius to be counted as extra feet of pipe.

- Count the number of bends that have a less than 6 in. radius _____(#)
- Multiply the number of bends by 0.35 = (Equivalent Length)
- Add the Equivalent length to the actual feet of installed line set = the calculated length.

15b

Example: (Your pipe sizes are 5/8 and 3/8)
A System with 5 bends each less than 6 in radius between the outdoor unit and the 1st branch box.

5/8 - Multiply no. of bends **5** X 0.35 = 1.75(ft)

3/8 - Multiply no. of bends **5** X 0.35 = 1.75(ft)

Now add those 2 together to equal= **3.5 (ft)**

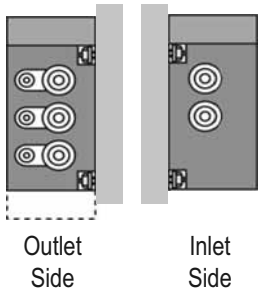
3.5 feet added to actual length makes the equivalent pipe length you must calculate.

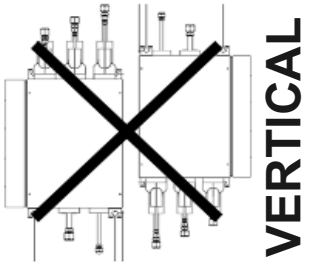
When brazing:
Refer to the installation manual when using elbows or hard pipe for pipe length calculation.

16a Branch Box Layout

4 factory supplied hanger brackets allow for flexible positioning.

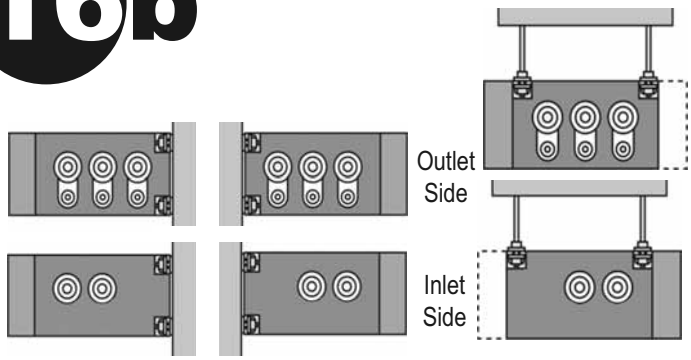
Vertical Wall Mount





- Factory Insulated Branch Boxes do not need a condensate drain line or a drain pan.
- Incorrect installation will void warranty and may cause electrical short in board.
- Suction line should always be on the top or side never on the bottom in relation to the discharge line. Electrical box is never on the bottom.

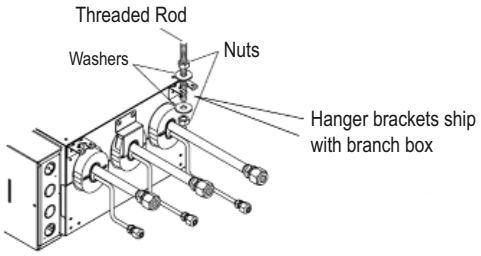
16b

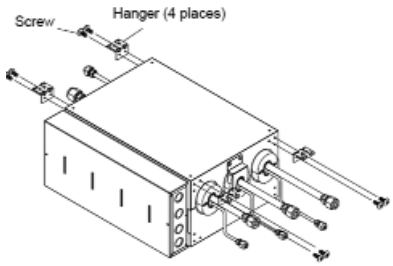


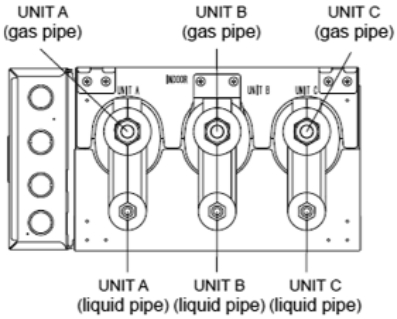
- Can be hung from the ceiling or on the wall by changing the location of hanger.
- Control box can be attached to the either side in **HORIZONTAL** position only.

- Branch boxes do not have a weatherproof enclosure.
- **Cannot be mounted outside or in a space above 80% relative humidity.**
- May be installed in a storage space that is inside the insulated envelope of the building.

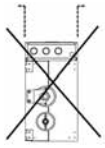
17 Branch Box Installation







CAUTION



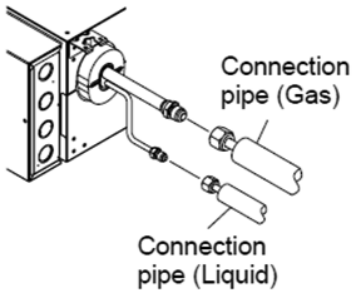
- Do not hang from the ceiling when performing a vertical installation.
- Secure the accessory hangers to the branch box with the screws provided.
- Use 3/8 threaded rods with hexagonal nuts and washers (field supplied) as shown on the figure.
- Make sure branch box is level before fastening the nuts. (The unit's slope must be within ±5° from level.)

Branch box is marked with engraved letters indicating each corresponding indoor unit (UNIT A, UNIT B and UNIT C).

UNIT A: Refrigerant pipe connection port for UNIT A
UNIT B: Refrigerant pipe connection port for UNIT B
UNIT C: Refrigerant pipe connection port for UNIT C

CAUTION

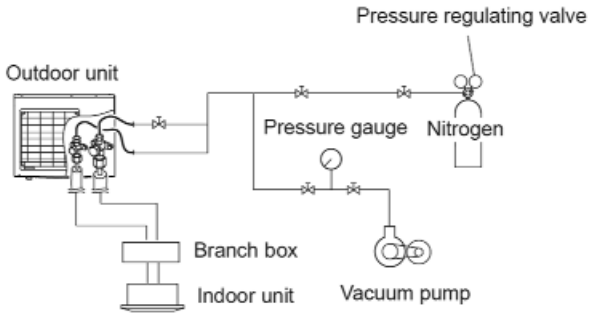
Label all the refrigerant piping (liquid pipe, gas pipe) specifying to which indoor units they will be connected.



18 Leak Test

YOU MUST!

- After connecting all refrigerant pipes connect gauge hose and a regulated nitrogen tank to one connection of the outdoor unit's port and purge entire system with nitrogen through the indoor units and back out the other port.
- Pressurize the entire piping system with nitrogen to 600PSI and leak test every fitting carefully with soap bubbles!
- Perform a 24 hour standing pressure test with nitrogen to assure a leak free system
- Keep service valves on the outdoor unit closed until system is evacuated and refrigerant is added.
- It is highly recommended that you replace the oil in the vacuum pump before it is used.



19 Evacuate & Charge

YOU MUST!

Never apply power to a Fujitsu HFI system until leak testing, repair, evacuation & the refrigerant has been added to the system!

- After completing nitrogen purge and leak test slowly remove nitrogen from the system
- Connect vacuum pump and micron gauge
- Using industry standard "Best Practices" evacuate system to **500 microns** and make sure it holds for 60 minutes.
- While evacuating calculate system charge requirements.

20 Refrigerant Charge

IMPORTANT NOTE:
R410a must be added to ALL Halcyon HFI Systems!

Never apply power to a Fujitsu HFI system until leak testing and evacuation and system refrigerant has been added!

Charge is based on length of the **liquid/small** line side of the system's pipes

- **Total length in feet of liquid ⅜** (small) pipes from outdoor unit ***to Branch Boxes***
- **Total length of feet of liquid ¼ pipes** from Branch Boxes ***to all indoor units***
- **Then add charge based on table below.**

Calculate the refrigerant charge as follow:

- Multiply ⅜ calculated pipe length **from outdoor unit to branch boxes** by .624 oz per ft.
- Multiply calculated ¼ pipe length **Branch Boxes to all Indoor Units** by .224 oz per foot

Example: *78 ft calculated ⅜ pipe & 110 feet of calculated ¼ pipe*

- ⅜@78ft X .624oz = 48.672oz divide oz by 16 to get 3.042lbs
- ¼@110ft X .224 oz = 24.64 oz = divide by 16 to get 1.54lbs
- Now Add ⅜ @ 48.672oz + ¼@ 24.64oz = 73.31oz – 4.58 lbs of R410a

Pipe Diameter	Location	Additional Refrig.
3/8"	Outdoor to Branch Box	0.624 oz./ft. or 58g/meter
1/4"	Branch Box to Indoor Unit	0.224 oz./ft. or 21g/meter
(Total length of 3/8" liquid line × 0.624 oz./ft. or 58g/meter) + (Total length of 1/4" liquid line × 0.224 oz./ft. or 21g/meter)		
(a+b+c+d+e) × 0.624 oz./ft. or 58g/meter + (f+g+h+i+j+k+l+m) × 0.224 oz./ft. or 21g/meter = additional refrigerant		

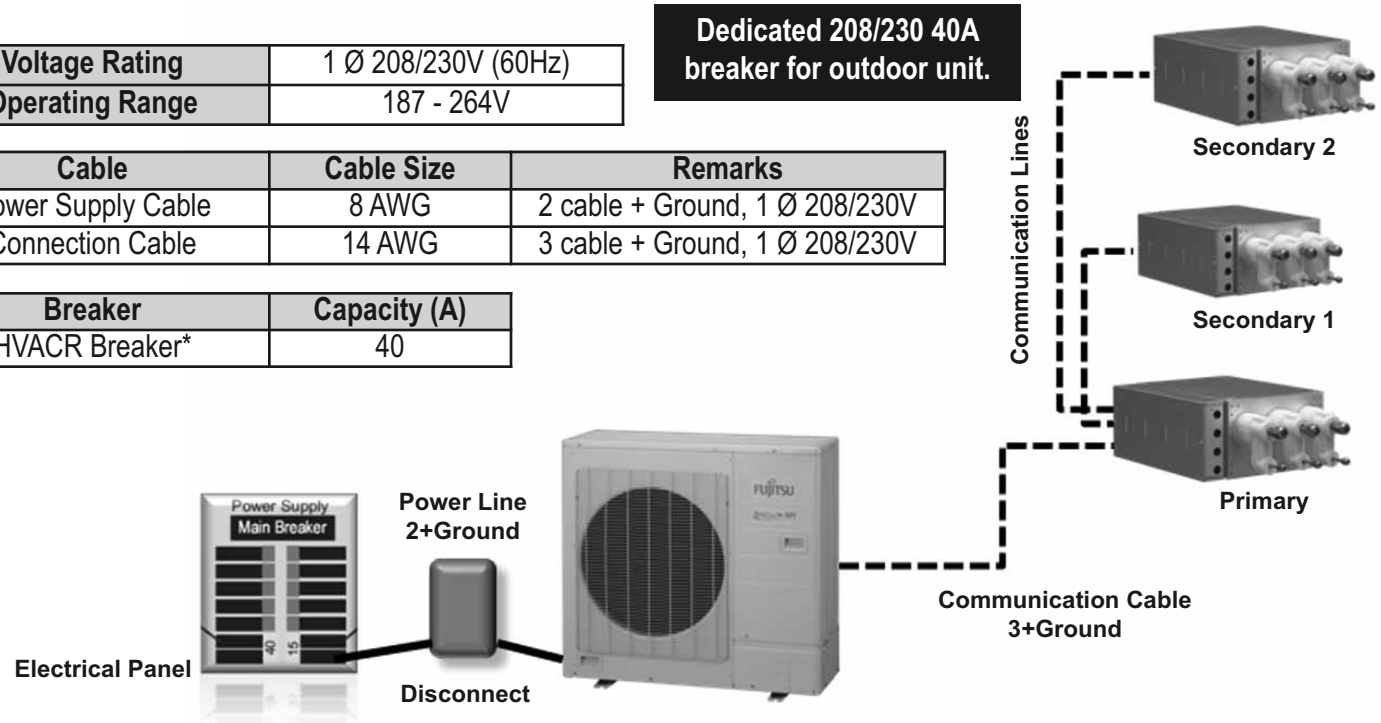
21a Electrical Requirement - Outdoor Unit

Voltage Rating	1 Ø 208/230V (60Hz)
Operating Range	187 - 264V

Dedicated 208/230 40A breaker for outdoor unit.

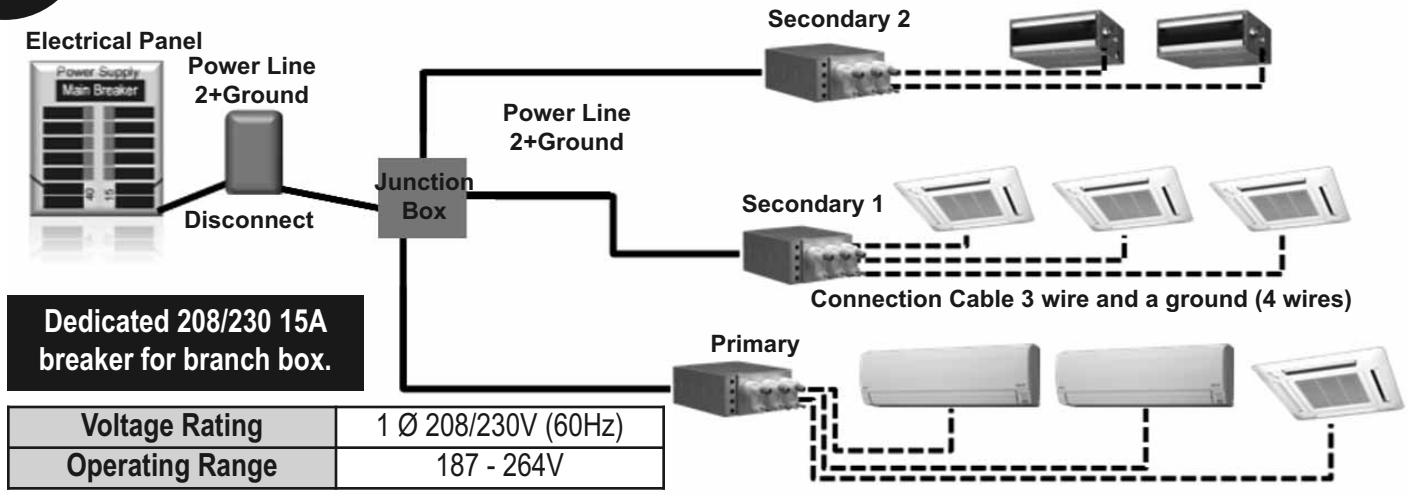
Cable	Cable Size	Remarks
Power Supply Cable	8 AWG	2 cable + Ground, 1 Ø 208/230V
Connection Cable	14 AWG	3 cable + Ground, 1 Ø 208/230V

Breaker	Capacity (A)
HVACR Breaker*	40



* When installing this system in high humidity locations, install using ground fault equipment breakers (often referred to in other countries as an ELCB earth leakage current breaker) to reduce the risk of leaking current which may result in electric shock or potential fire. **We suggest installing GFEB breakers or follow local electrical code.** This system uses an inverter, which means that when used with a ground fault breaker you must use breakers that can handle higher harmonics such as a (GFEB) Ground Fault Equipment Breaker (30 mA or greater) in order to prevent malfunctioning of ground fault device.

21b Electrical Requirement - Branch Boxes



Dedicated 208/230 15A breaker for branch box.

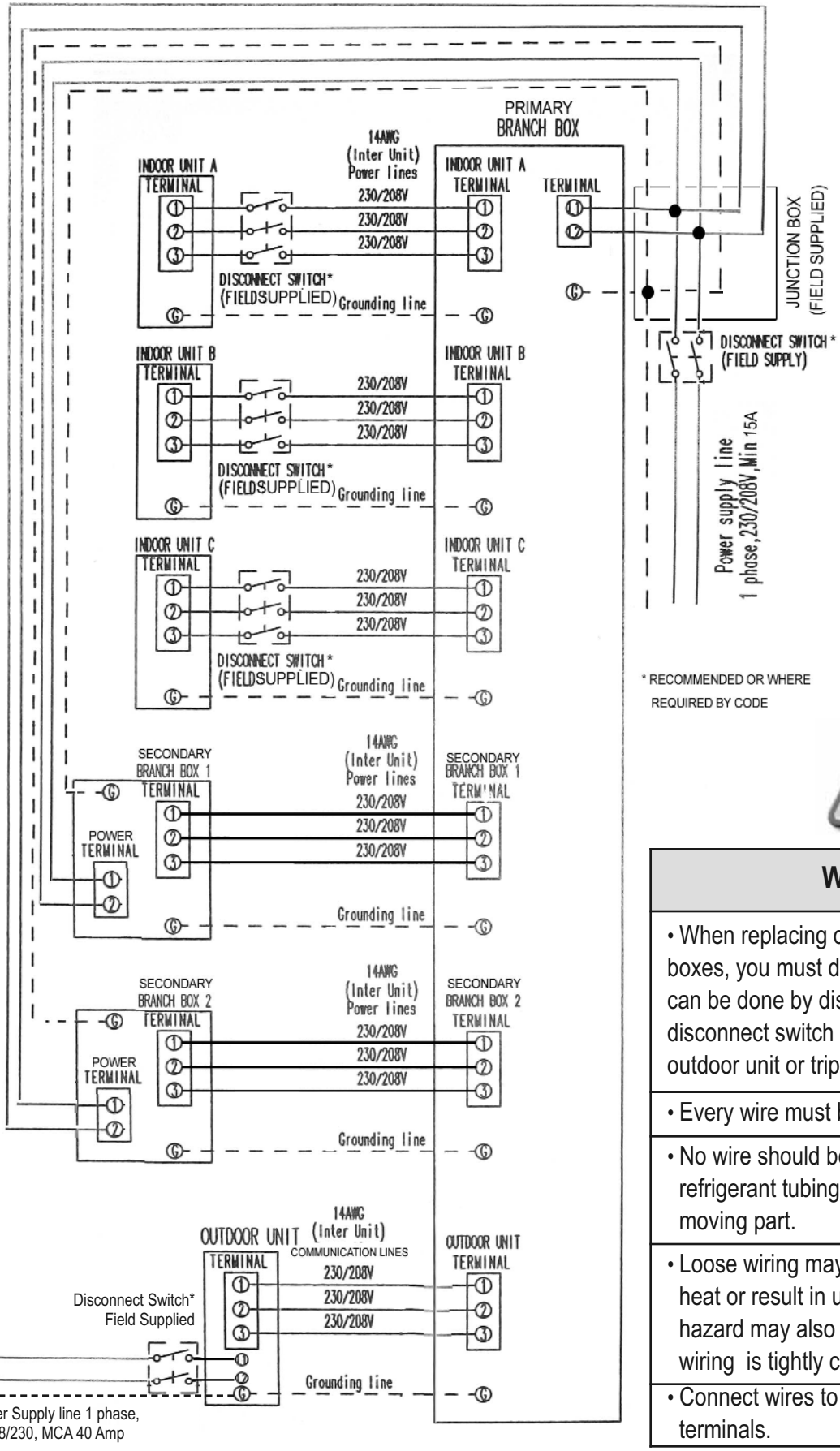
Voltage Rating	1 Ø 208/230V (60Hz)
Operating Range	187 - 264V

Cable	Cable Size	Remarks
Power Supply Cable	14 AWG	2 cable + Ground, 1 Ø 208/230V
Connection Cable	14 AWG	3 cable + Ground, 1 Ø 208/230V

Breaker	Capacity (A)
HVACR Breaker*	15

* When installing this system in high humidity locations, install using ground fault equipment breakers (often referred to in other countries as an ELCB earth leakage current breaker) to reduce the risk of leaking current which may result in electric shock or potential fire. **We suggest installing GFEB breakers or follow local electrical code.** This system uses an inverter, which means that when used with a ground fault breaker you must use breakers that can handle higher harmonics such as a (GFEB) Ground Fault Equipment Breaker (30 mA or greater) in order to prevent malfunctioning of ground fault device.

22 Wiring Primary Branch Box



* RECOMMENDED OR WHERE REQUIRED BY CODE

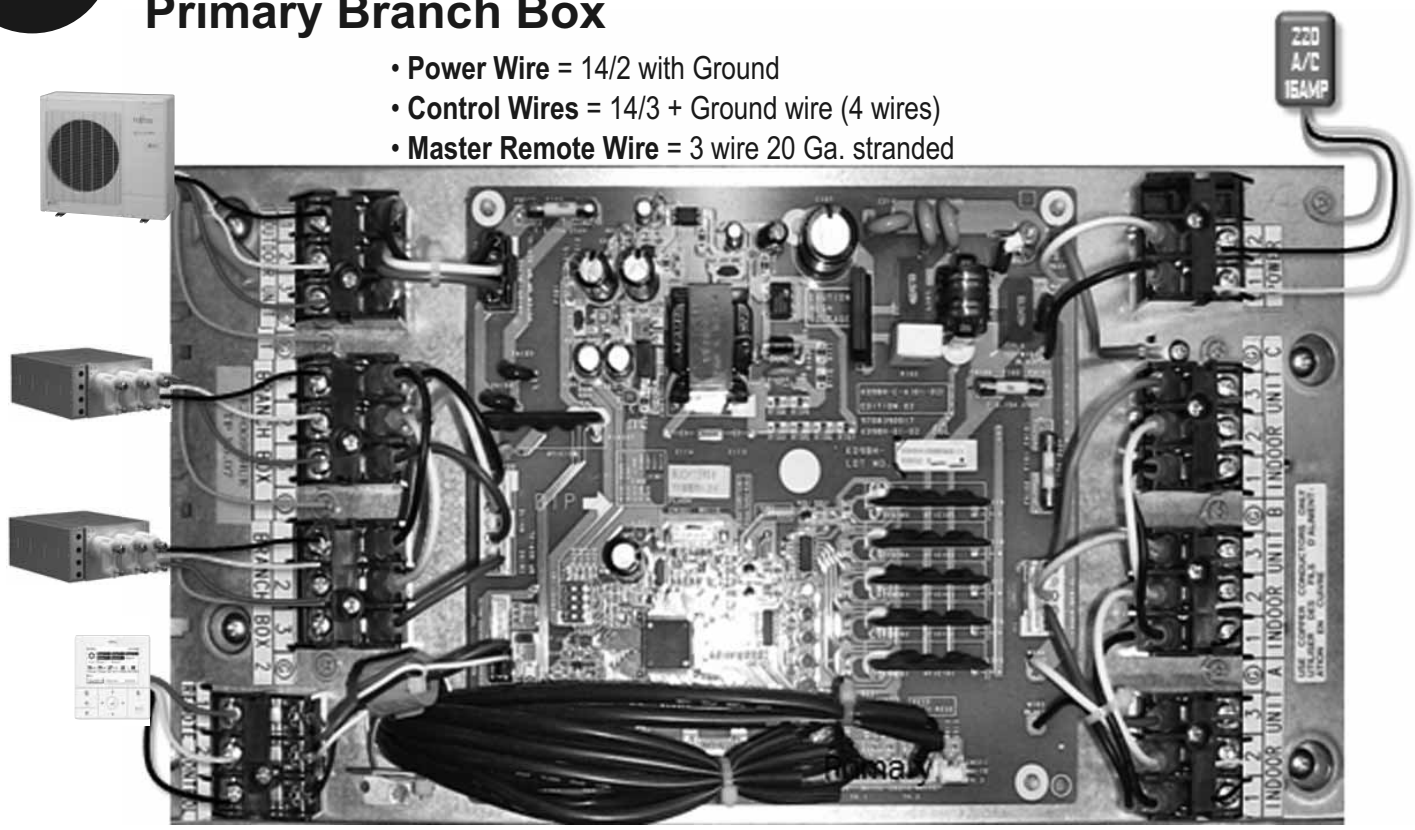
WARNING

- When replacing or servicing any branch boxes, you must disconnect all power. This can be done by disconnecting power at the disconnect switch by the junction box and the outdoor unit or tripping both breakers.
- Every wire must be connected firmly.
- No wire should be allowed to touch refrigerant tubing, the compressor or any moving part.
- Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, be sure all wiring is tightly connected.
- Connect wires to the matching numbers of terminals.

23 Electrical Connection

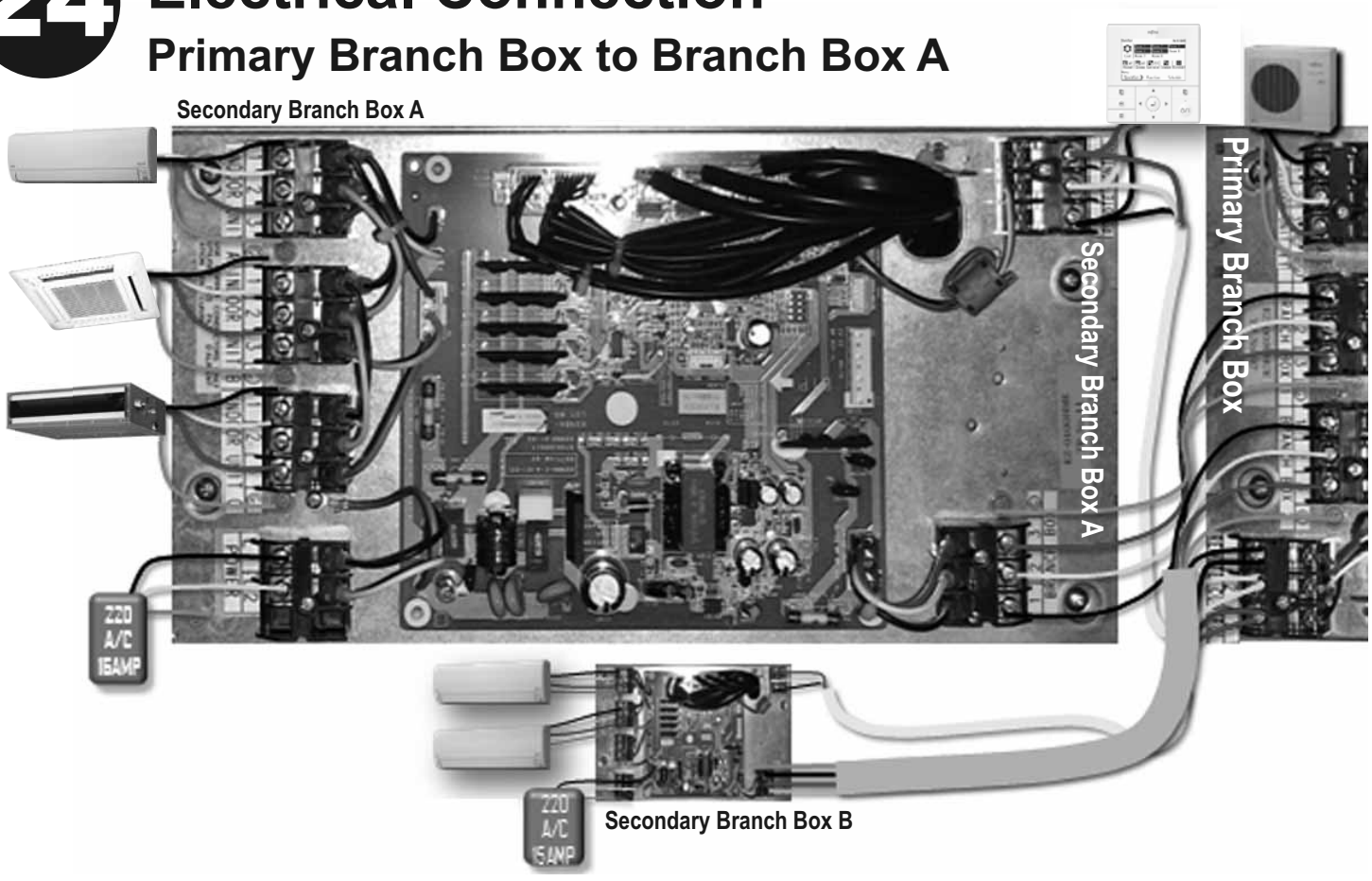
Primary Branch Box

- **Power Wire** = 14/2 with Ground
- **Control Wires** = 14/3 + Ground wire (4 wires)
- **Master Remote Wire** = 3 wire 20 Ga. stranded



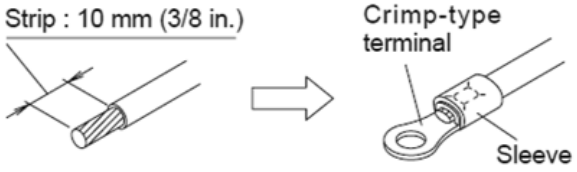
24 Electrical Connection

Primary Branch Box to Branch Box A

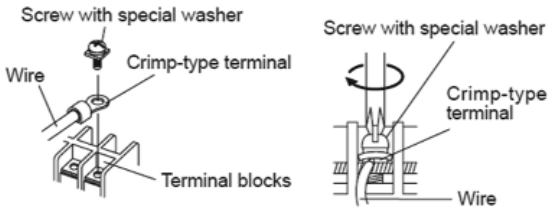


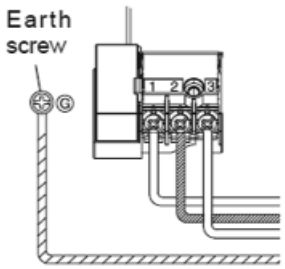
25 Electrical Connections

Stranded Wire Shown



Solid or Stranded Wire





26 Before Turning On Power

1. Was the system leak tested, purged with nitrogen and evacuated?
2. Have all refrigeration lines been insulated separately?
3. Was the correct amount of refrigerant added? All HFI systems require the addition of refrigerant
4. Is the system electrical supply all connected according to instructions and codes?
5. Are all system electrical connections tight?
6. Have the service valves been opened on the outdoor unit?

27 Pre-Start-Up Checklist

Perform the Check Operation - auto diagnostic function

- See installation manual before running Check Operation system function.

ALWAYS PERFORM THE CHECK OPERATION. NORMAL OPERATION WILL NOT BE POSSIBLE WITHOUT PERFORMING THE CHECK OPERATION.

If you attempt Test Run or system operation "FAIL" is displayed when operating the unit before the check operation is completed. Once the Check Operation has been performed put system in Test Run mode.

Before finishing:

Confirm operation of each indoor unit individually

- Check for cool or warm air flow depending on mode
- Confirm air flow and louver operation
- Make sure all remotes operate the units

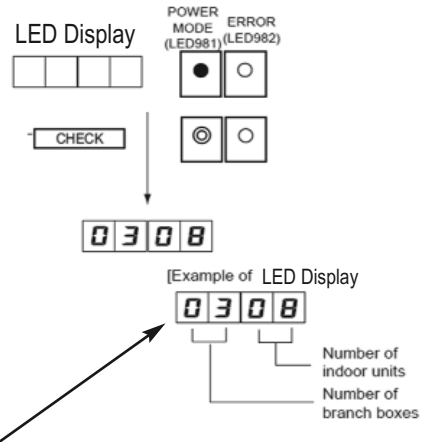
Read actual installation manual for complete details on the operating conditions and limitations during "check operation."

28a Check Operation

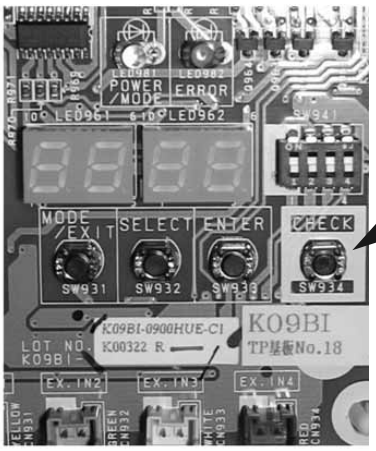
(1) Turn on power to the outdoor unit, indoor units and branch boxes.

(2) Press and hold the CHECK button for approximately 5 seconds.

(3) The number of connected branch boxes and internal units will be displayed on the display. Check that the displayed number matches the actual number of connected units.

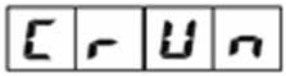


28b

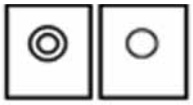


(4) Press and hold the **CHECK** button **again** for approximately 5 seconds. The Check operation will start.

(5) Check operation will stop automatically. If you MUST stop the system, press the MODE/EXIT button. connected units.

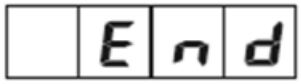


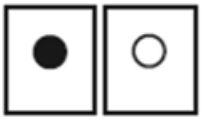
Operating in Check Run Mode



28c

Check operation will stop automatically when done.





OPERATION HAS FINISHED NORMALLY WITHOUT ERROR.

You cannot execute the stop operation using the remote control.

When an error occurs, consult the installation manual for complete instructions following error display.

When you've completed this step, power needs to be reset.

29 Test Run

Perform after successful Check Operation (28a) above.

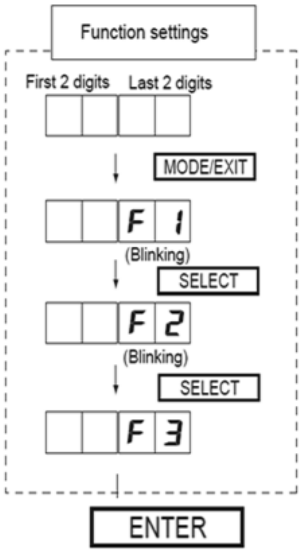
Test run is not possible during an error code condition.

Refer to the installation manual for all error codes and repair instructions.

- During test run, the outdoor unit and the connected indoor units will start operating. Room temperature control along with the remote controller commands will be ignored during test run.
- Test run set with the outdoor unit doesn't stop automatically. Be sure to stop the Test Run to place the system in normal operation cooling/heating.
- Operation mode cannot be changed during the test run. To change the operation mode, please stop test run first.

30 Test Run Setting

Test run setting method



MODE/EXIT Press the "MODE/EXIT" button.

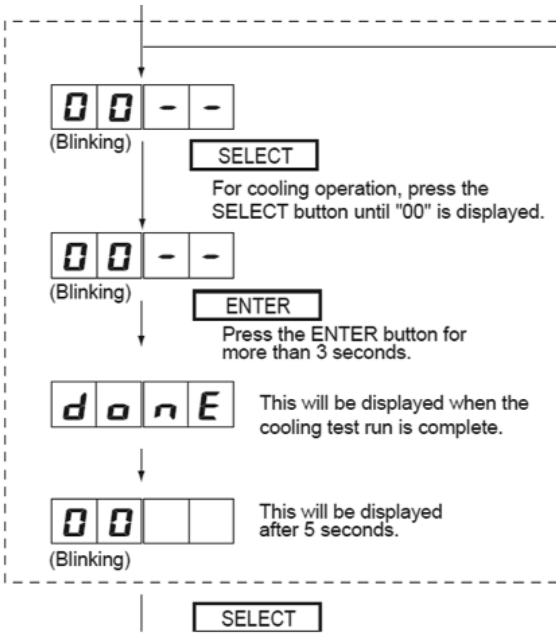
SELECT Press the "SELECT" button.

ENTER Press the "ENTER" button.

(When [F4] to [F9] are displayed, continue to press the SELECT button until [F3] is displayed.)

- Press **Mode/Exit** button
- Press **Select** button until F3 appears
- Press **Enter**
- Select "00"
- Press **Enter**

31 Start Test Run for Cooling

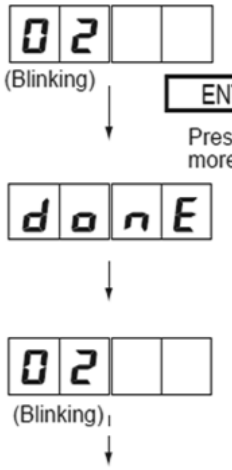


When setting for test run are complete it will display "done" on the LED and test run will commence.

32 Stop Test Run

To stop Test Run:

- Press Select until "02" is displayed
- Press Enter



Refer to the installation manual for heating test run mode and the different operating conditions.

After test run is complete, turn off the power. Then replace the cover of the electrical component box and the front panel of the outdoor unit.

33 Homeowner Information

Things to review with the home owner – from the Operation Manual.

- Wireless remote controls will need 2 AA batteries seasonally depending on use.
- Filters will need to be cleaned in all indoor units on a monthly basis.
- Regular seasonal maintenance is required including washing of outdoor coils.

- ECONOMY OPERATION
- MINIMUM HEAT OPERATION
- CLEANING AND CARE
- DEFROST OPERATION

Run the units in normal modes and confirm operation.

Operating Modes

AUTO .....64-88°F
Heating .....60-88°F
Cooling/Dry .....64-88°F

Example: When set to 80°F

Simultaneous Use of Multiple Indoor Units:

1. This system has a 100% capacity of 48,000 BTUs.
2. Whether you connect a total of 48,000 BTUs of indoor units or you connect up to 62,000 BTUs of indoor units, the system will only provide a total of 48,000 BTUs of capacity.
3. If you operate indoor units over 100 percent of capacity up to 62,000 BTU's at the same time, each indoor capacity will be reduced. The total capacity delivered will be 48,000 BTU.
4. When using connectable capacity above the rated 100% of the outdoor unit's BTU capacity cycle the indoor units to increase the desired indoor unit's capacity to its rated BTUs.

Outdoor Unit Operating Range:
Cooling 25 to 115°F (-5 to 46°C)
Heating 5 to 75°F (-15 to 24°C)

Warning

Always use a licensed installer or contractor to install this product. Do not try to install the product yourself. Improper installation can result in water or refrigerant leakage, electrical shock, fire or explosion. Use only parts and accessories supplied or specified by Fujitsu. Ask a licensed contractor to install parts and accessories. Use of unauthorized or improper installation of parts and accessories can result in injury or property damage. Read the owner's operation manual carefully before using this product. The owners operation manual provides important safety instructions and warnings which should be followed closely. For any questions or concerns, please contact Fujitsu General America, Inc.

Trademarks

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Complete System Warranty

All 2010 **Halcyon HFI Systems** have a warranty of:

5 Year Parts, 7 Year Compressor Warranty.

Note: Condensing units come pre-charged from factory. Additional refrigerant may be required, be sure to check installation manual for more details.

- Cooling capacity is based on the following conditions:
  Indoor temperature: 80°F DB/67°F WB (26.7°C DB/19.4°C WB)
  Outdoor temperature: 95°F DB/75°F WB (35°C DB/23.9°C WB)
- Heating capacity is based on the following conditions:
  Indoor temperature: 70°F DB (21.1°C DB)
  Outdoor temperature: 47°F DB/43°F WB (8.3°C DB/6.1°C WB)

Non-Internet Retail Policy

Internet sales are strictly prohibited and unauthorized. Any HVAC systems purchased on the Internet, from an online retailer or any similar e-tailing website, OR where the original factory serial numbers of the display have been removed, defaced, or replaced in any way **WILL NOT BE COVERED BY WARRANTY.**

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