Installation and Maintenance Manual IM 986-18

Group: **ATS**
Part Number: **IM986-18**
Date: **July 2023**

Vertical Stack Water Source Heat Pumps

Model VHF Cabinet
Model VHC Chassis (Standard Range)
Model VHW Chassis (Geothermal Range)

Unit Sizes 009 – 036 / R-410A Refrigerant

Model VHF **Model VHC/VHW**

Hazard Identification Information

⚠ WARNING

This Installation and Maintenance bulletin is intended to provide the proper procedures for installing a Daikin Console Water Source Heat Pump. Failure to follow these procedures can cause property damage, severe personal injury or death. Additional, failure to follow these procedures can cause premature failure of this equipment or cause erratic unit operation, resulting in diminished unit performance. Disregarding these directions may further lead to suspension or revocation of the manufacturer's warranty.

⚠ DANGER

Dangers indicates a hazardous situation, which will result in death or serious injury if not avoided.

⚠ WARNING

Warnings indicate potentially hazardous situations, which can result in property damage, severe personal injury, or death if not avoided.

⚠ CAUTION

Cautions indicate potentially hazardous situations, which can result in personal injury or equipment damage if not avoided.

Note: *Indicates important details or clarifying statements for information presented.*

Note: *Text displayed in* ***Bold-Italics*** *designate standard offering.*

Category	Code Item	Code Option	Code Designation & Description *(Bold-Italic = Standard)*
Product Category	**1**	**1**	***W = Water Source Heat Pump***
Model Type	**2**	**2, 3, 4**	***VHC = Vertical Stacked Heat Pump Chassis***
			VHF = Vertical Stacked Heat Pump Cabinet
			VHW = Vertical Stacked Geothermal Chassis only
Design Series	**3**	**5**	3 = 3rd Design
			4 = 4th Design (Sizes 015 only)
Unit Size	**4**	**6, 7, 8**	009 = 9,000 Btuh Nominal Cooling
			012 = 12,000 Btuh Nominal Cooling
			015 = 15,000 Btuh Nominal Cooling
			018 = 18,000 Btuh Nominal Cooling
			021 = 21,000 Btuh Nominal Cooling
			024 = 24,000 Btuh Nominal Cooling
			030 = 30,000 Btuh Nominal Cooling
			036 = 36,000 Btuh Nominal Cooling
Controls	**5**	**9**	***B = MicroTech III Unitary Controller - Standalone***
			C = Microtech III Unitary Controller w/LonWorks Comm Module
			D = Microtech III Unitary Controller w/BACnet Comm Module
			F = Microtech III Unitary Controller w/BACnet Comm Module - WSHP System
Voltage	**6**	**10**	A = 115/60/1
			E = ***208-230/60/1***
			J = 265-277/60/1
Secondary Drain Pan	**7**	**11, 12**	***GL = Standard Galvanized***
			SS = Stainless Steel - IAQ Option
			YY = None
Refrigerant	**8**	**13**	***A = R410A***
Motorized 2-way Isolation Valve	**9**	**14**	C = 2-Way Motorized 1/2" Iso-Valve, General Close-Off Pressure N.C. (Normally Closed)
			V = 2-Way Motorized 1/2" Iso-Valve, General Close-Off Pressure N.O. (Normally Open)
			H = 2-Way Motorized 1/2" Iso-Valve, High Close-Off Pressure N.C. (Normally Closed)
			D = 2-Way Motorized 3/4" Iso-Valve, General Close-Off Pressure N.C. (Normally Closed)
			K = 2-Way Motorized 3/4" Iso-Valve, General Close-Off Pressure N.O. (Normally Open)
			J = 2-Way Motorized 3/4" Iso-Valve, High Close-Off Pressure N.C. (Normally Closed)
			E = 3-Way Motorized 1/2" Iso-Valve, General Close-Off Pressure N.C. (Normally Closed)
			G = 3-Way Motorized 1/2" Iso-Valve, High Close-Off Pressure N.C. (Normally Closed)
			M = 3-Way Motorized 3/4" Iso-Valve, General Close-Off Pressure N.C. (Normally Closed)
			P = 3-Way Motorized 3/4" Iso-Valve, High Close-Off Pressure N.C. (Normally Closed)
			B = Auto-Reg-PT
			Y = None
Chassis Construction Type	**10**	**15**	A = 1/2" Fiberglass Skin Faced
			E = 3/8" Closed Cell Foam
Note:			Y = None
A compressor sound blanket is not available for units with a rotary compressor (Unit sizes 009-021)		**16**	M = Mass Plate & Compressor Blanket (Unit Sizes 024-036 Only)
			Y = None
			S = Mass Plate Only
		17	D = Corrosion Protection
			Y = None
Coaxial Heat Exchanger Construction	**11**	**18**	C = Copper Inner Tube - Steel Outer Shell
			S = Cupronickel Inner Tube - Steel Outer Shell
Discharge Air	**13**	**20**	B = Primary Supply - Back
			F = Primary Supply - Front
			L = Primary Supply - Left
			R = Primary Supply - Right
			T = Primary Supply - Top
			Y = None
		21	B = Secondary Supply - Back
			F = Secondary Supply - Front
			L = Secondary Supply - Left
			R = Secondary Supply - Right
			T = Secondary Supply - Top
			Y = None
		22	T = Tertiary - Top
Power Connection	**14**	**23**	F = Fused Disconnect with Wire Harness
			N = Non-Fused Disconnect with Wire Harness
			H = HACR Breaker

Note: *Text displayed in* ***Bold-Italics*** *designate standard offering.*

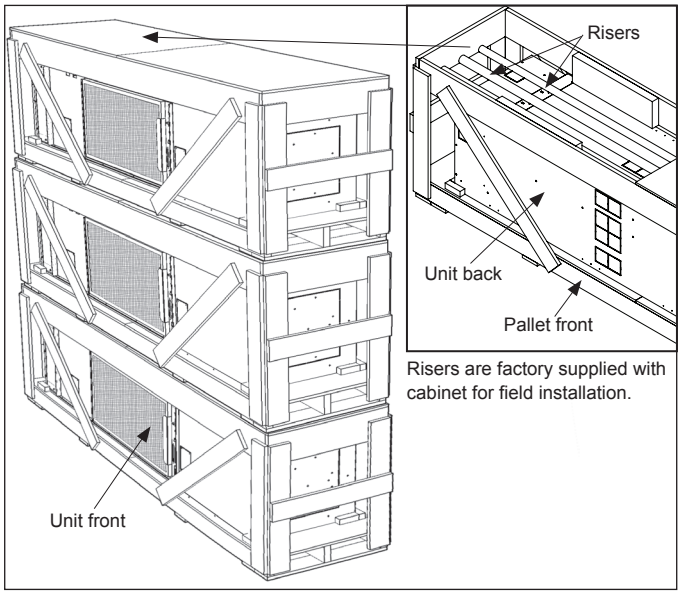
Category	Code Item	Code Option	Code Designation & Description *(Bold-Italic = Standard)*
Blower Motor	**15**	**24, 25**	12 = PSC Motor, 2-Speed Fan, T'stat Controlled
			13 = PSC Motor, 2-Speed Fan Switch (Unit Mounted)
			22 = High Static PSC Motor, 2-Speed Fan, T'stat Controlled (Sizes 015-018)
			23 = High Static PSC Motor, 2-Speed Fan Switch (Unit Mounted - Sizes 015-018)
			34 = EC Motor, 4-Position Fan Speed Selection Switch
Power & Control Access	**16**	**26**	***S = Side***
			T = Top
Flow Control	**17**	**27**	B = Auto Flow Regulator 1.5 GPM
			C = Auto Flow Regulator 2.0 GPM
			D = Auto Flow Regulator 2.5 GPM
			E = Auto Flow Regulator 3.0 GPM
			F = Auto Flow Regulator 3.5 GPM
			G = Auto Flow Regulator 4.0 GPM
			H = Auto Flow Regulator 4.5 GPM
			I = Auto Flow Regulator 5.0 GPM
			J = Auto Flow Regulator 5.5 GPM
			K = Auto Flow Regulator 6.0 GPM
			L = Auto Flow Regulator 7.0 GPM
			M = Auto Flow Regulator 8.0 GPM
			N = Auto Flow Regulator 9.0 GPM
			O = Auto Flow Regulator 10.5 GPM
			YY = None
		28	S = Strainer
Filter Type	**18**	**29**	***S = Standard 1" Fiberglass***
			Y = None
			M = 1" Merv 8
			H = 2" Merv 13
Cabinet Height	**19**	**30, 31, 32**	080 = 80" Cabinet Height
			088 = 88" Cabinet Height
			092 = 92" Cabinet Height
			096 = 96" Cabinet Height
			KDN = 63.5" Cabinet (for ducted discharge applications only)
Cabinet Insulation	**20**	**33, 34**	AY = Standard 1/2" Fiberglass
			EY = 3/8" Closed Cell Foam (IAQ)
			FY = 1/2" Foil Faced
			YY = None
Riser Mounting	**21**	**35**	F = Factory Supplied Shipped with Cabinet - for Field Installation
			J = Factory Supplied Shipped Separate from Cabinet - for Field Installation
Riser Location	**22**	**36**	L = Left Cabinet Piping
			R = Right Cabinet Piping
			B = Back Cabinet Piping
Heating Options	**23**	**37**	H = Hot Water Coil
			Y = None
Heating Control Option		**38**	Y = None
		39	A = 3-Way 1/2" Motorized Valve
			B = 3-Way 3/4" Motorized Valve
			Y = None
Wireless T'Stat Option	**24**	**40**	N = Factory Installed Wireless RF Receiver with Non-Programmable Thermostat
			P = Factory Installed Wireless RF Receiver with 7-Day Programmable Thermostat
			Y = None
Factory Installed Subbase	**28**	**47**	2 = 2 Inch Subbase
			3 = 3 Inch Subbase
			4 = 4 Inch Subbase
			5 = 5 Inch Subbase
Packaging	**30**	**50**	1 = Multipack Chassis or Single Crated Cabinet
			2 = Multipack Cabinets - Multiple Cabinets on one pallet group

Receiving and Storage

Upon receipt of the equipment, check the carton and pallets for visible damage. Make a notation on the shipper's delivery ticket before signing. If there is any evidence of rough handling, immediately open the cartons to check for concealed damage. If any damage is found, notify the carrier within 48 hours to establish your claim and request their inspection and a report. The Warranty Claims Department should then be contacted.

Cabinet Stacking (1 unit per crate)

Do not stack over three crates high at any time during transportation or storage.



Risers are factory supplied with cabinet for field installation.

Chassis (4 per skid)

Do not stack over two skid high at any time during transportation or storage. For storing, each carton is marked with "up" arrows.

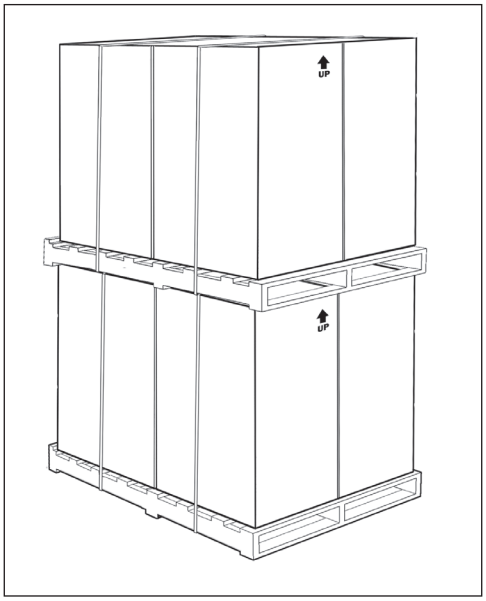


Table 1: Short stack 63.5" cabinet without factory attached risers - overall shipping dimensions (4-pack dimensions shown)

Unit Size	Overall Dimensions
009-012	42-5/8" x 45-1/2" x 67-5/8"
015-018	46-5/8" x 46-3/8" x 67-5/8"
021-036	54-5/8" x 57-1/2" x 67-5/8"

Note: 63.5" high cabinets ship from 1 to 4 per skid, vertically, similar to the chassis's as shown above.

Storage and Operating Environment

Temporary storage at the job site must be indoor, completely sheltered from rain, snow, etc. Units should not be installed in environments that fall below freezing or exceed 140°F ambient.

Table 2: Cabinet packaging overall dimensions

Unit Size		Cabinet Size		
		18 x 18	**18 x 20**	**24 x 24**
009-012	**With Risers**[1]	21"W x 29"H x 91.50" to 124.50"L	–	–
	Without Risers	21"W x 27"H x 91.50" to 107.50"L	–	–
015-018	**With Risers**[1]	_	21"W x 31"H x 91.50" to 124.50"L	–
	Without Risers	_	21"W x 29"H x 91.50" to 107.50"L	–
021-036	**With Risers**[1]	_	–	27"W x 35"H x 91.50" to 124.50"L
	Without Risers	_	–	27"W x 23"H x 91.50" to 107.50"L

Note: [1] Risers are factory supplied with cabinet for field installation.

Handling

Carefully check items against the bills of lading to verify all crates and cartons have been received. Cabinets and Chassis normally ship four to a pallet.

Carefully inspect all units for shipping damage. Report damage immediately to the carrier and file a claim.

Check the unit data plate to be sure the unit electrical agrees with the power supply available (Figure 1).

DO NOT handle units by the riser piping. Riser clamps hold the riser in position; they are not designed to support the cabinet weight. The clamps are removed after the unit is installed.

Figure 1: Unit components & descriptions - received as assembled cabinet with chassis shipped separate

Component Descriptions (Assembled Cabinet)

1. Cabinet assembly complete (without chassis)
   - **1a.** Pipe riser sets (return, supply and condensate)
   - **1b.** Inner front panel and filter bracket
2. Cooling and heating chassis (shipped separate)
3. Return air grille/panel (accessory)
4. Double-deflection diffuser (accessory)

Unit cabinets are factory assembled and wired and have individual thermostat control capability. They are installed by stacking one unit on top of the other. While installing, prevent dirt and other foreign matter from entering the risers and plugging lines or valves.

General Information

Daikin Vertical Stack units are designed for use in multiple floor apartments, office buildings, hotels, nursing homes and other similar applications. They require a minimum amount of floor space and are designed for multiple discharge arrangement.

Installation and maintenance must follow accepted industry practices as described in the ASHRAE Handbook, the National Electric Code, and other applicable standards. Install this equipment in accordance with regulations of authorities having jurisdiction and with all applicable codes.

⚠ CAUTION

Installation and maintenance are to be performed by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment.

⚠ WARNING

The installer must determine and follow all applicable codes and regulations. This equipment presents hazards of electricity, rotating parts, sharp edges, heat and weight. Failure to read and follow these instructions can result in property damage, severe personal injury or death. This equipment must be installed by experienced, trained personnel only.

⚠ CAUTION

Sharp metal edges are a hazard, use care when servicing to avoid contact with them.

Disassembling Upper and Lower Cabinet Sections

The Vertical Stack unit cabinet ships completely assembled. If required, it may be disassembled into two (2) sections (upper-fan/discharge cabinet) and (lower chassis/return air cabinet) to make it easier to handle. To disassemble, do the following.

1. Remove risers (if received attached).
2. Remove the three (bottom row) screws on the back of the unit as shown in Figure 2.

Note: *Retain all screws for later use to reassemble unit in reverse order as described in steps 1-6. Number of screws will vary depending on unit size.*

3. Carefully lay the unit down on its back and remove the remaining eight (8) screws on the left and right side of the cabinet (Figure 3).
4. Remove the ten (10) screws and lift off the front panel/filter rack to gain access to the cabinet interior (Figure 4).
5. Locate and remove the six (6) screws located inside the cabinet joining the upper and lower cabinet sections (Figure 5).

Note: *Pull the insulation away from the walls of the cabinet interior to get access to the screws.*

6. Separate the lower return air cabinet section from the upper blower/discharge cabinet section (Figure 6).

Figure 2: Remove three (3) screws (bottom row) on the back of the unit.

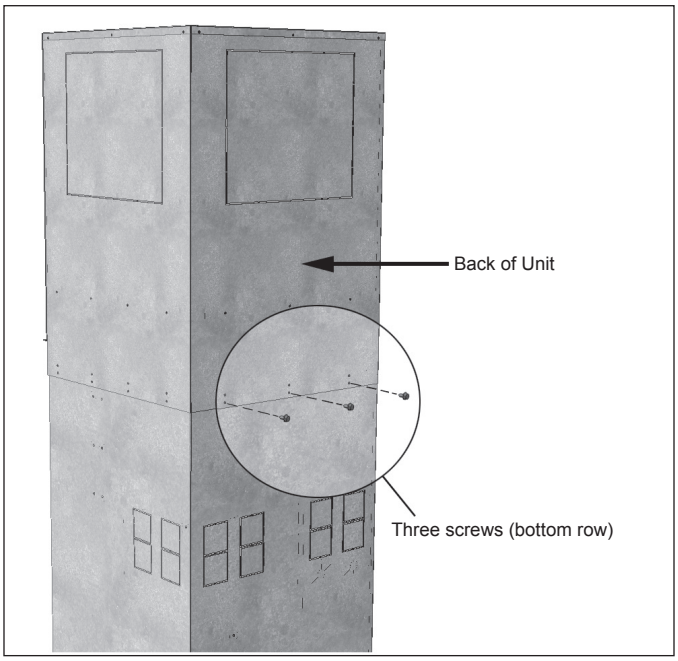


Figure 3: Remove remaining eight (8) screws on the left and right sides of the cabinet

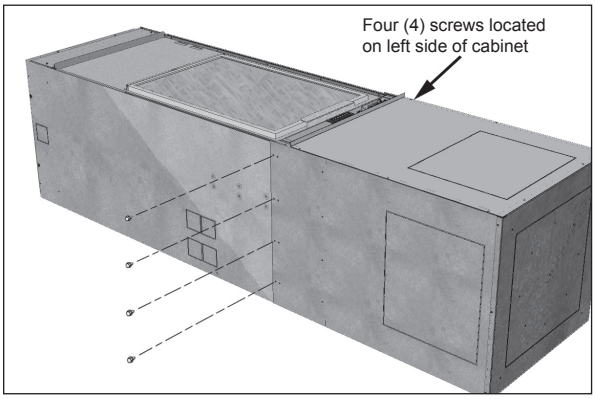


Figure 4: Remove the ten (10) screws from the front panel/ filter rack.

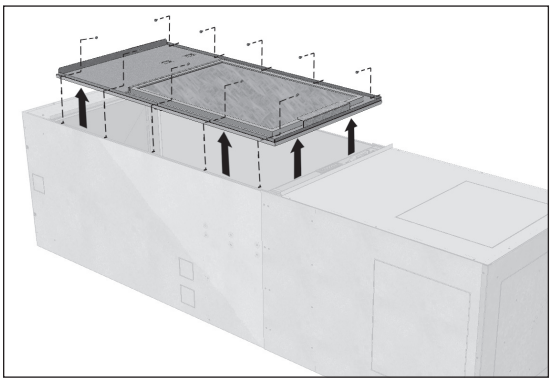


Figure 5: Remove the six (6) screws located on the interior of the unit.

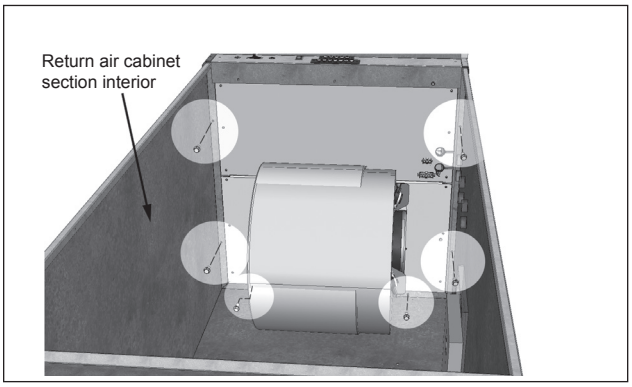
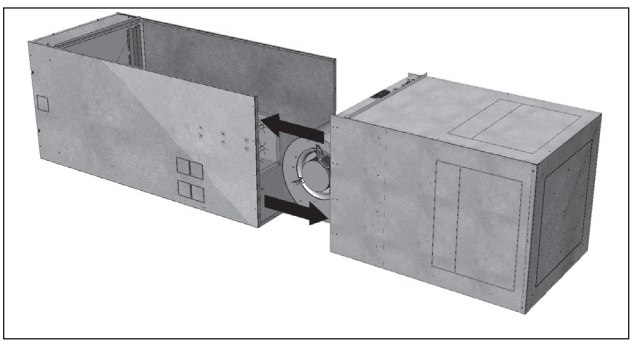
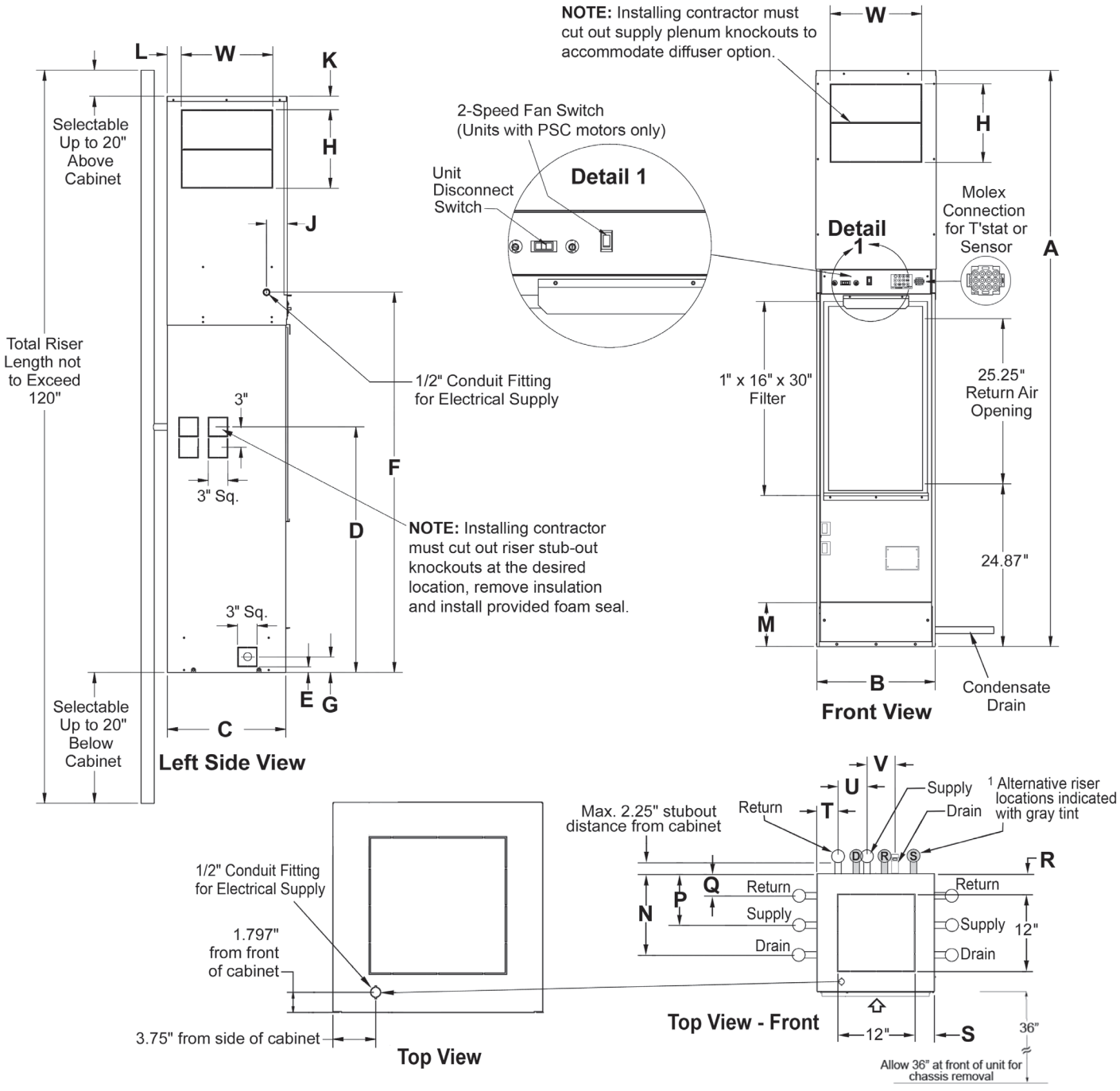


Figure 6: Separate the lower cabinet section from the upper cabinet.



Model VHF & VHW – 18" × 18" Cabinet – Size 009-012



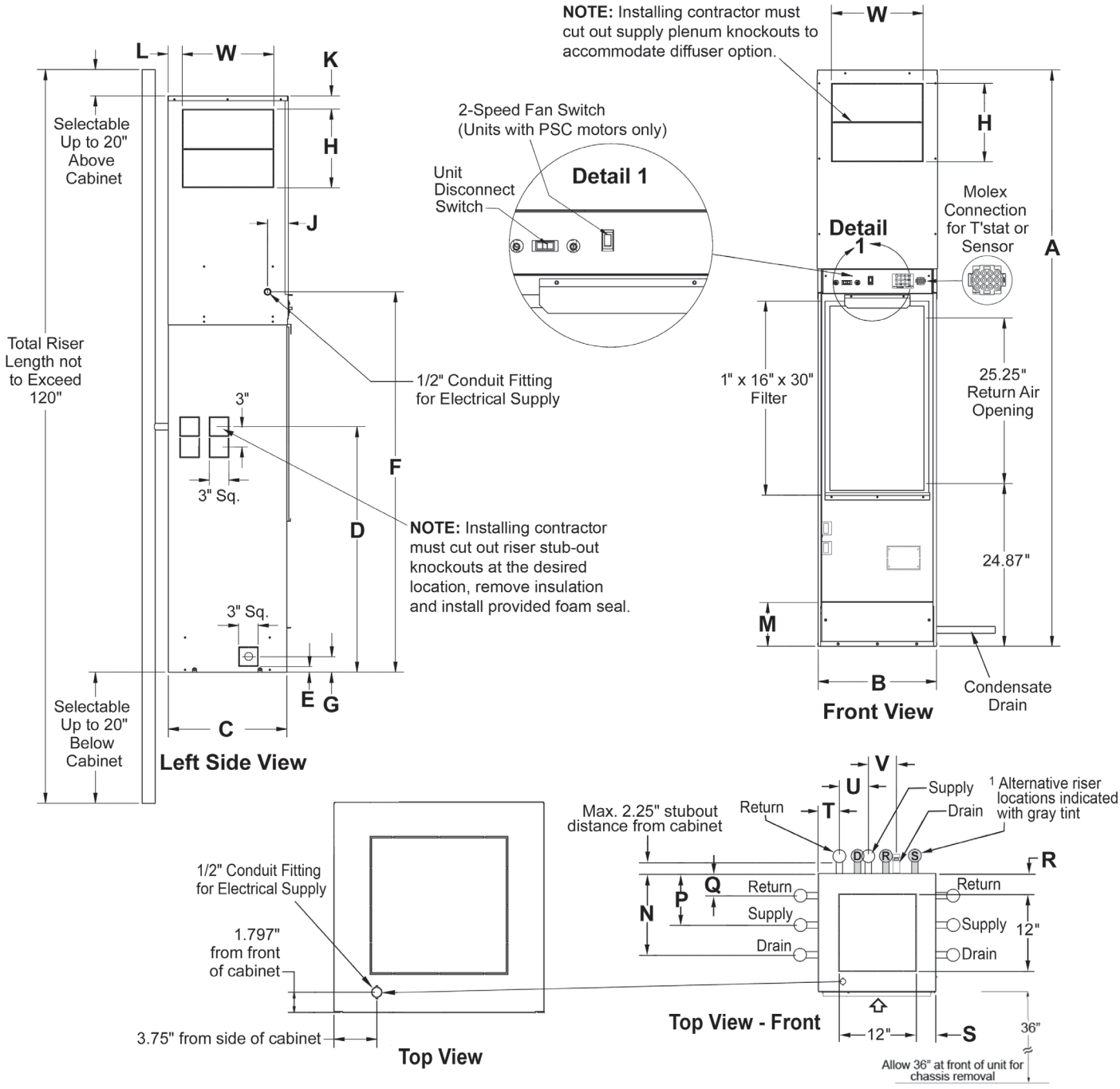
Dimensions

Unit Size 009–018 (18" × 18") Cabinet (Dimensions in inches)																		
Unit Height "A"	**B**	**C**	**D**	**E**	**F**	**G**	**J**	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**S**	**T**	**U**	**V**
80, 88, 92, 96	18.07	18.11	37.50	0.88	58.09	2.38	3.125	2.0	2.0	6.72	12.4	7.9	3.3	3.0	3.0	3.3	4.5	4.5

Discharge Openings (Dimensions in inches)								
Unit Size	**Single**		**Double**		**Triple**		**Single- Top Opening**	
009–012	**W**	**H**	**W**	**H**	**W**	**H**	**W**	**H**
	14	16	14	8	NR	NR	12	12

Notes: *[1] Alternative riser locations dimensions mirror those shown as "T", "U", and "V"*
NR = Not Recommended
80" high cabinet not available with side discharge, top discharge only.

Model VHF & VHW – 18" × 20" Cabinet – Size 015-018



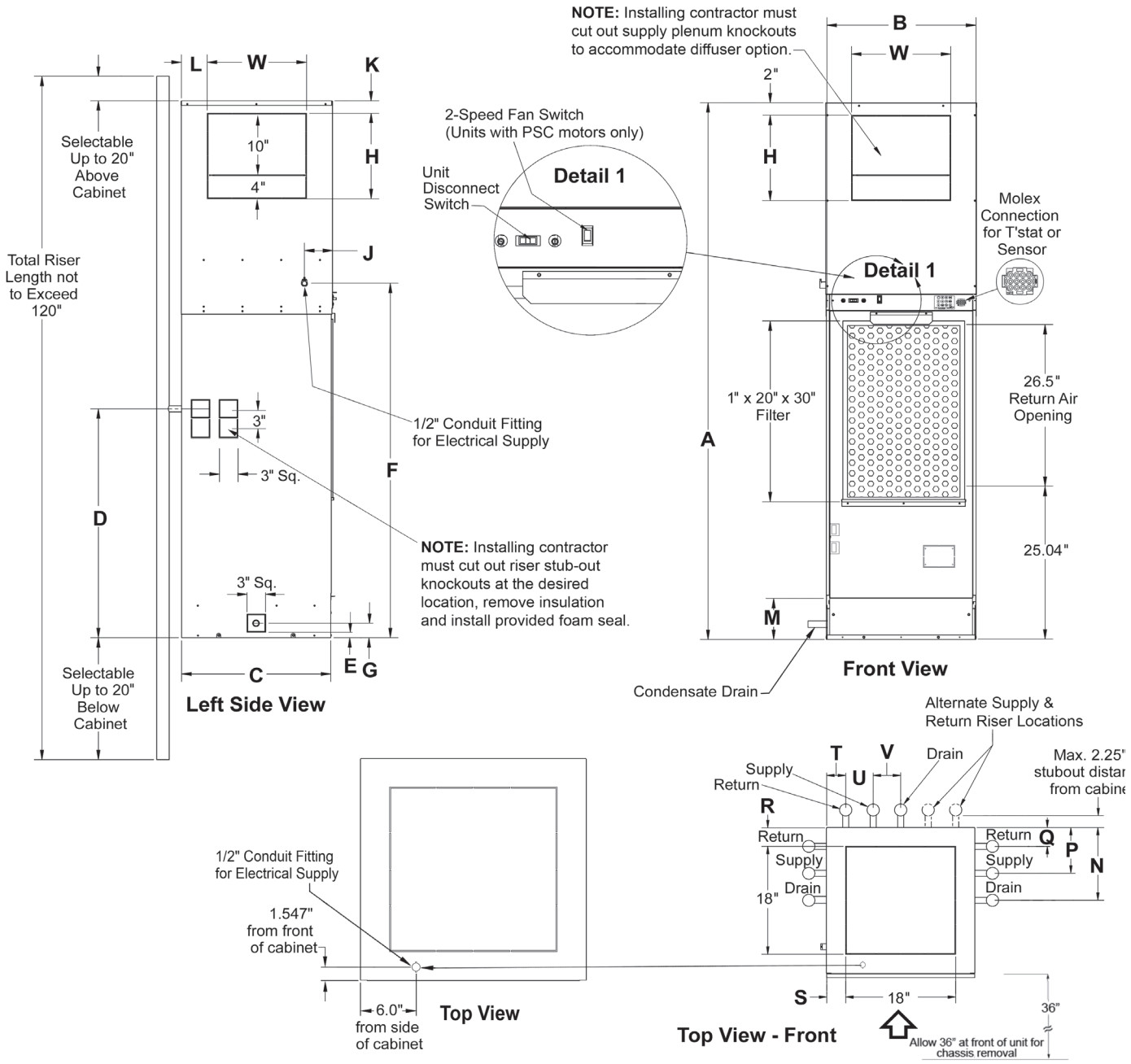
Dimensions

Unit Size 015–018 (18" × 20") Cabinet (Dimensions in inches)																		
Unit Height "A"	B	C	D	E	F	G	J	K	L	M	N	P	Q	R	S	T	U	V
80, 88, 92, 96	18.07	20.00	37.50	0.88	58.09	2.38	3.125	2.0	3.0	6.72	12.4	7.9	3.3	4.0	3.0	3.12	4.5	4.5

Discharge Openings (Dimensions in inches)																		
Unit Size	Single		Double		Triple		Single- Top Opening											
015–018	W	H	W	H	W	H	W	H										
	14	16	14	8	14	8	12	12										

Notes: *[1] Alternative riser locations dimensions mirror those shown as "T", "U", and "V"*
80" high cabinet not available with side discharge, top discharge only.

Model VHF & VHW – 24" × 24" Cabinet – Size 021-036



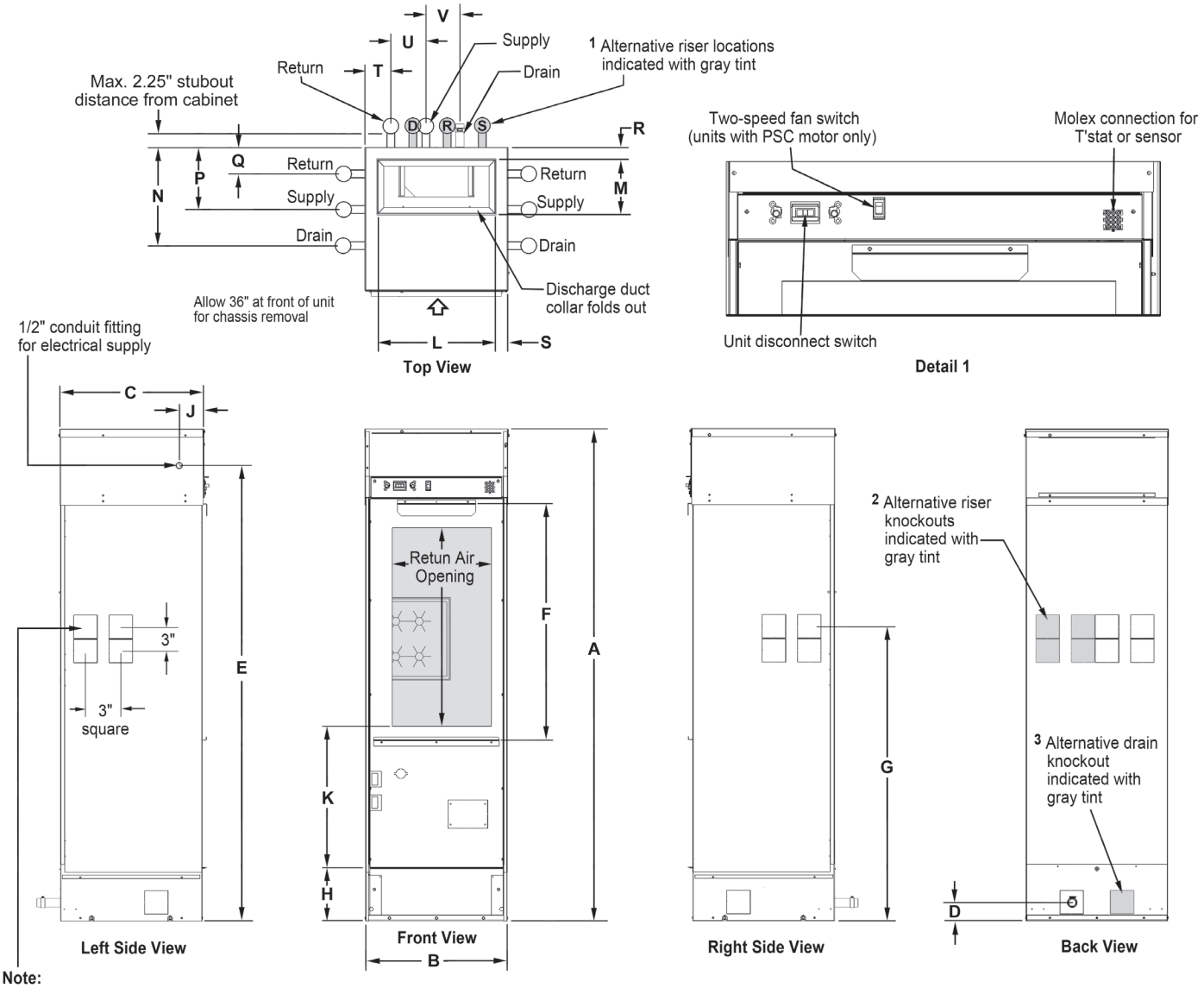
Dimensions

Unit Size 021–036 (24" × 24") Cabinet (Dimensions in inches)																		
Unit Height "A"	**B**	**C**	**D**	**E**	**F**	**G**	**J**	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**S**	**T**	**U**	**V**
80, 88, 92, 96	24.00	24.04	37.50	0.88	58.08	2.38	4.54	2.0	3.0	6.72	12.4	7.9	3.3	3.09	3.10	3.12	4.5	4.5

Discharge Openings (Dimensions in inches)								
Unit Size	**Single**		**Double**		**Triple**		**Single- Top Opening**	
021–024	W	H	W	H	W	H	W	H
	NR	NR	18	10	18	10	18	18
030–036	NR	NR	18	14	18	10	18	18

Notes: *NR = Not Recommended*
80" high cabinet not available with side discharge, top discharge only.

Model VHF 63.5" High Cabinet - Sizes 009-018



Note:
Installing contractor must cut-out knockouts at the desired locations, remove insulation and install foam seal

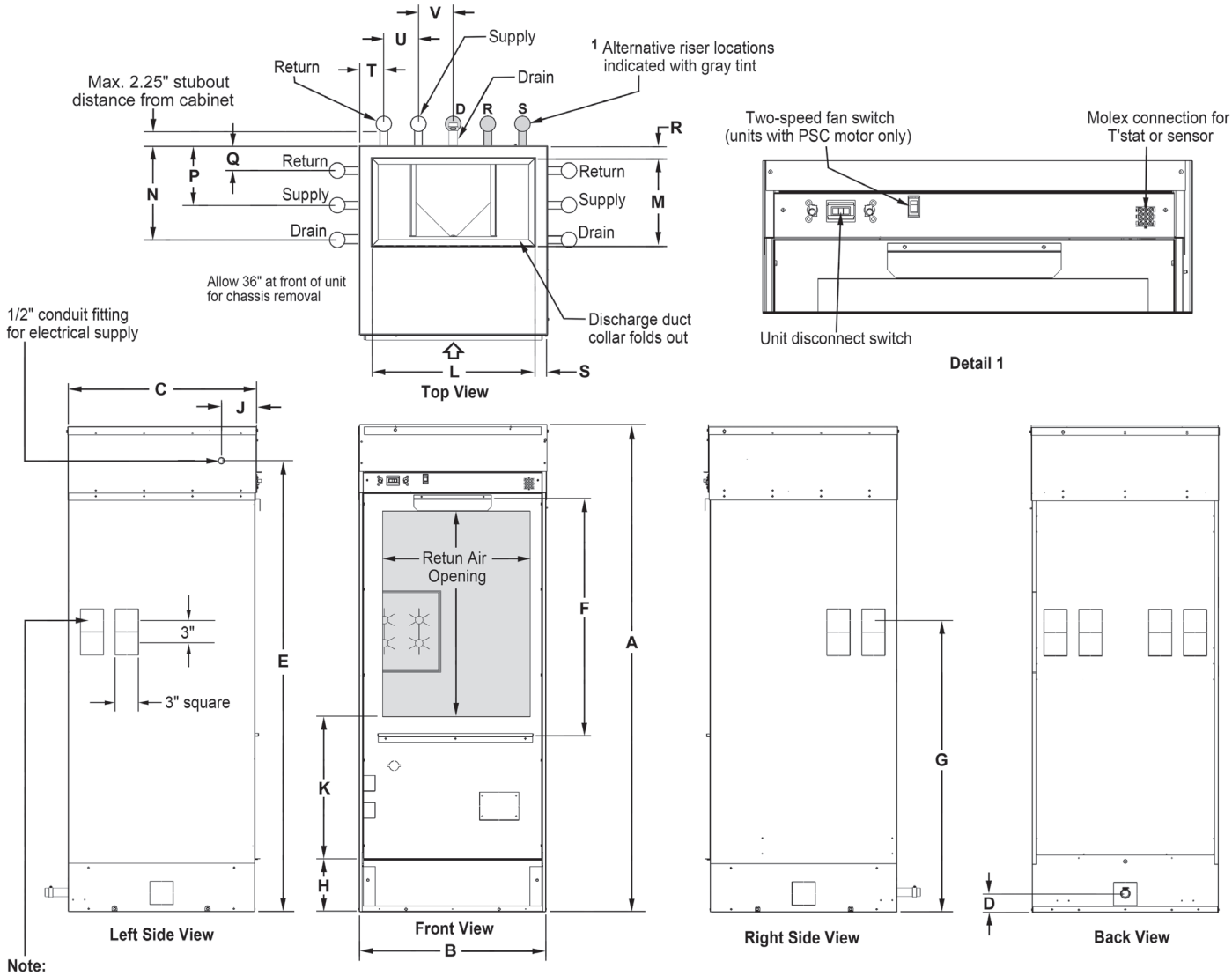
Dimensions

Cabinet											
Cabinet	A[4]	B	C	D	E	Filter Size F	Return Air Opening	G	H	J	K
18 x 18 (Size 009-012)	62.75	18.00	18.00	2.38	58.08	16"w x 30"h x 1"d	12.62w x 25.25h	37.50	6.72	3.125	24.87
18 x 20 (Size 015-018)			20.00								

Top View										
Cabinet	Discharge Air Opening[5]		N	P	Q	R	S	T	U	V
	L	M								
18 x 18 (Size 009-012)	15.00	6.80	12.4	7.9	3.3	1.64	1.64	3.12	4.50	4.50
18 x 20 (Size 015-018)		8.80								

Notes: *1 Alternative riser locations dimensions mirror those shown as "**T**", "**U**", and "**V**"*
2 Alternative riser locations for unit sizes 009-018 are field-specified (code 22 = A)
3 Alternative drain location for unit sizes 009-018 is field-specified (code 22 = A)
*4 Dimension "**A**" overall cabinet height is 63.5" with discharge duct collar folded out.*
*5 Dimensions "**L**" and "**M**" are the discharge air opening with the duct collar folded out.*

Model VHF 63.5" High Cabinet - Sizes 021-036



Note:
Installing contractor must cut-out knockouts at the desired locations, remove insulation and install foam seal

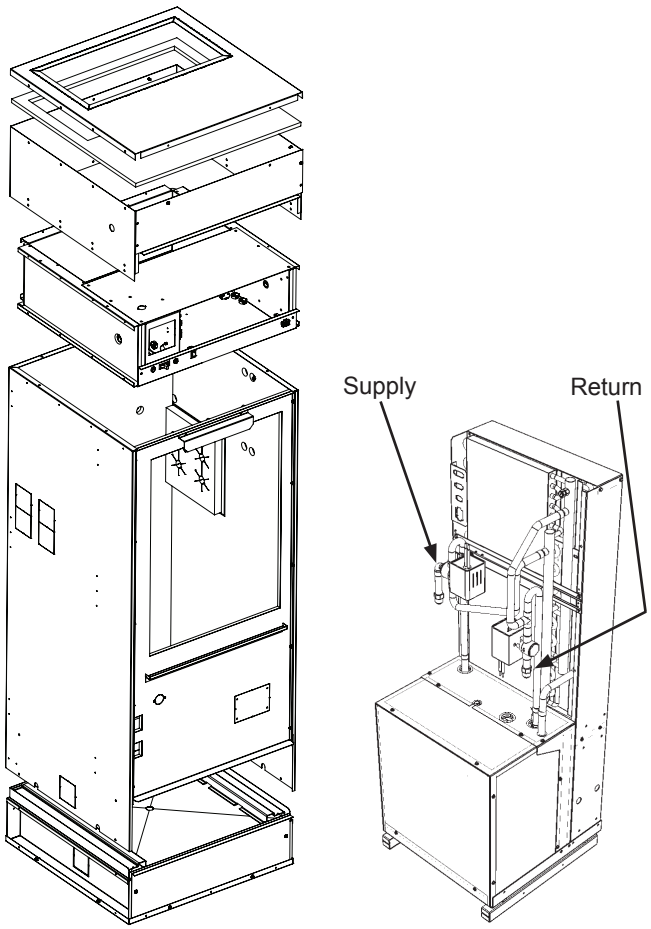
Dimensions

Cabinet											
Cabinet	A[4]	B	C	D	E	Filter Size F	Return Air Opening	G	H	J	K
24 x 24 (Size 021-036)	62.75	24.00	24.00	2.38	58.08	20"w x 30"h x 1"d	19.00w x 26.50h	37.50	6.72	4.54	25.04

Top View										
Cabinet	Discharge Air Opening[5]		N	P	Q	R	S	T	U	V
	L	M								
24 x 24 (Size 021-036)	21.00	11.25	12.4	7.9	3.3	1.64	1.64	3.12	4.50	4.50

Notes: 1 *Alternative riser locations dimensions mirror those shown as "***T***", "***U***", and "***V***". Knockouts are factory provided on unit sizes 021-036.*
2 *Alternative riser locations for unit sizes 009-018 are field-specified (code 22 = A).*
3 *Alternative drain location for unit sizes 009-018 is field-specified (code 22 = A).*
4 *Dimension "***A***" overall cabinet height is 63.5" with discharge duct collar folded out.*
5 *Dimensions "***L***" and "***M***" are the discharge air opening with the duct collar folded out.*

63.5" High Unit – Cabinet (VHF) and Chassis (VHC)



1. To prevent damage to equipment, do not operate supplementary heating and cooling during the construction period.
2. Inspect the carton for any specific tagging numbers indicated by the factory per a request from the installing contractor. At this time the voltage, phase and capacity should be checked against the plans.
3. Check the unit size against the plans to verify that the unit is being installed in the correct location.
4. Before installation, check the available dimensions of the area where the unit is to be installed versus the dimensions of the unit.
5. Note the location and routing of water piping, condensate drain piping, and electrical wiring. The locations of these items are clearly marked on submittal drawings.
6. The installing contractor will find it beneficial to confer with piping, sheet metal, and electrical foremen before installing any unit.

Note: *Check the unit data plate for correct voltage with the plans before installing the equipment.*

⚠ WARNING

Make sure all electrical ground connections are made in accordance with local code.

⚠ WARNING

The contractor shall cover the units to protect the machines during finishing of the building. This is critical while spraying fireproofing material on bar joists, sandblasting, spray painting and plastering.

For Optimum Unit Performance and to Help Minimize Noise and Vibration

- Adhere to the "Critical Dimensions" for locations of framing and distances to the cabinet.
- Be sure there are no kinks and that the stainless steel braided hoses do not come in contact with and vibrate on chassis and cause noise.
- Be sure there are no kinks in the condensate drain hose that can restrict flow of condensate to the drain riser.
- Ensure there is no metal-to-metal contact between return air grille and cabinet and the discharge diffuser and the cabinet, use provided gaskets.
- Air balancing in ducted applications is critical for proper airflow at each diffuser.
- It is recommended that all unused openings in the cabinet be sealed to eliminate any air leakage from the cabinet.

Figure 7: Typical side by side unit installation

NOTICE

Top air discharge units will require turning vanes and/or a volume damper for proper air flow and balancing, to minimize turbulence. These components must be field-installed and furnished in accordance with SMACNA guidelines.

Figure 8: Single side discharge

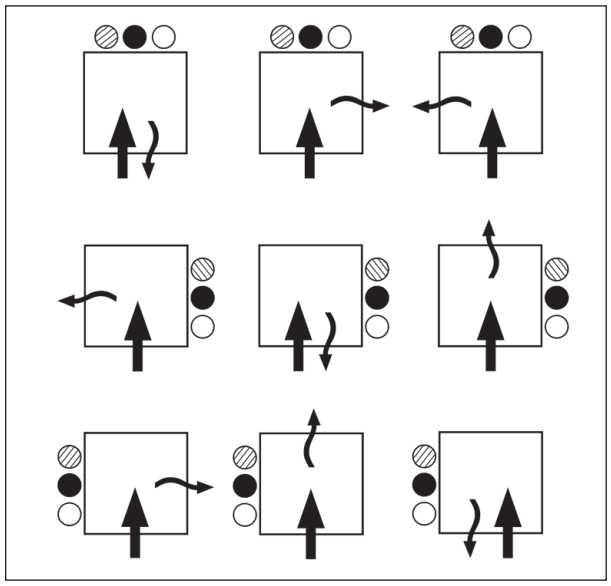


Figure 9: Double side discharge

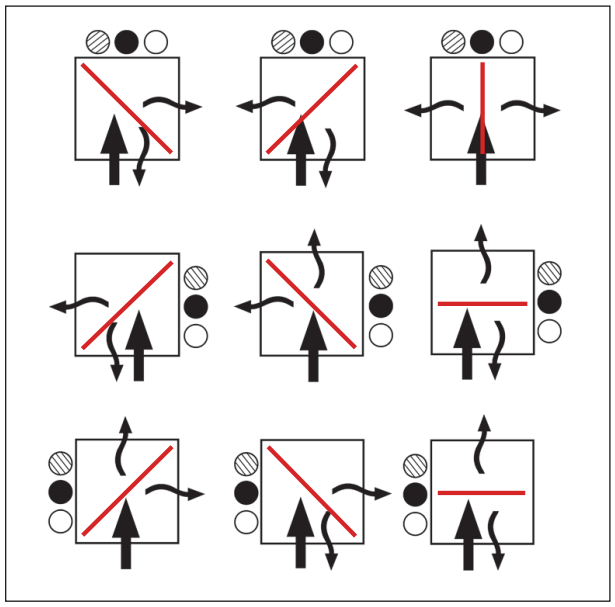
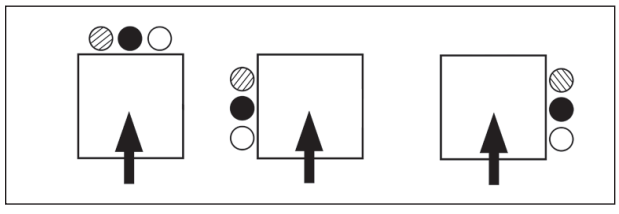


Figure 10: Closed plenum – field modification required



Privacy Baffles: (refer to Figure 9 and Figure 12)

Note: *If cabinet has multiple discharge air openings- check to make sure privacy baffle is present and oriented properly to block sight lines. It is important that this step is taken before wall is completed around the cabinet.*

Figure 11: Side & top discharge (see Notice on page 16)

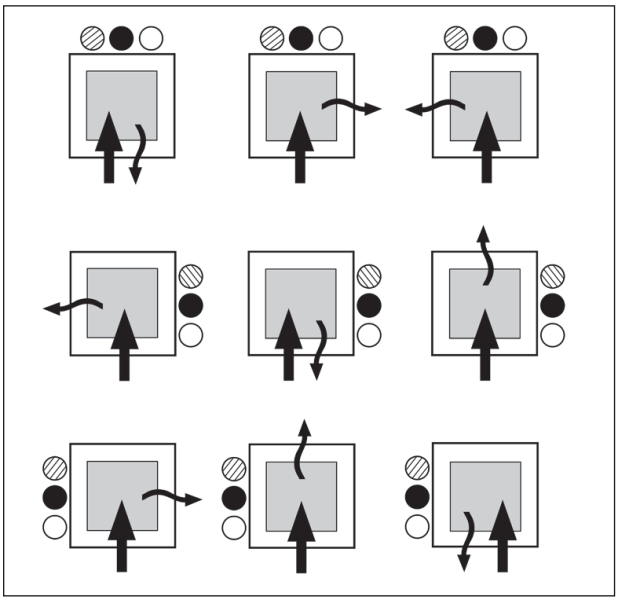


Figure 12: Double side & top discharge (see Notice on page 16)

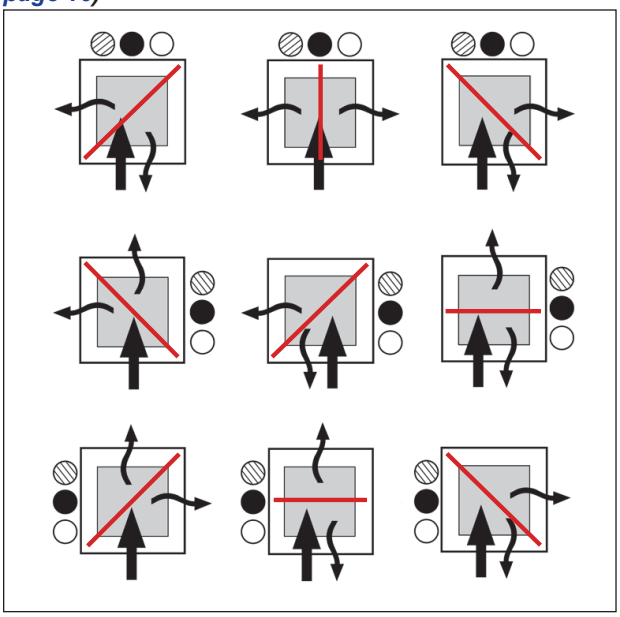
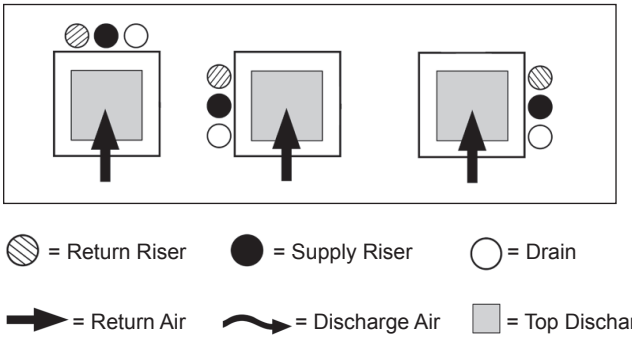
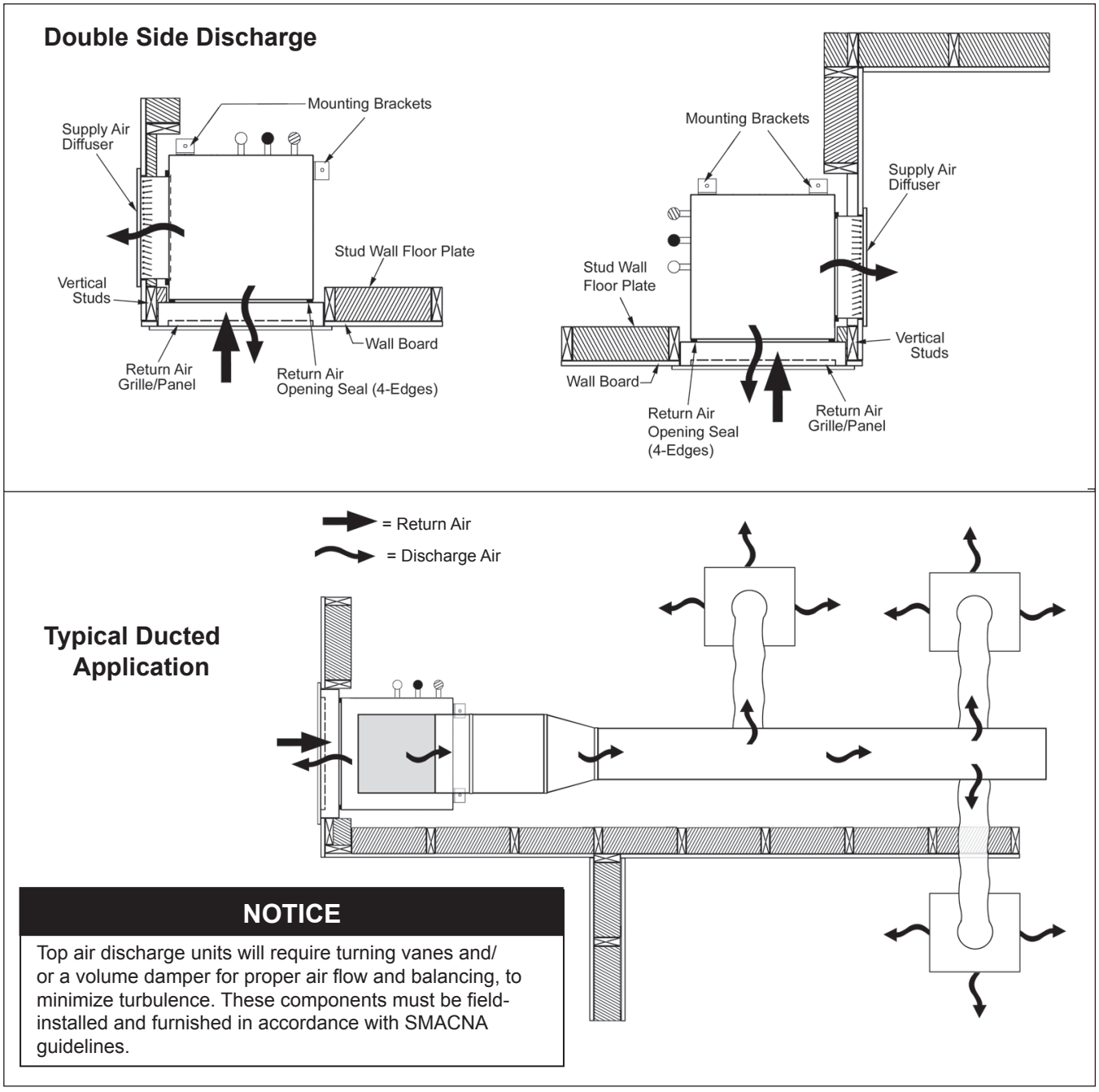


Figure 13: Top discharge (see Notice on page 18)



Note: *80" high cabinet not available with side discharge, top discharge only.*

Figure 14: Typical framing & discharge arrangements

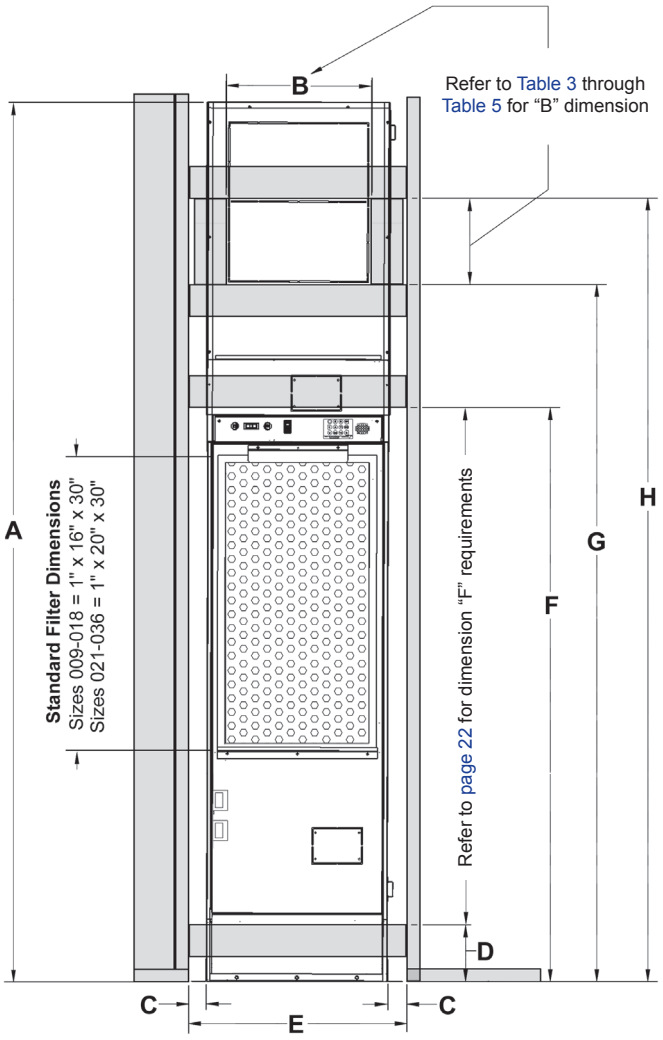


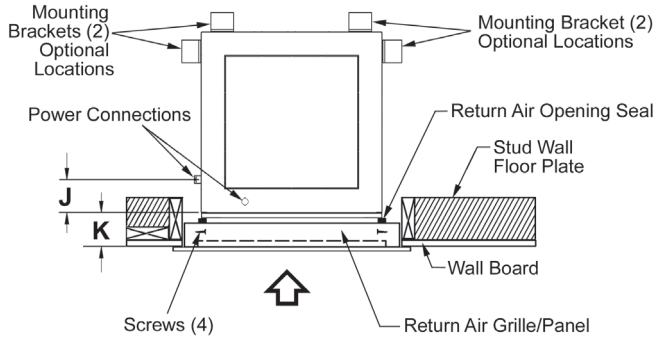
Note: *All ducted applications require a unit that utilizes an EC motor*

Framing Locations and Dimensions

Location of framing around unit is critical for proper fit-up and will help reduce sound levels due to the transfer of vibration when properly installed.

Figure 15: Framing locations and dimensions





IMPORTANT

If an optional subbase is used, add its height of either 2", 3", 4" or 5" to the vertical dimensions shown in Figure 15.

Table 3: Letter dimensions for Figure 15 (18" x 18" unit)

Dimension	Framing Locations			
	18" x 18" Unit - Sizes 009-012			
	Unit Height "A"			
	80"	88"	92"	96"
B	14"			
C	2.07"			
D	5.75"			
E[1]	22.25"			
F	58.75"			
G[2]	60.75"	68.75"	72.75"	76.75"
H[2]	78.75"	86.75"	90.75"	94.75"
J	3.125"			
K[3, 4]	3.125" Min./Max. (See Note 4 exception)			

Table 4: Letter dimensions for Figure 15 (18" x 20" unit)

Dimension	Framing Locations			
	18" x 20" Unit - Sizes 015 & 018			
	Unit Height "A"			
	80"	88"	92"	96"
B	14"			
C	2.07"			
D	5.75"			
E[1]	22.25"			
F	58.75"			
G[2]	60.75"	68.75"	72.75"	76.75"
H[2]	78.75"	86.75"	90.75"	94.75"
J	3.125"			
K[3, 4]	3.125" Min./Max. (See Note 4 exception)			

Table 5: Letter dimensions for Figure 15 (24" x 24" unit)

Dimension	Framing Locations			
	24" x 24" Unit - Sizes 021-036			
	Unit Height "A"			
	80"	88"	92"	96"
B	18"			
C	2.125"			
D	5.75"			
E[1]	28.25"			
F	58.75"			
G[2]	62.75"	70.75"	74.75"	78.75"
H[2]	78.75"	86.75"	90.75"	94.75"
J	4.54"			
K[3, 4]	3.125" Min./Max. (See Note 4 exception)			

Notes: [1] *Dimension "E" ± 0.125*

[2] *Dimension "G" and "H" will vary based on cabinet height selected and choice of upper or lower discharge knockout. Refer to "Dimensional Data" on page 10 through page 12.*

[3] ***Dimension "K" is critical**, and that it be no more or no less than 3.125" from the finished wall surface to the front of the unit when using the hinged perimeter return air panel door or the louvered return air panel door. See Note 4 for the exception. Also refer to page 22.*

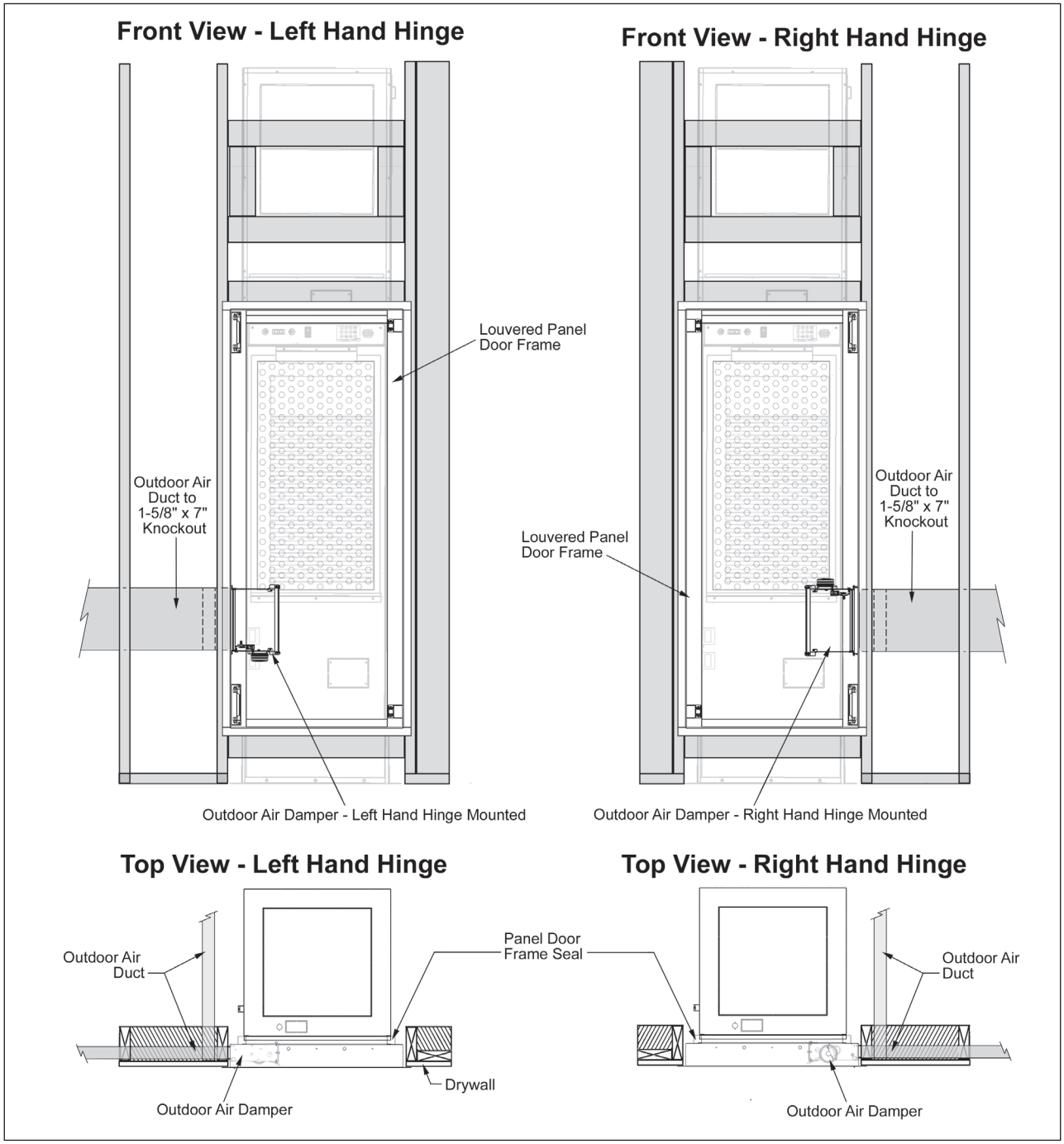
[4] *Add 1" to dimension "K" when a 2", Merv 13 filter is used.*

Louvered Return Air Panel Door with Optional Motorized Outdoor Air Damper

1. Based on the location of the hinges on the ordered louvered panel door, construct the framing to accommodate the ducting for connecting the motorized outdoor air damper, see Figure 16. Also refer to "Return Air Panel Door(s) Dimensions" on page 22 and "Installing The Optional Motorized Outdoor Air Damper with Louver Panel Door Only" on page 37 for details.

Note: *It is the responsibility of the installing contractor to install the ductwork that connects the outdoor air opening in the panel door frame to the source of the outdoor intake opening in the building. All ductwork should conform to industry standards of good practice as described in the ASHRAE Systems Guide. Also refer to good installation practices as outlined in ED 18529.*

Figure 16: Louvered panel door with motorized outdoor air damper



Note: *The outdoor air duct can be located on either side of the cabinet and routed around the side- to the back of the cabinet, or run straight- parallel to the front of the cabinet.*

Vertical Riser Stub-Outs Locations to Unit Knockouts

Figure 17: Riser stub-outs knockouts locations

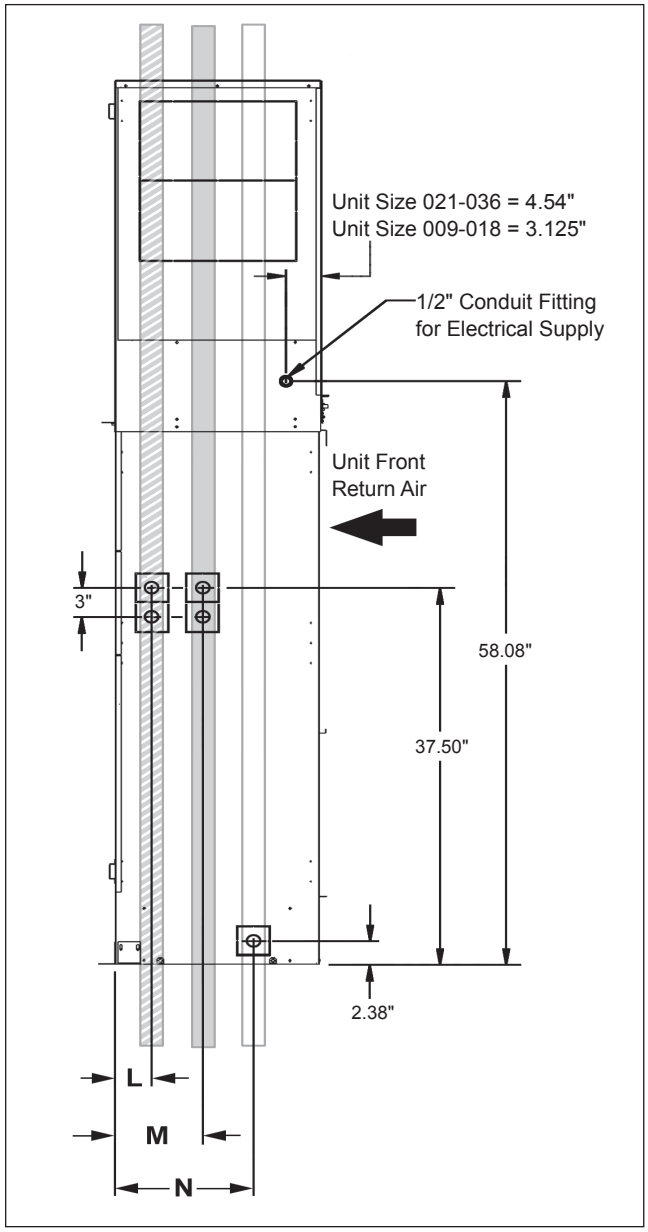


Table 6: Letter dimensions for Figure 17 (18" x 18" unit)

Dimension	Riser Stub-Outs Locations				
	18" x 18" Unit - Sizes 009-012				
	Unit Height				
	63.5"	80"	88"	92"	96"
L	3.3"				
M	7.9"				
N	12.4"				

Table 7: Letter dimensions for Figure 17 (18" x 20" unit)

Dimension	Riser Stub-Outs Locations				
	18" x 20" Unit - Sizes 015 & 018				
	Unit Height				
	63.5"	80"	88"	92"	96"
L	3.3"				
M	7.9"				
N	12.4"				

Table 8: Letter dimensions for Figure 17 (24" x 24" unit)

Dimension	Riser Stub-Outs Locations				
	24" x 24" Unit - Sizes 021-036				
	Unit Height				
	63.5"	80"	88"	92"	96"
L	3.13"				
M	7.63"				
N	12.13"				

Return Air Panel Door(s) Dimensions

Location of studs in relation to the unit and the return air panel door are critical for proper installation and fit up. When installed, the return air grille gasket must compress and seal completely against the outer edge of the cabinet and around the inner front panel and filter bracket. Refer to "Installing The Return Air Panel Door" on page 36 and Figure 15 on page 19.

Figure 18: Hinged panel door

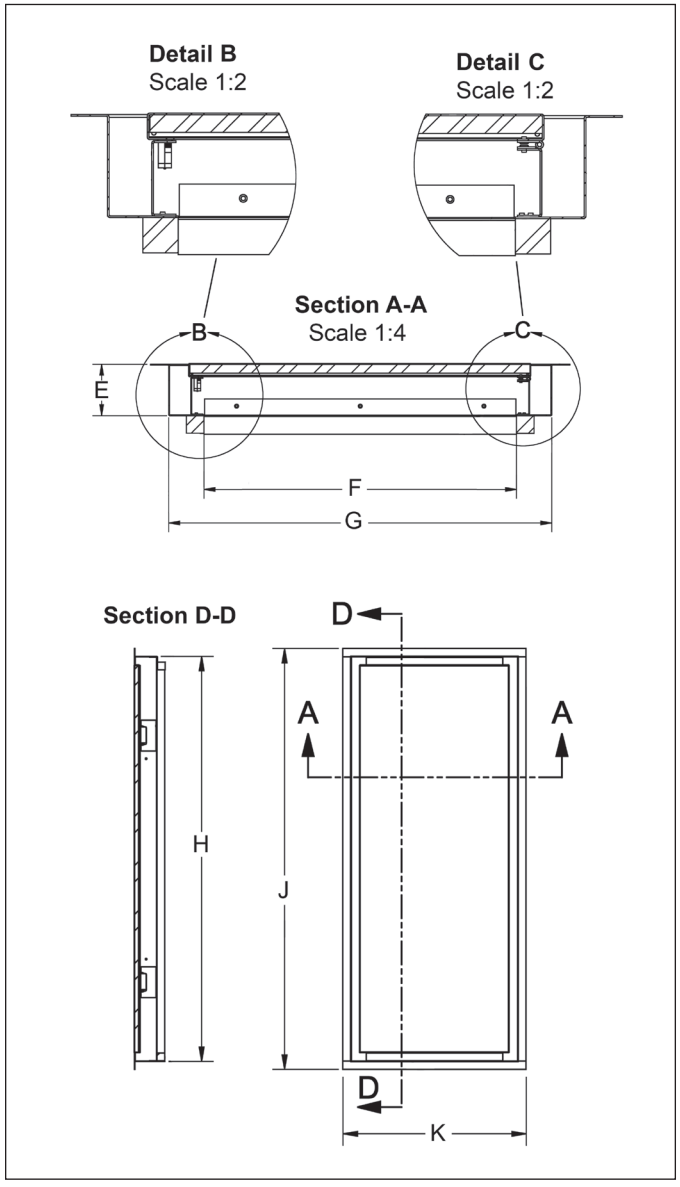
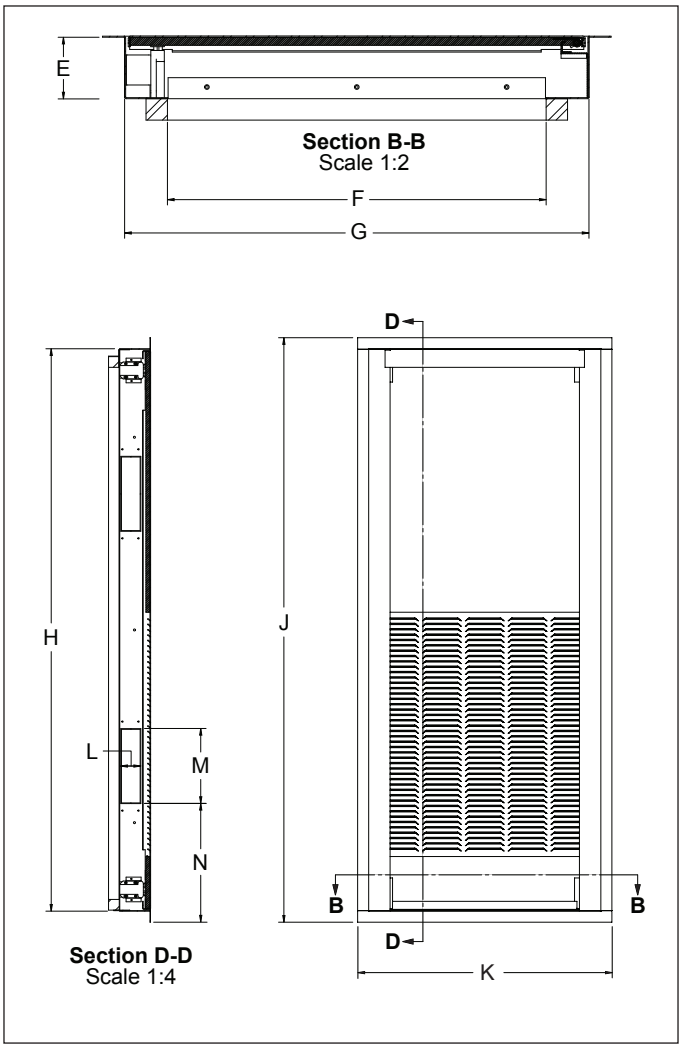


Figure 19: Louvered panel door



Dimensions

Unit Size	E		F	G	H	J	K	Outdoor Air Opening		
	1" Filter Compatible Door	2" Filter Compatible Door						L	M	N
009-018	2.92"	3.92"	17.69"	21.69"	52.53"	54.60"	23.75"	1.88"	7.00"	11.08"
021-036			23.69"	27.69"			29.75"			

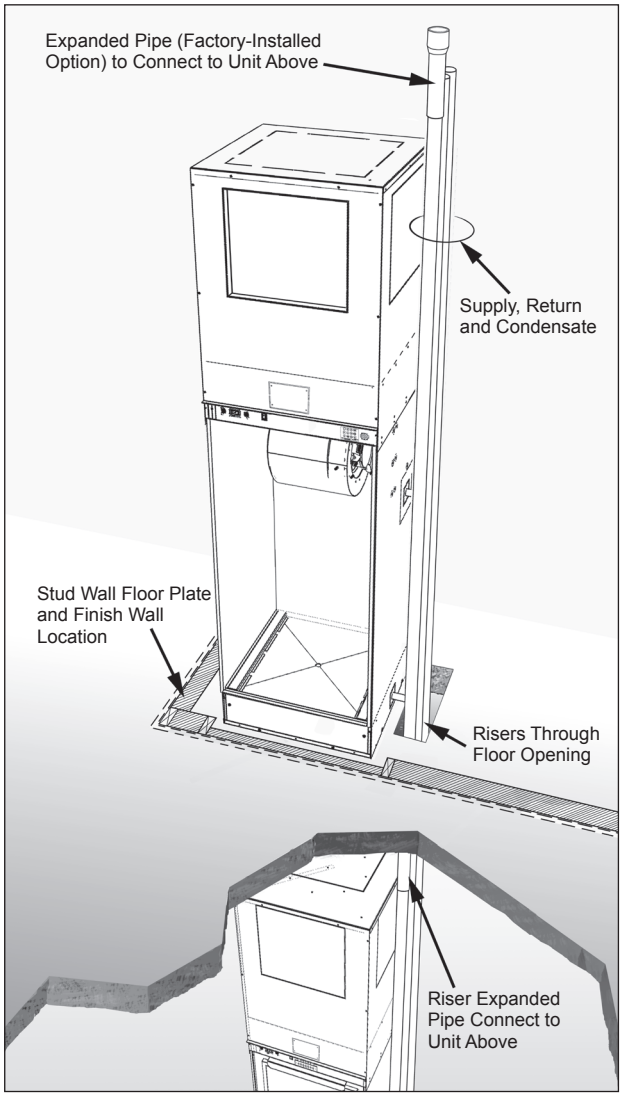
⚠ CAUTION

Installation and maintenance is to be performed only by qualified personnel who are familiar with, and in compliance with state, local and national codes and regulations, and experienced with this type of equipment. Sharp edges and coil surfaces are potential injury hazards. Avoid contact with them.

Risers and Cabinet

1. Position the cabinet and risers within the building pipe chase and align with the unit on the floor above and/or below (Figure 20).

Figure 20: Position the cabinet and risers



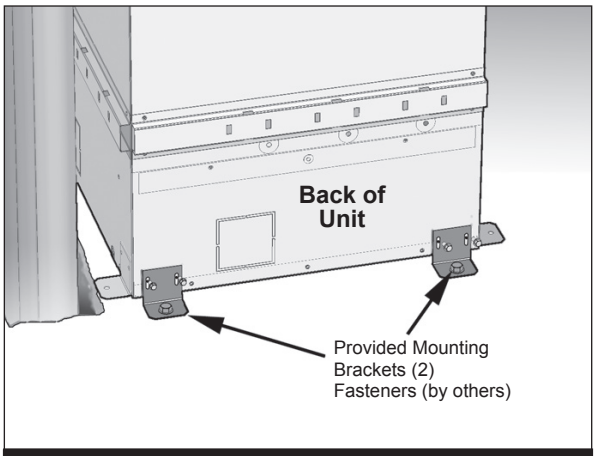
IMPORTANT

The cabinet must be centered between the wall studs and plumb vertically for the grille/panel frame and diffuser to properly align and seal to the cabinet. Use of a 4' level is recommended.

Note: *Refer to Figure 21 Critical Dimension Notice to determine the correct recess depth from the front of the unit to the drywall face. When the installation is complete, the return air grille/panel frame must meet to seal with the cabinet discharge opening and the discharge air diffuser duct must meet and seal with the discharge opening.*

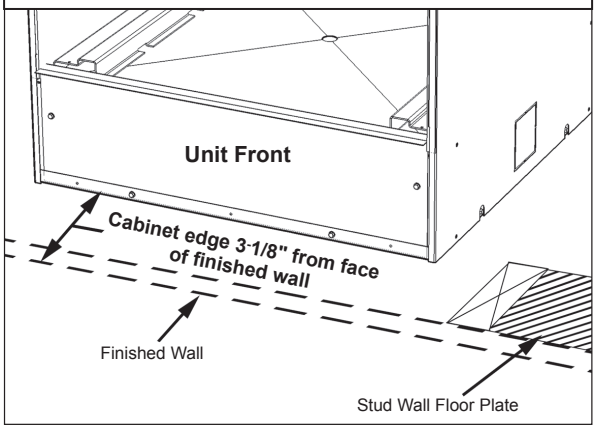
2. Using the riser extensions, make preliminary riser connections between the units above and or below to assure proper riser alignment (supply, return and condensate). Figure 20.
3. After all components are aligned properly, anchor the unit cabinet to the floor using the Daikin provided mounting brackets (Figure 21).
4. Locate the two (2) mounting brackets in the parts bag and position them near the back corners of the unit, or one on a side and one on the back, whichever location or combination is most suitable, as illustrated in Figure 21. Contractor is responsible for the appropriate fasteners to secure the brackets to the floor, as local codes dictate.

Figure 21: Position the cabinet for securing to the floor with mounting brackets (2)



NOTICE

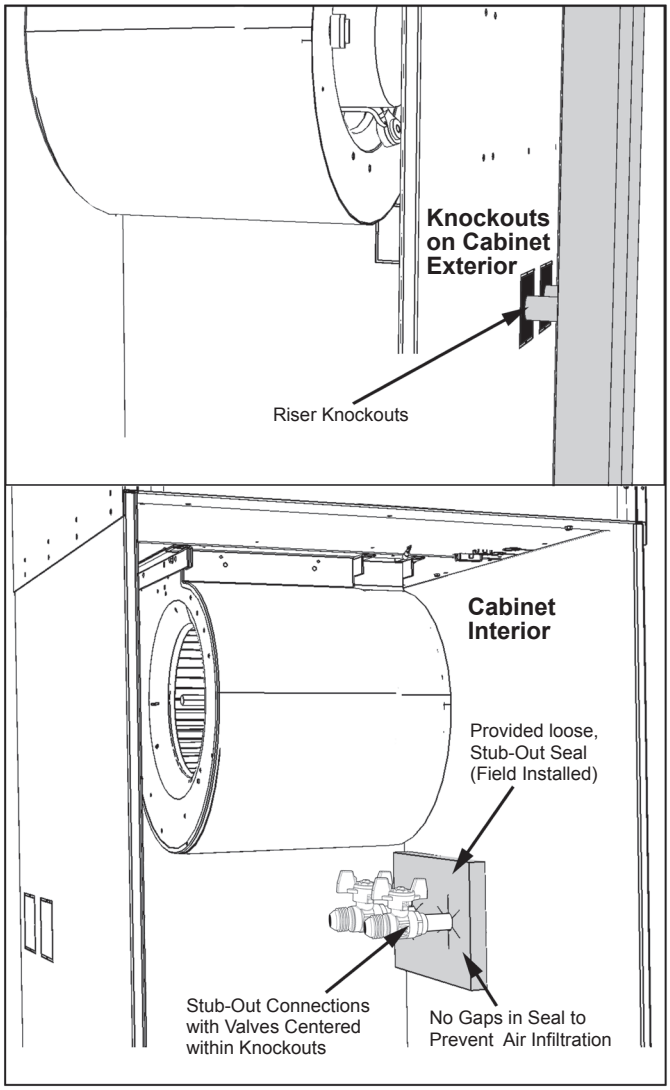
Critical Dimension!



Note: *Add 1" to dimension when a 2", Merv 13 filter is used.*

Note: *Apply the provided seal to the interior of the cabinet around the stub-outs. Be sure there are no voids between the stub-outs and the stub-out seal which helps prevent air infiltration into the cabinet*

Figure 22: Center the riser stub-outs within the knockouts and apply provided seal to the cabinet interior



⚠ CAUTION

The unit is not designed to support the weight of the risers. Anchor them securely to the building structure.

5. Anchor risers to the building structure to prevent vertical riser movement greater than, plus or minus one inch to allow for riser expansion or contraction.
6. Solder all supply and return riser connections to units above and/or below.
7. Remove riser ties used to secure the risers to the cabinet during shipping.

⚠ WARNING

Before furring-in units, hydrostatically test the risers and unit connection joints in accordance with local building codes, to make sure they are leak-proof.

Note: *Perform "Cleaning and Flushing Water System" on page 26*

⚠ CAUTION

When furring-in units make sure that no screws or nails penetrate the unit cabinet.

8. Layout the stud wall floor plates and frame-in unit referencing "Typical framing & discharge arrangements" on page 18 and Figure 15 on page 19.

Note: *Before cutting and hanging drywall, remove the appropriate discharge air opening knockout. See Table 9). Protect unit from construction debris with a protective cover.*

Table 9: Discharge knockout openings

Unit Size	Discharge Openings							
	Single		Double		Triple		Single-Top Opening	
	W	H	W	H	W	H	W	H
009–012	14"	16"	14"	8"	NR	NR	12"	12"
015–018	14"	16"	14"	8"	14"	8"	12"	12"
021–024	NR	NR	18"	14"	18"	10"	18"	18"
030–036	NR	NR	18"	14"	18"	10"	18"	18"

***NR** = Not Recommended*

Water System Quality

The cleaning, flushing and chemical treatment of a water source heat pump system is fundamental to efficient operation and the life expectancy of the system.

Potential system problems produced by the use of water fall into three general categories:

- **Scale formation –** Mineral deposits which result from the crystallization and precipitation of dissolved salts in the water. The deposits form an insulating barrier, reducing the heat transfer rate and impeding the circulation of fluids due to increased pressure drop.
- **Corrosion –** Decomposition of the metal caused by absorption of gases from the air. Corrosion may occur in any metal component of the system.
- **Organic growths –** Slime and algae which form under certain environmental conditions, and can reduce the heat transfer rate by forming an insulating coating or can promote corrosion by pitting.

The system water should be evaluated for degrees of impurity, with testing available from independent testing labs, health departments or state agencies.

Table 10 is a list of water characteristics, the potential impurities and their results and the recommended treatment.

Avoiding Potential Problems

As shown in Table 10, all water contains some degree of impurities which may affect the performance of a heat pump system. The use of a cupro-nickel coil can help avoid potential problems. Water flow rates should:

- Be high enough that the temperature rise through the heat exchanger does not exceed 10° F when operating in the cooling mode.
- Not exceed 4 GPM per nominal ton. Flow rates that have velocities of 10 feet per second or more may cause pipe erosion and heat exchanger failure.

Table 10: Water quality conditions & applications

Potential Problem	Chemical(s) or Condition	Range for Copper Heat Exchangers	Range of Cupronickel Heat Exchanger
Scaling	Calcium & Magnesium Carbonate	Less than 350 ppm	Less than 350 ppm
Corrosion	pH Range	7 – 9	5 – 9
	Total Dissolved Solids	Less than 1000 ppm	Less than 1500 ppm
	Ammonia, Ammonium Hydroxide	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonium Chloride, Ammonium Nitrate	Less than 0.5 ppm	Less than 0.5 ppm
	Calcium Chloride/ Sodium Chloride	Less than 125 ppm	Less than 125 ppm - Note 4
	Chlorine	Less than 0.5 ppm	Less than 0.5 ppm
	Hydrogen Sulfide	None Allowed	None Allowed
Biological Growth	Iron Bacteria	None Allowed	None Allowed
	Iron Oxide	Less than 1 ppm	Less than 1 ppm
Erosion	Suspended Solids	Less than 10 ppm	Less than 10 ppm
	Water Velocity	Less than 8 ft./s	Less than 12 ft./s

Notes: *1. Water hardness in ppm is equivalent to hardness in mg/L.*

2. Grains/gallon = ppm divided by 17.1.

3. Copper and cupronickel heat exchangers are not recommended for pool applications for water outside the range of the table. Secondary heat exchangers are required for applications not meeting the requirements shown above.

4. Salt water applications (approximately 25,000 ppm) require secondary heat exchangers due to copper piping between the heat exchanger and the unit fittings.

Supply & Return Piping

All units should be connected to supply and return piping in a two-pipe reverse return configuration. A reverse return system is inherently self-balancing and requires only trim balancing where multiple quantities of units with different flow and pressure drop characteristics exist in the same loop.

- To insure proper water flow, measure the temperature differential between the supply and return connections. The temperature differential should be 10°F to 14°F (5°C to 8°C) for units in cooling mode.

A direct return system may also work acceptably, but proper water flow balancing is more difficult to achieve and maintain.

- The piping can be steel or copper.

⚠ WARNING

Polyolester Oil, commonly known as POE oil is a synthetic oil used in many refrigeration systems, and may be present in this Daikin product. POE oil, if ever in contact with PVC/CPVC will coat the inside wall of PVC/CPVC pipe causing environmental stress fractures. Although there is no PVC/CPVC piping in this product, please keep this in mind when selecting piping materials for your application, as system failure and property damage could result.

The supply and return stub outs and the factory-provided shutoff valves have male JIC connections and usually join the unit via short lengths of high pressure flexible hose which are sound attenuators for both unit operating noise and hydraulic pumping noise.

- Some flexible hose threaded fittings are supplied with sealant compound. If not, apply Teflon tape to assure a tight seal.

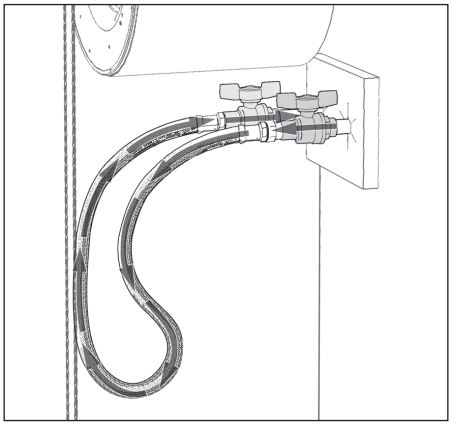
Cleaning and Flushing Water System

⚠ CAUTION

Prior to first operation of any unit, the water circulating system must be cleaned and flushed of all construction dirt and debris or damage will occur.

1. Prior to first operation of any unit, the water circulating system must be cleaned and flushed of all construction dirt and debris.
2. If the units are equipped with water shutoff valves, either electric or pressure operated, the supply and return runouts must be connected together at each unit location. This will prevent the introduction of dirt into the unit, (Figure 23).

Figure 23: Connections for flushing system piping



2. Fill the system at the city water makeup connection with all air vents open. After filling, close all air vents.
   The contractor should start main circulator with the pressure reducing valve open. Check vents in sequence to bleed off any trapped air, ensuring circulation through all components of the system.
   Power to the heat rejector unit should be off, and the supplementary heat control set at 80°F (27°C).
   While circulating water, the contractor should check and repair any leaks in the unit and surrounding piping. Drains at the lowest point(s) in the system should be opened for initial flush and blow-down, making sure city water fill valves are set to make up water at the same rate. Check the pressure gauge at pump suction and manually adjust the makeup to hold the same positive steady pressure both before and after opening the drain valves. Flush should continue for at least two hours or longer until the drain water is clean and clear.
3. Shut off supplemental heater and circulator pump and open all drains and vents to completely drain down the system. Short circuited supply and return runouts should now be connected to the unit supply and return connections. Do not use sealers at the swivel flare connections of hoses.
4. Flush system with water for 2 hours or longer until water is clean.
5. Refill the system with clean water. Test the water using litmus paper for acidity, and treat as required to leave the water slightly alkaline (pH 7.5 to 8.5). The specified percentage of antifreeze may also be added at this time. Use commercial grade antifreeze designed for HVAC systems only. Do not use automotive grade antifreeze (See "Antifreeze Correction Factors" on page 27).
   Once the system has been filled with clean water and antifreeze (if used), precautions should be taken to protect the system from dirty water conditions.

NOTICE

It is not Daikin Applied policy to make recommendations on water treatment. However, the general contractor or owner should contact a local water treatment company regarding water treatment. A fouled closed loop water system will lead to premature component failure.

Note: *Contact a local water treatment company to confirm water clarity prior to unit operation.*
Dirty water will result in system wide degradation of performance and solids may clog system-wide valves, strainers, flow regulators, etc. Additionally, the heat exchanger may become clogged which reduces compressor service life or causes premature failure.

6. Set the loop water controller heat add setpoint to 70°F (21°C) and the heat rejection setpoint to 85°F (29°C). Supply power to all motors and start the circulating pumps. After full flow has been established through all components including the heat rejector (regardless of season) and the vented air and loop temperatures have been stabilized, each of the units will be ready for check, test and start-up, air balancing, and water balancing.

Environment

This equipment is designed for indoor installation only. Sheltered locations such as attics, garages, etc., generally will not provide sufficient protection against extremes in temperature and/or humidity, and equipment performance, reliability, and service life may be adversely affected.

⚠ CAUTION

Units must be checked for water leaks upon initial water system start-up. Water leaks may be a result of mishandling or damage during shipping. Failure by the installing contractor to check for leaks upon start-up of the water system could result in property damage.

Operating Limits

Table 11: Air limits in °F (°C)

Air Limits	Standard Range Units		Geothermal Range Units	
	Cooling (DB/WB)	Heating	Cooling (DB/WB)	Heating
Minimum Ambient Air[1]	50°F/40°F (10°C/4°C)	50°F (10°C)	40°F/30°F (4°C/-1°C)	40°F (4°C)
Maximum Ambient Air[2]	100°F/85°F (38°C/29°C)	85°F (29°C)	100°F/85°F (38°C/29°C)	85°F (29°C)
Minimum Entering Air[1]	65°F/55°F (18°C/13°C)	50°F (10°C)	65°F/55°F (18°C/13°C)	50°F (10°C)
Common Design Entering Air	75°F/63°F (24°C/17°C)	70°F (21°C)	75°F/63°F (24°C/17°C)	70°F (21°C)
Maximum Entering Air[2]	85°F/71°F (29°C/22°C)	80°F (27°C)	85°F/71°F (29°C/22°C)	80°F (27°C)
Minimum CFM/Ton	300			
Maximum CFM/Ton	450			

Table 12: Fluid limits

Fluid Limits	Standard Range Units		Geothermal Range Units	
	Cooling	Heating	Cooling	Heating
Minimum Entering Fluid	55°F (13°C)	55°F (13°C)	30°F (-1°C)	20°F (-6°C)
Common Design Entering Fluid	85-90°F (29-32°C)	70°F (21°C)	90°F (32°C)	35-60°F (1.5-16°C)
Maximum Entering Fluid	120°F (49°C)	90°F (32°C)	120°F (49°C)	90°F (32°C)
Minimum GPM/Ton	1.5			
Nominal GPM/Ton	3.0			
Maximum GPM/Ton	4.0			

Notes: *1. Maximum and minimum values may not be combined. If one value is at maximum or minimum, the other two conditions may not exceed the normal condition for standard units. Geothermal range units may combine any two maximum conditions, but not more than two, with all other conditions being normal conditions.*

2. This is not a normal or continuous operating condition. It is assumed that such a start-up is for the purpose of bringing the building space up to occupancy temperature.

Antifreeze Correction Factors

	Antifreeze % by weight			
	15%	25%	35%	45%
Ethanol				
Cooling Capacity	0.985	–	–	–
Heating Capacity	0.9825	–	–	–
Pressure Drop	1.04			
Ethylene Glycol				
Cooling Capacity	0.9935	0.9895	0.985	0.981
Heating Capacity	0.9865	0.9795	0.973	0.965
Pressure Drop	1.10	1.16	1.22	1.27
Methanol				
Cooling Capacity	0.985	–	–	–
Heating Capacity	0.9825	–	–	–
Pressure Drop	1.04	–	–	–
Propylene Glycol				
Cooling Capacity	0.985	0.975	0.965	0.955
Heating Capacity	0.981	0.9685	0.952	0.936
Pressure Drop	1.11	1.20	1.31	1.40

Power Wiring From Building to Unit

⚠ DANGER

To avoid electrical shock, personal injury or death:
1. Installer must be qualified, experienced technician.
2. Disconnect power supply before installation to prevent electrical shock and damage to equipment.

1. Locate the electrical power supply wiring from the building and feed wiring through a 1/2" conduit fitting (strain relief), (field provided) on the unit as shown in Figure 24 & Figure 25, following local electrical codes and regulations.

Figure 24: Supply electric wiring from building to unit

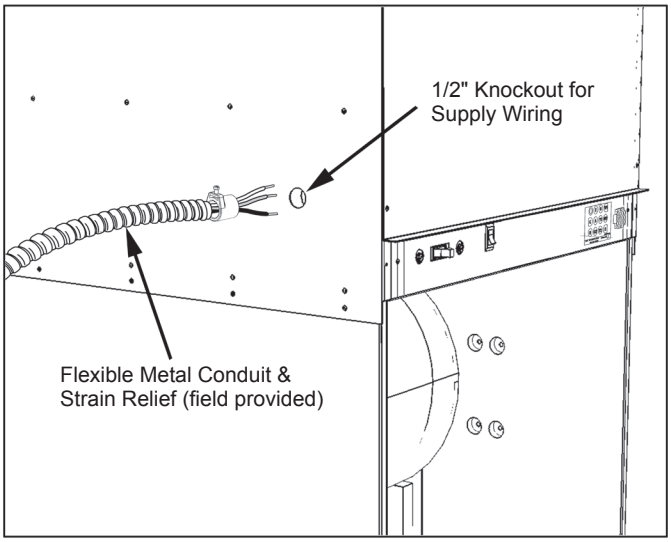
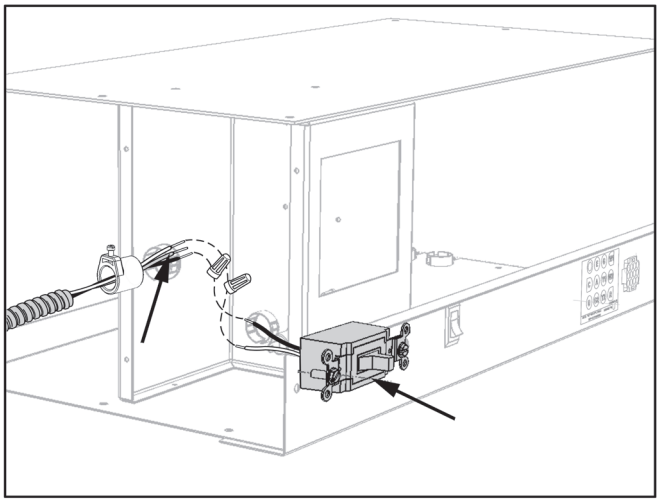
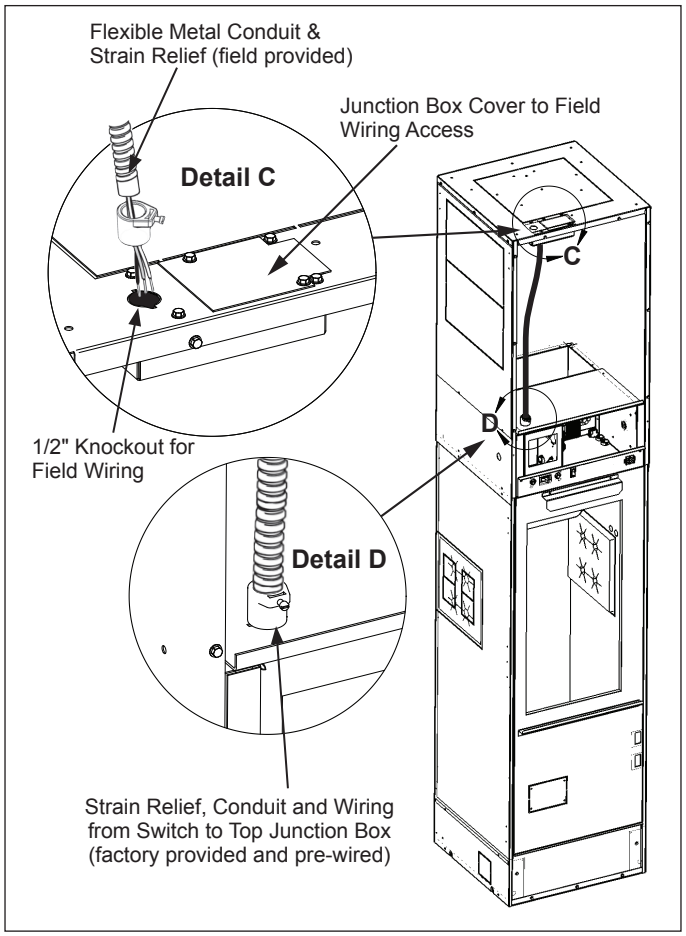


Figure 25: Wire to unit switch



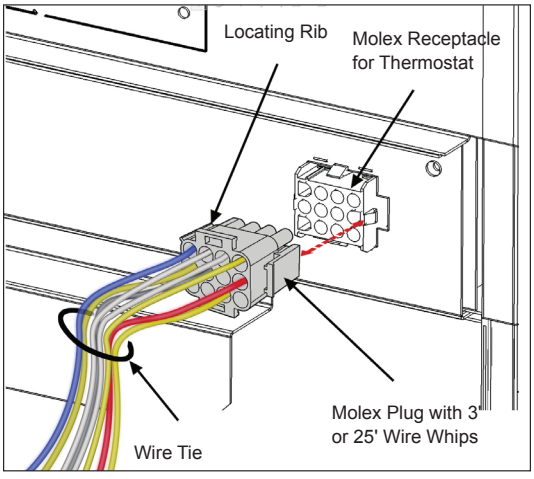
Electrical Entry Through Top

Figure 26: Power wiring through top entry



2. If a remote wall-mounted thermostat is being used, install it referring to the the installation manual that came with the thermostat. Route the wires and male molex plug to the unit mounted molex receptacle located on the face plate of the unit. Secure the wires in compliance with local codes. Plug in the 12-pin molex plug noting the position of the locating rib as a reference, Figure 27. See Table 13 on page 29.

Figure 27: Plug 12-pin molex with wire whips into the molex receptacle



NOTICE

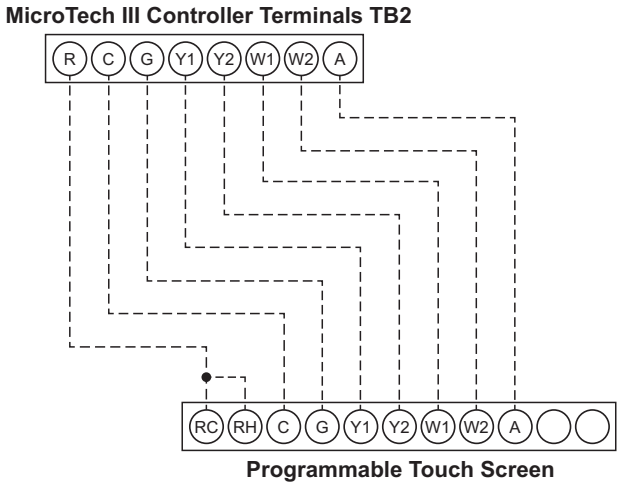
Before enclosing the unit with drywall, install the 3.25" deep diffuser extension frame to the unit discharge air opening. See "Installing The 3.25" Deep (2-Piece) Discharge Air Diffuser" on page 40. Note that the louvered discharge air diffuser will slide into and connect to the extension frame and secured *after* the unit has been framed-in and the discharge opening is cut out of drywall.

Table 13: Thermostat Molex Plug

Molex Plug		Thermostat
Wire Color	**Wire No.**	**Termination Point**
BLU	1	R
WHT	2	W2
WHT	3	W1
YEL	4	Y2
YEL	5	Y1
GRY	6	G
YEL	7	G2
RED	8	A
PNK	9	E
BRN	10	U
YEL	11	C

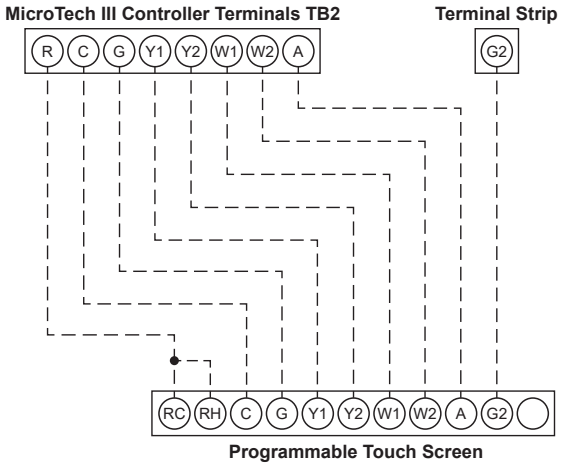
Typical Connections For Thermostats & Temperature Sensors Applications

Programmable Electronic Thermostat 2 Heat/2 Cool, 7-Day Programmable, Auto Changeover, Hardwired – P/N 910193126 & Wi-Fi P/N 910193131



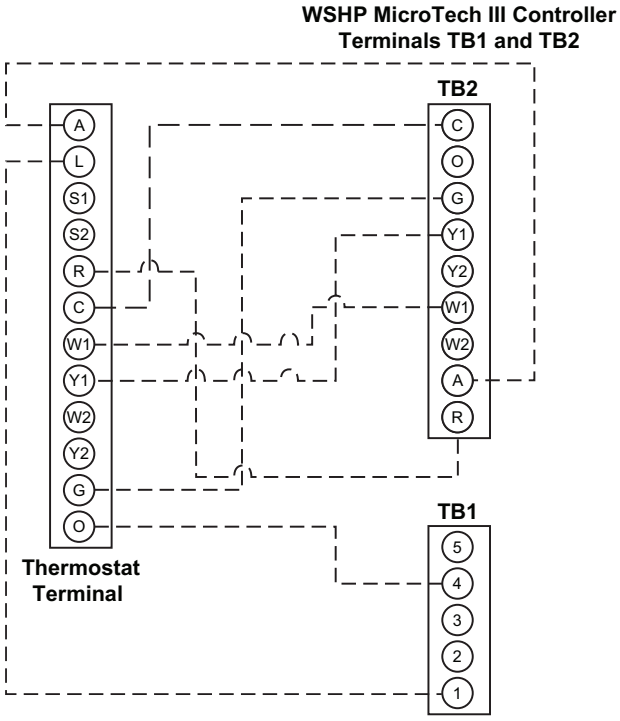
Notes: *Includes thermostat and wall plate Refer to IO manual 910193126.*

Programmable Electronic Thermostat 2 Heat/2 Cool, 7-Day Programmable, Auto Changeover, Hardwired – P/N 910193093 & Wi-Fi P/N 910193130



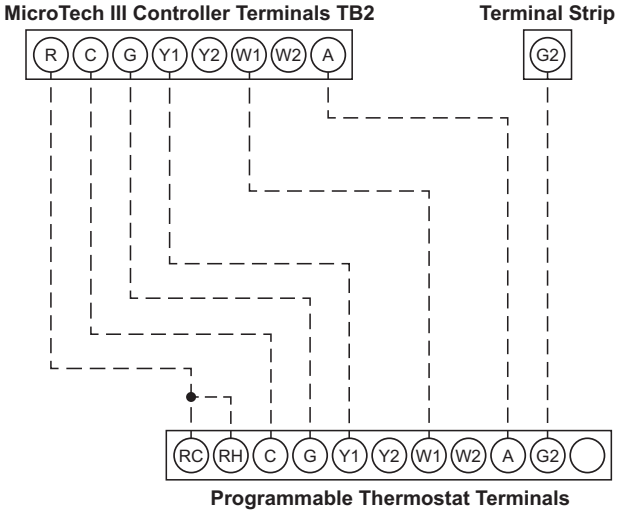
Notes: *Includes thermostat and wall plate Refer to IO manual 910193093.*

Non-Programmable Electronic Thermostat Hardwired – 1 Heat/1 Cool, Auto Changeover Fan Speed Control – P/N 668811201



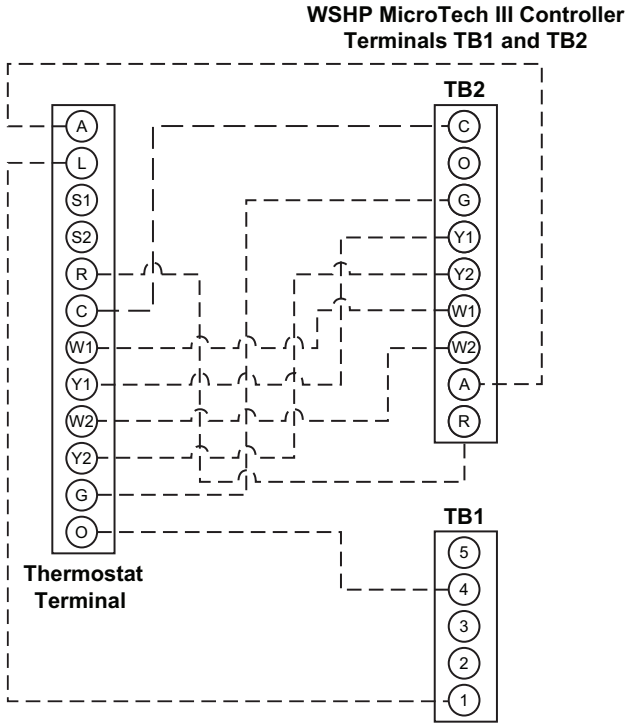
Notes: *Includes thermostat and wall plate. Refer to IO manual 668811201.*
**When remote reset of a lockout condition is required at the wall thermostat, it will be necessary to utilize a conductor between terminal "O" on the wall thermostat to "TB1 terminal 4" on the MicroTech III unit controller (non-programmable stat only).*

Programmable Electronic Thermostat Hardwired – 1 Heat/1 Cool, Auto Changeover Fan Speed Control – P/N 668811301



Notes: *Includes thermostat and wall plate. Refer to IO manual 668811301.*

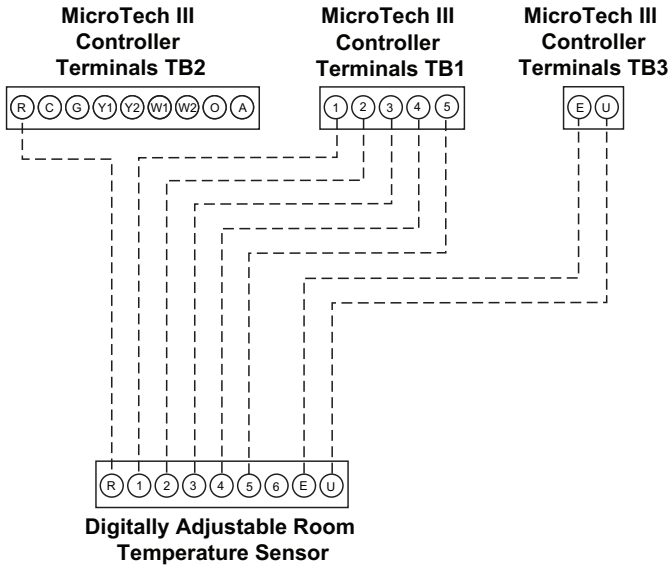
Non-Programmable Electronic Thermostat 2 Heat/2 Cool, Auto Changeover, Hardwired – P/N 910121746 & P/N 910121748



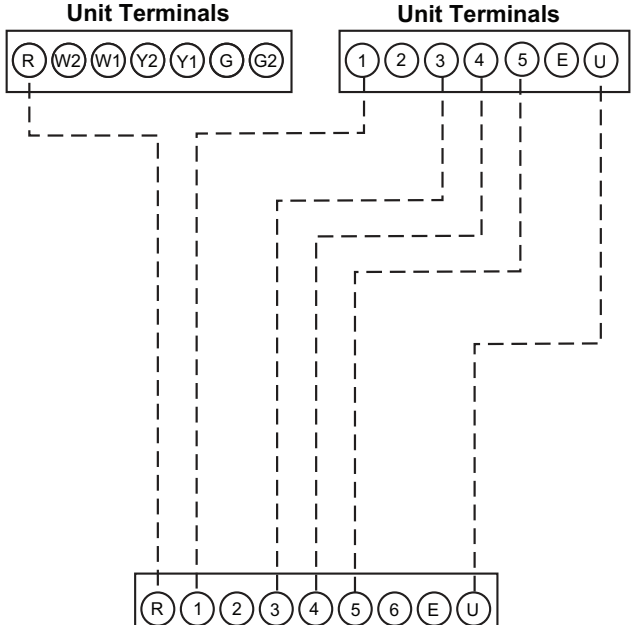
Notes: *Includes thermostat and wall plate. Refer to IO manuals 910121746 or 910121748.*
**When remote reset of a lockout condition is required at the wall thermostat, it will be necessary to utilize a conductor between terminal "O" on the wall thermostat to "TB1 terminal 4" on the MicroTech III unit controller (non-programmable stat only).*

Sensors Used With Vertical Stack Units – Building Automated System (BAS) Operation – Wiring

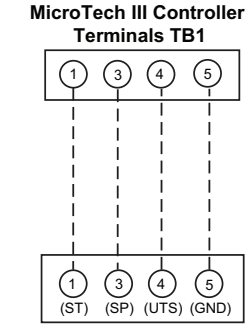
6-Button Digitally Adjustable Display Sensor – P/N 910121754



4-Button Digitally Adjustable Display Sensor – P/N 910152147

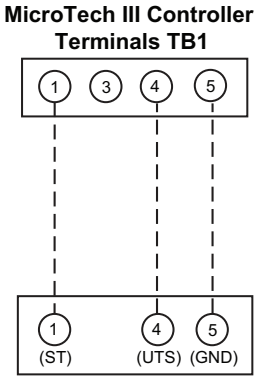


Cool/Warm Adjustable Sensor Wiring – P/N 910171464



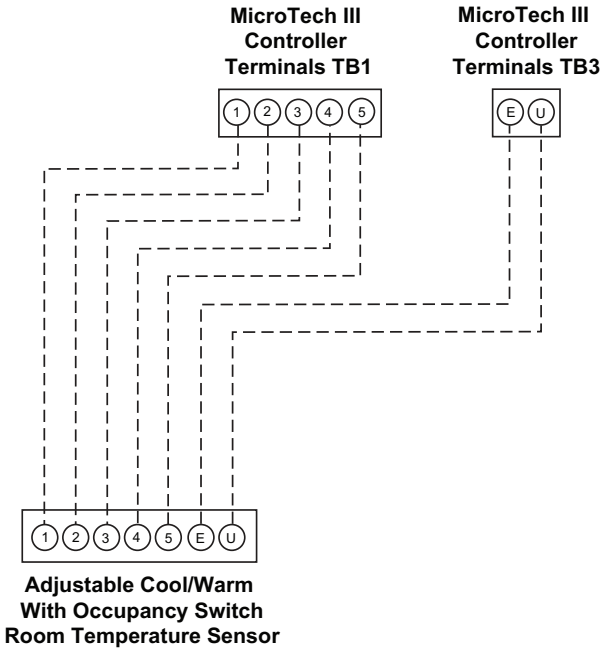
Cool/Warm Adjustable Sensor (Part No. 910171464)

Basic Sensor Wiring – P/N 910152149



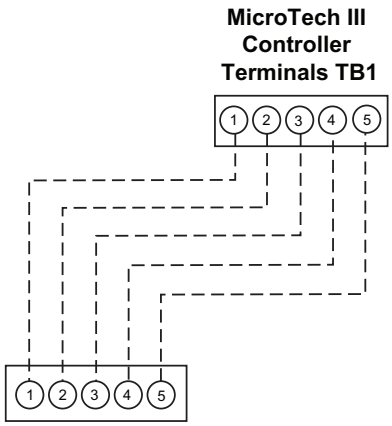
Basic Sensor (Part No. 910152149)

Room Temperature Sensor – Adjustable Cool/ Warm With Occupancy Switch – P/N 910121753



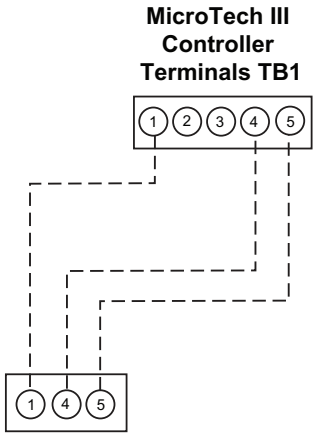
Adjustable Cool/Warm With Occupancy Switch Room Temperature Sensor

Room Temperature Sensors Adjustable 55° to 95°F or +/- 3°F – P/N 669529101 Sensor +/- 3°F – P/N 669529201



Adjustable 55º to 95º or +/- 3ºF Room Temperature Sensor

Basic Sensor – P/N 669529001



Basic Sensor

Connect Condensate Drain Hose to Field-Supplied or Factory-Provided (Shipped Loose) Drain Stub-Out

NOTICE

For shipped loose or field supplied risers by others, the condensate hose connection is dependent on riser location and must be field adjusted. For a drain riser located at the back of the unit the factory provided drain hose can be connected (as is) to the drain stub out. Right or left hand drain hose connections will require the drain tube be cut at the indicated cut line on the drain tube, (units sizes 009 - 018 only)

1. Remove the two (2) screws located along the back edge of the drain pan, holding it in place (Figure 28).

Figure 28: Remove two (2) screws along back edge of drain pan

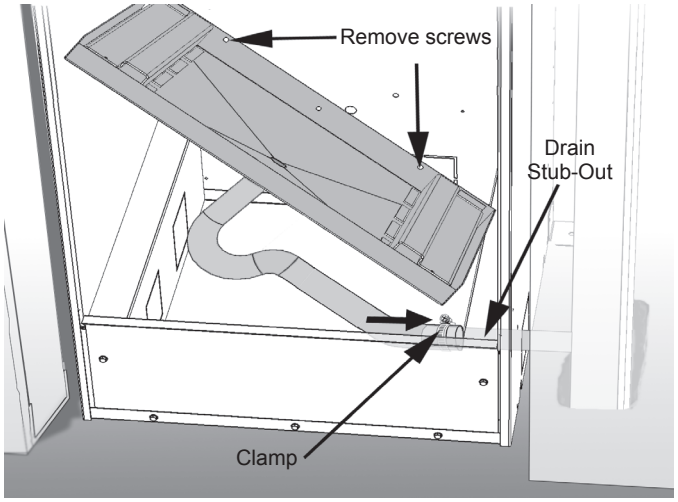
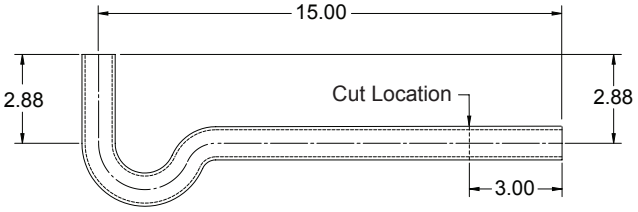


Figure 29: Drain tube cut location (see Notice above)



2. Cut the drain tube to the appropriate length for a right or left hand drain connection, (units sizes 009 - 018 only). If connecting the drain tube to the drain stub-out at the back of the unit, Cutting the drain tube may not be necessary.
3. Connect the condensate drain hose to the drain stub-out. Using the provided clamp, secure the hose by tightening the clamp.

⚠ CAUTION

Be sure that there are no kinks, bends or restrictions in the drain tube, but that it is straight with a slight down-pitch between the J-trap and clamp.

4. Reinstall the secondary drain pan with the two (2) screws removed in step 1.

Water Connections

All piping connections should be made using good plumbing practices and in accordance with any and all local codes that may apply.

Unit Piping Connection

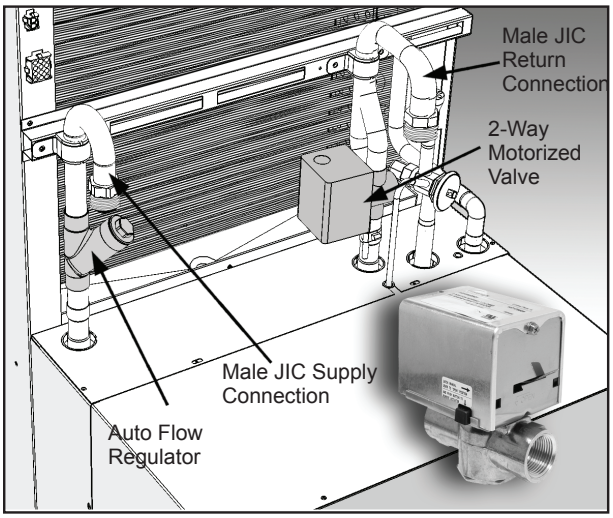
Unit sizes 009 through 018 coil connections are gooseneck style, made of copper tubing with 1/2" male JIC. Unit sizes 021 through 036 have 3/4" male JIC connections (Figure 30).

Shutoff/Balancing Valve

Each heat pump requires a flexible hose with a shutoff valve on both the supply and return stubouts for easy serviceability and removal of the chassis when necessary.

Daikin recommends a factory installed 2-way motorized isolation valve on the return line of the chassis and an Auto Flow Regulator (AFR) installed on the supply line which allows proper water flow in a given size unit. Each valve package has 1/2" JIC or 3/4" JIC threaded connections (Figure 30).

Figure 30: Typical motorized valve piping



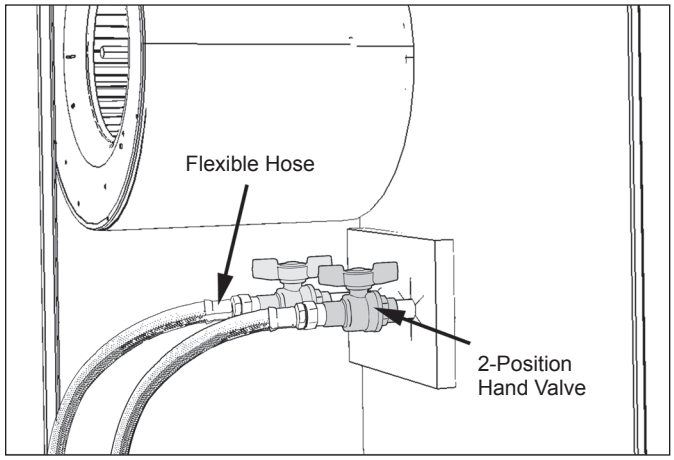
Motorized Valve & Auto Flow Regulator

The Vertical stack water source heat pump chassis can be configured with a 2-way motorized valve. The 2-way motorized valve is mounted on the return line of each unit and the Auto Flow Regulator (AFR) is mounted to the supply line.

Make Flexible Hose Connections to the Supply and Return Valves From Riser Stub-Outs

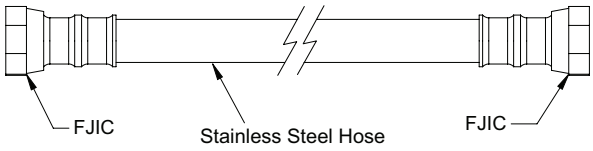
1. Using the specified supply and return hoses make supply and return hose connections to the riser stub-outs valve connections (Figure 31).
2. Attach one end of the JIC swivel hose end to the male JIC connection on the supply and return stub out valves. Using two crescent wrenches, one to hold the valve and the second on the hose end, tighten the connections.

Figure 31: Make supply and return hose connections to the valves from the riser stub-outs



Note: *To complete the flexible hose connections to the chassis, only partially install the chassis into the cabinet as shown in Figure 34.*

Figure 32: Hose kits, sizes 007-019 (1/2" x 30"), sizes 021-036 (3/4" x 36")



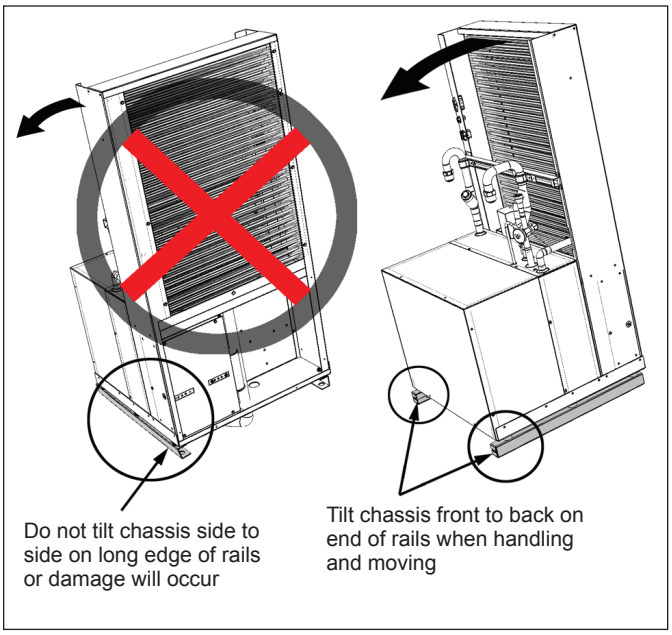
Important When Handling Chassis

Note: *If using a hand truck to move chassis, tip the chassis forward or back only, pivoting on the ends of the chassis rails. Tipping and pivoting the chassis side-to side on the long edge of the rails will damage the rails and the rubber vibration isolators.*

⚠ CAUTION

To avoid personal injury, protective gloves should be used while moving and lifting the unit chassis.

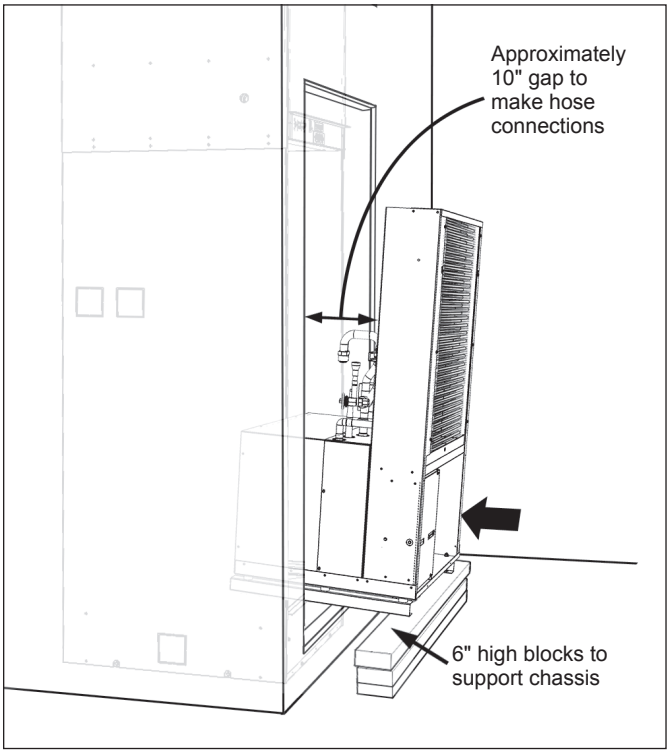
Figure 33: Tip chassis front to back only, Pivoting on the ends of the rails



Installing Unit Chassis

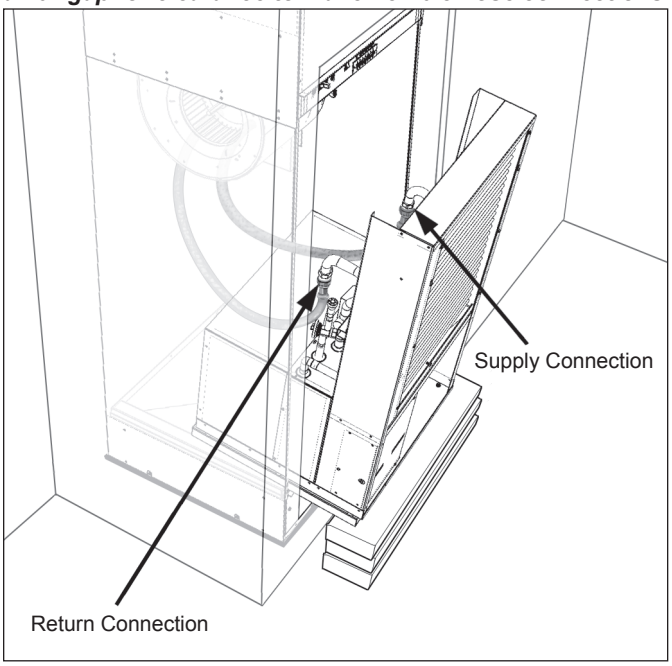
1. Install the chassis by sliding it into the cabinet opening until the chassis support rails sit on the cabinet rails. Slide the chassis into the cabinet until there is approximately a 10" space between the chassis coil and the cabinet. This will allow adequate clearance to connect the flexible hoses to the chassis coil. For safety, place a 6" high block under the chassis rails to support the chassis as shown in Figure 34.

Figure 34: Slide chassis partially into the unit cabinet



2. Thread the female swivel ends of the hoses on to the water supply and return connections. Using two crescent wrenches, one to hold the chassis pipe fitting connection and the second on the flexible hose swivel, tighten the connections. (Figure 35).

Figure 35: Slide chassis into cabinet leaving approximately a 10" gap for clearance to make flexible hose connections



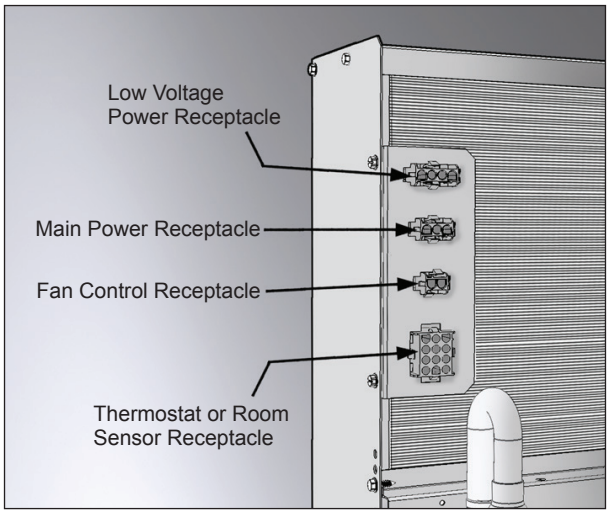
Making Cabinet to Chassis Wiring Connections

⚠ DANGER

To avoid electrical shock, personal injury or death:
1. Installer must be qualified, experienced technician.
2. Disconnect power supply before installation to prevent electrical shock and damage to equipment.

1. Locate the wires and plugs in the upper fan section of the unit that connect to the unit chassis.
2. Plug in the wires from the top cabinet section into the proper molex receptacle on the chassis (Figure 36).

Figure 36: Plug unit component wiring from the top cabinet section into the proper receptacle on the chassis (Unit Size 015 Chassis Shown)



2. Push the chassis into the cabinet until it makes contact with the stops on the rails at the rear of the cabinet.

Note: *Be sure there are no kinks and that the stainless steel braided hoses do not come in contact with and vibrate on chassis and cause noise. Also be sure not to pinch wires between cabinet and chassis when inserting chassis.*

Installing the (Optional) Remote Control Node (RCN) For Use With The Optional Wireless Thermostat

Heat Pump Kit Part No. 910139783 – Parts Included

1. RCN
2. Bezel with Overlay
3. Wire harness to MTIII Board
4. Wire harness to RCN Board

Introduction

Although the wireless temperature control kit is factory supplied it may also be field installed, which requires units set up for unit-mounted 24V thermostat control. The kit consists of a battery powered wireless remote thermostat and a unit-mounted Remote Control Node (RCN) and wireless remote control decal.

Note: *The Remote Control Node is configured at the factory. See factory default configurations for Part Number 910139783.*

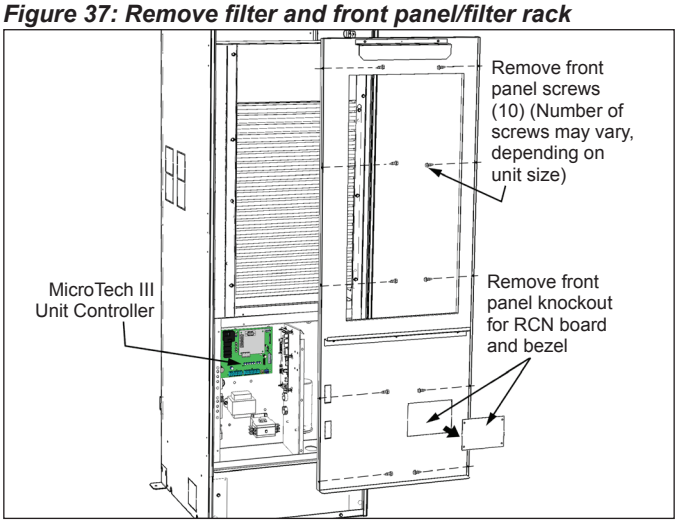
Tools Required

- Phillips head screw driver
- Small Phillips head screw driver
- Small (flat head) screw driver

Procedure

1. Be sure that all power to the unit is disconnected and that the disconnect switch is in the OFF position.
2. Remove the filter and then the front panel/filter rack (Figure 37).

Figure 37: Remove filter and front panel/filter rack



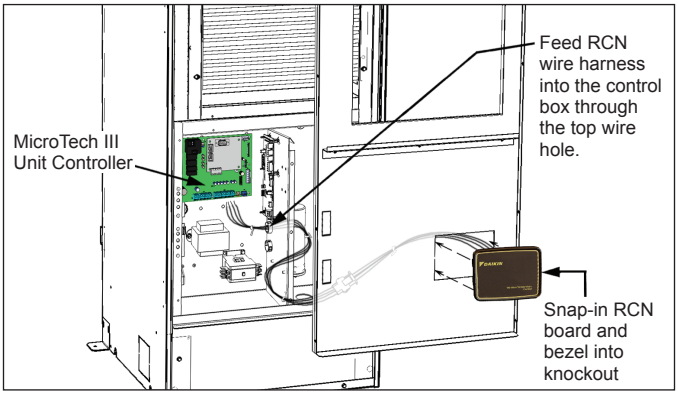
3. Remove the knockout plate in the front panel/filter rack and cut away the insulation within the knockout opening (Figure 37).

Note: *For clarity, not all unit components are shown in illustrations.*

4. Feed the provided RCN wire harness through the knockout opening and snap the RCN bezel and board assembly into the knockout (Figure 38).

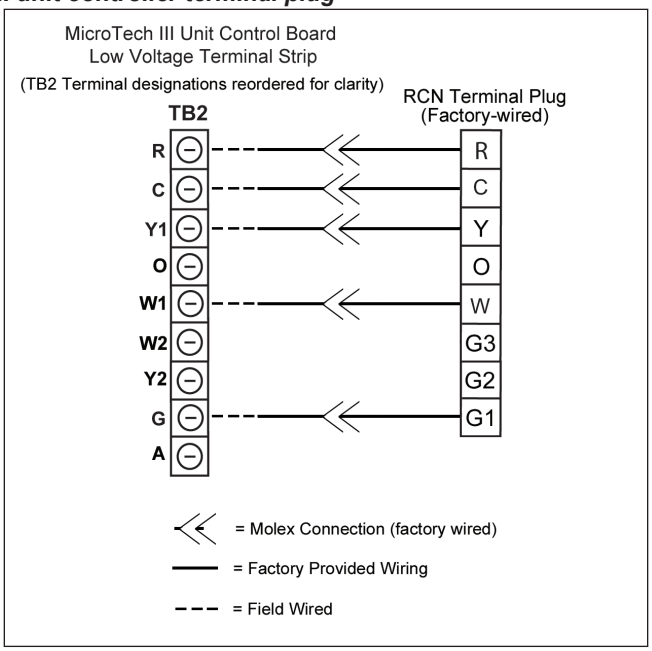
Note: *Feed RCN wire harness into the control box through the top wire hole.*

Figure 38: Feed RCN wire harness through front panel knockout



6. Remove existing wires (if any) from the unit control board terminal plug (TB2), R, C, W, Y, G2.
7. Connect the provided (pre-stripped) RCN wire harness wires to the unit control board plug on terminals R, C, W, Y & G2 as shown in Figure 39.

Figure 39: RCN wire harness connections to the MicroTech III unit controller terminal plug



8. Reinstall the front panel/filter rack and filter.

Installing The Return Air Panel Door

1. Install the return air panel door assembly (Figure 40). Center, level and plumb the frame inside the framed opening. Push the assembly into the opening until the gaskets compress against the cabinet, and the frame face is tight to the finished wall.

Notes: *1. Shims (field-supplied) should be used to make up the space between the studs and the panel frame at the locations of the fasteners on the panel frame (4). Adhere them to the panel frame to keep them in place (Figure 40).*

2. Be sure the bottom flange of the door frame slides beneath the cabinet flange, as shown in Figure 40. This seal must compress between the bottom panel flange and the bottom cabinet flange when the installation of the panel door frame is complete.

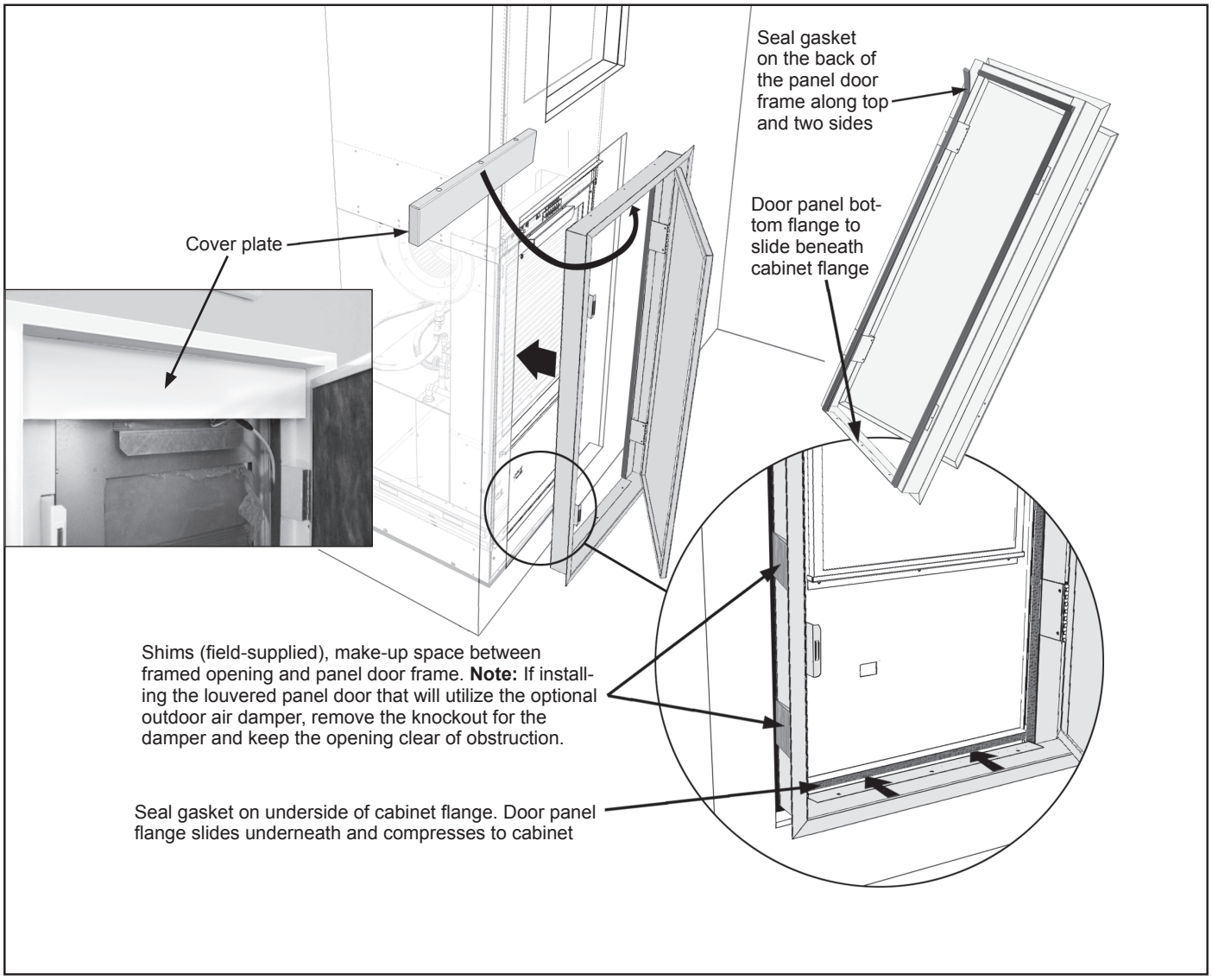
2. Check that the panel door frame is centered within the opening and seals completely to the cabinet return air opening. Also confirm that the room side flange of the frame is level, plumb and firmly against the drywall. Secure the hinged panel door frame with the appropriate fasteners/ screws (field provided).

Note: *Before proceeding to instruction 3, be sure to clean frame with rubbing alcohol to remove any oils or dust to ensure a strong bond between velcro and door frame.*

3. Remove the backing on the (hook) velcro strips and firmly press the cover plate to the panel door frame in the location shown in Figure 40.

Note: *The clearance holes along the top edge of the cover plate should fit around the screws on the underside of the top door frame.*

Figure 40: Installing the return air panel door (hinged perimeter panel door shown)



Installing The Optional Motorized Outdoor Air Damper with Louver Panel Door Only

1. Install the return air panel door assembly as described in "Installing The Return Air Panel Door" on page 36.
3. Fasten the damper assembly to the door frame with the provided screws. On left hand hinged doors the damper assembly will mount on the hinge side with the motor located at the bottom, and with right hand hinged doors the damper assembly will mount on the right side with the motor in the top position.
4. Wire the damper assembly motor using the correct schematic based on the unit motor type and voltage, (Figure 55 through Figure 60).

Note: *It is the responsibility of the installing contractor to install the ductwork that connects the outdoor air opening in the panel door frame to the source of the outdoor intake opening in the building. All ductwork should conform to industry standards of good practice as described in the ASHRAE Systems Guide. Also refer to good installation practices as outlined in ED 18529.*

Figure 41: Fasten the outside air damper assembly to the louver panel door frame

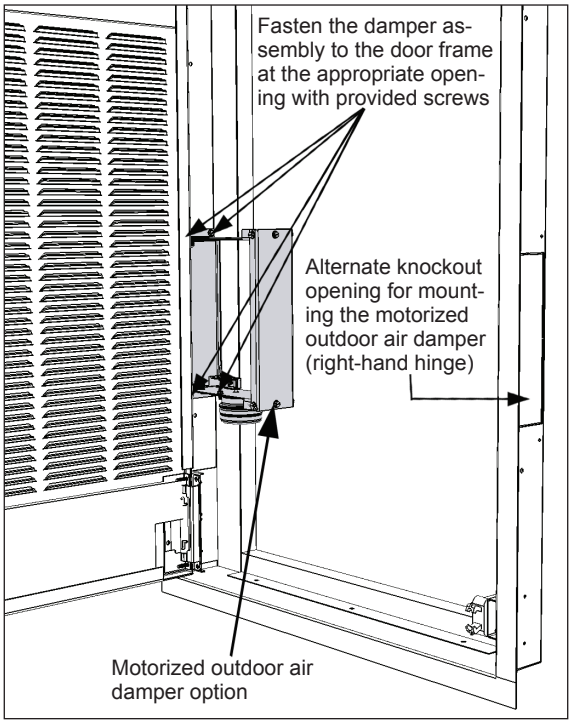


Figure 55: Damper control wiring, sizes 009-012 with 208/230V and 277V fan motor control

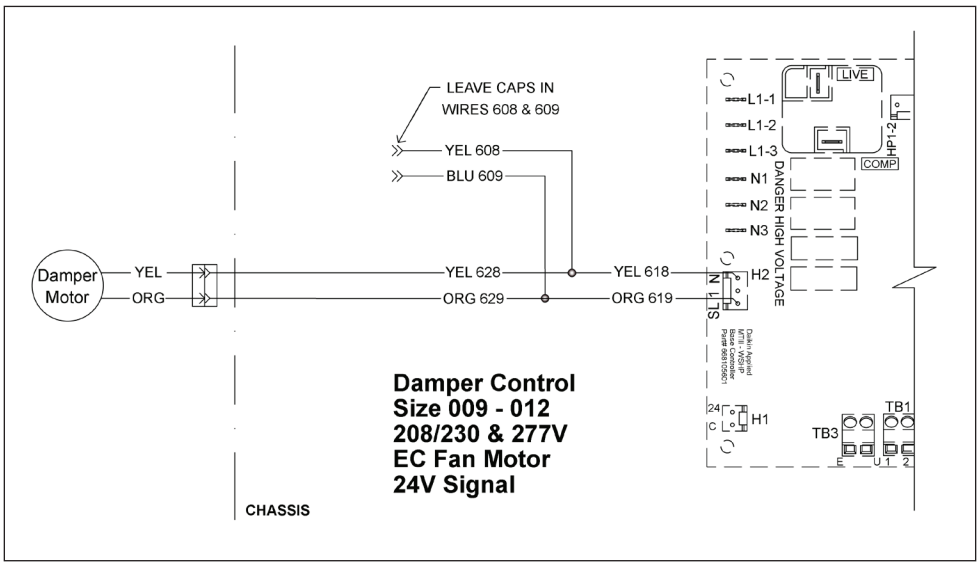


Figure 56: Damper control wiring, sizes 015-036 with EC motor

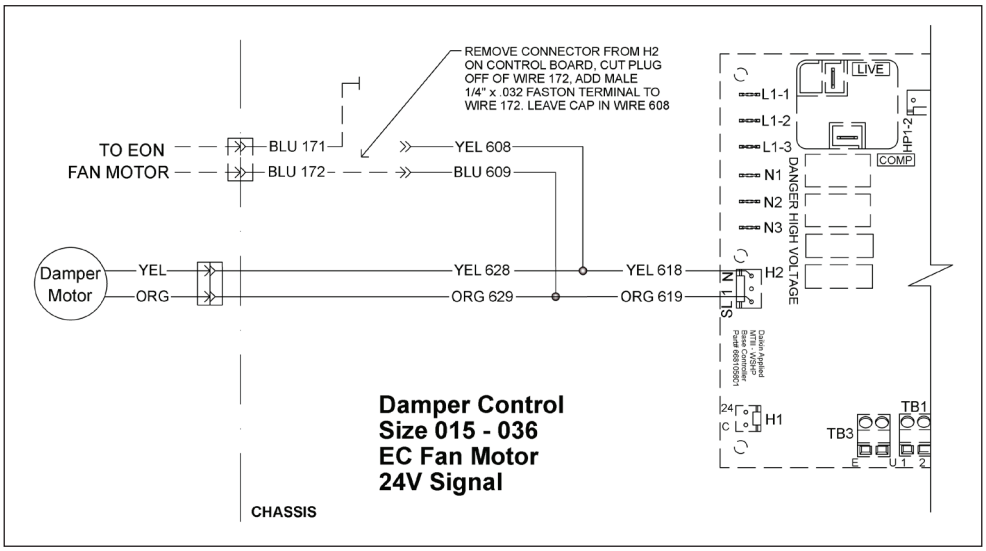


Figure 57: Damper control wiring, sizes 009-012 with 115V PSC fan motor, line voltage control

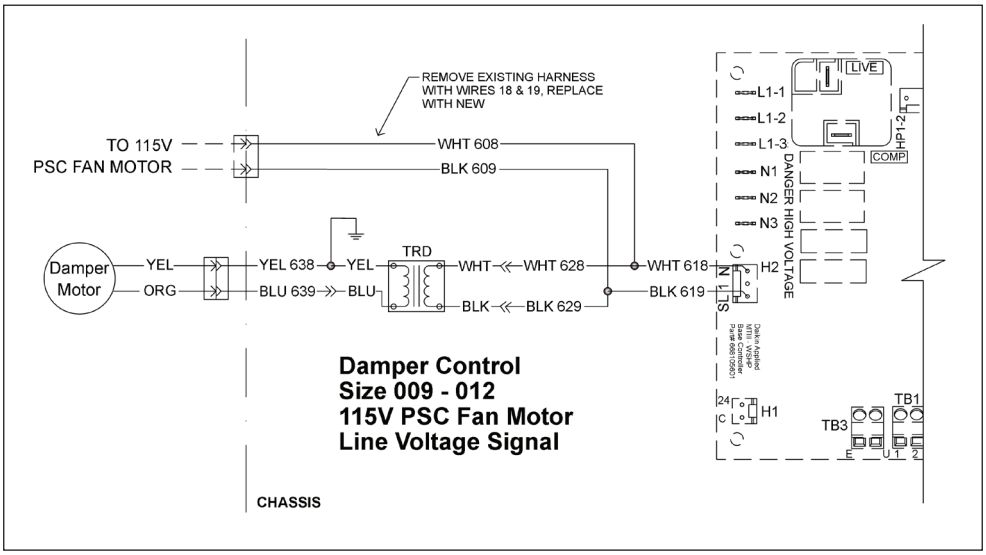


Figure 58: Damper control wiring, sizes 009-036 with 277V PSC fan motor, 24V control

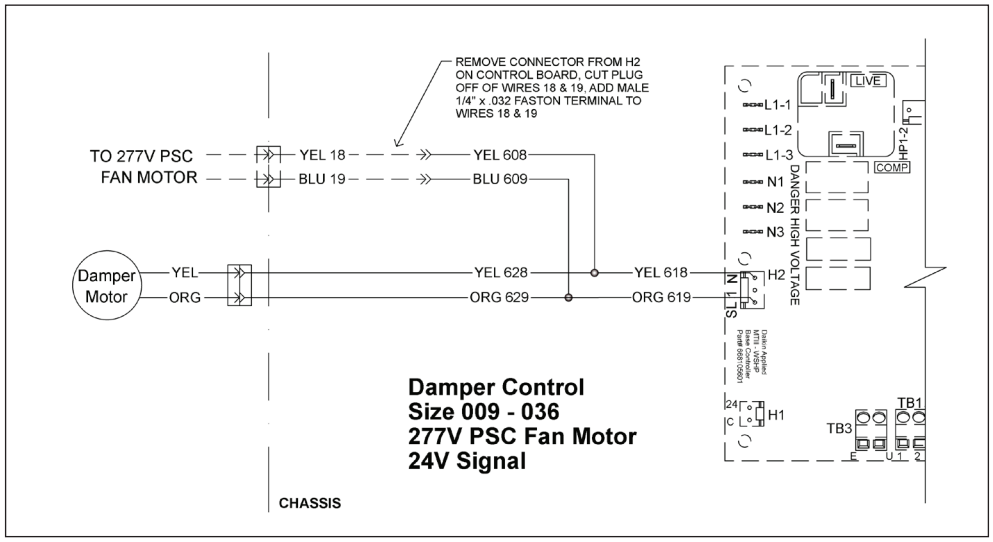


Figure 59: Damper control wiring, sizes 009-036 with 208/230V PSC fan motor, 24V control

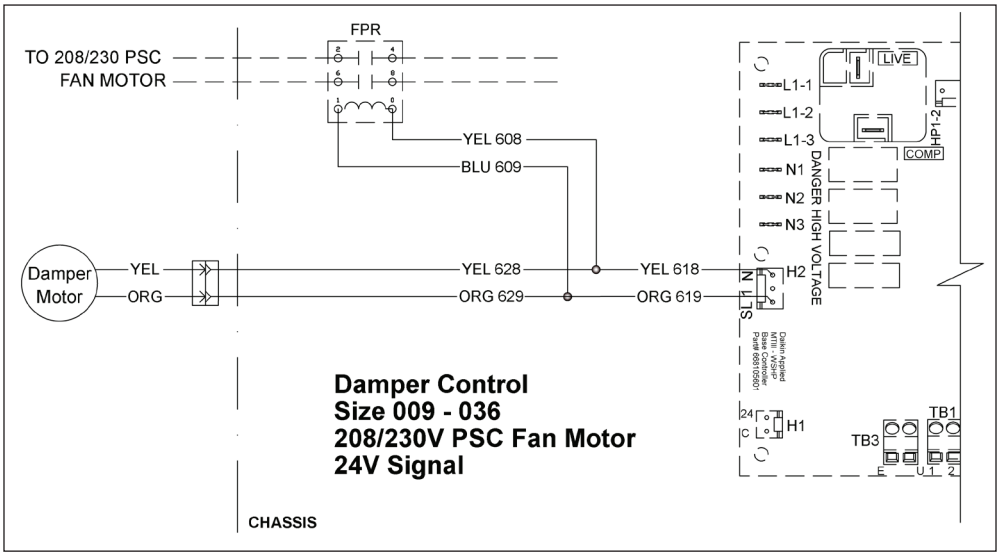
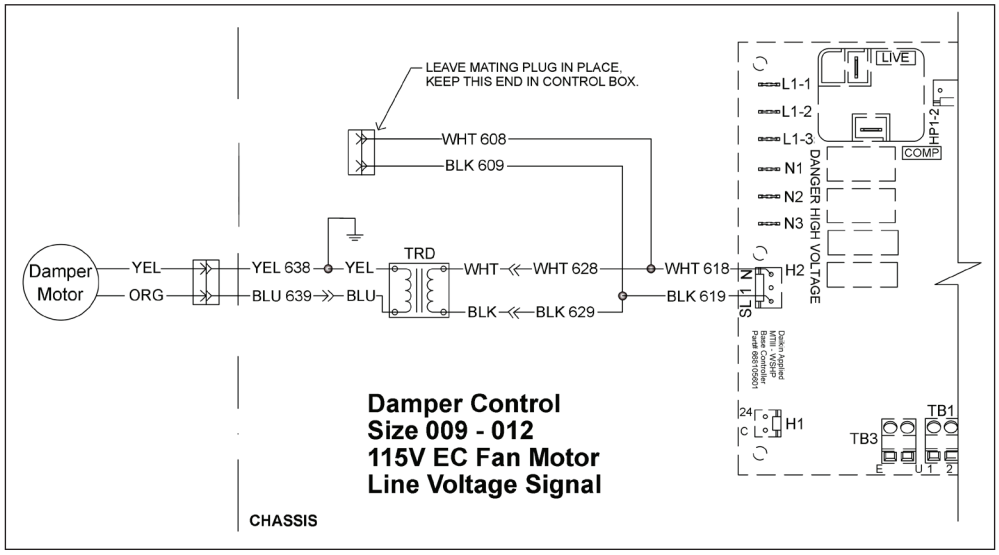


Figure 60: Damper control wiring, sizes 009-012 with 115V EC fan motor, line voltage control



Installing The 3.25" Deep (2-Piece) Discharge Air Diffuser

NOTICE

Install the diffuser extension frame half of the two-piece 3.25" deep discharge air diffuser assembly to the unit before installing drywall. The louvered discharge air diffuser will slide in and connect to the extension frame and secured *after* the unit has been framed-in and the discharge opening is cut out of the drywall.

Note: *To lessen noise transmission and air leakage, avoid metal-to-metal contact. Installation of a foam seal around the units discharge air opening is recommended.*

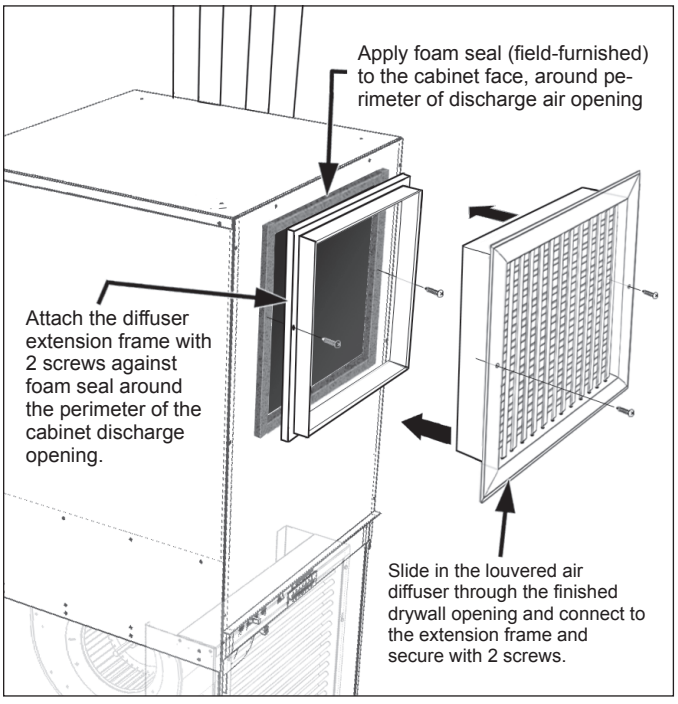
1. Adhere field-provided 1/2" foam seal to the face of the cabinet around the perimeter of the discharge air opening (Figure 42).
2. Attach the extension frame portion of the two-piece discharge air diffuser assembly to the foam seal around the perimeter of the cabinet discharge opening.

Note: *Be sure the the extension frame is level and plumb.*

3. After the unit has been framed-in and the discharge opening is cut out of the drywall, slide in the louvered air diffuser through the finished drywall opening and connect to the extension frame. Secure with two (2) screws provided.

Notes: *1. To avoid bending the adjustable discharge louvers do not press on them.*
2. When installed correctly the diffuser frame should connect to the extension frame and seal to the cabinet discharge air opening so no discharge air is lost between the unit and the wall cavity.

Figure 42: Installing the 3.25" deep (2-piece) discharge air diffuser



Installing The 1.75" Deep Discharge Air Diffuser

Note: *To lessen noise transmission and air leakage, avoid metal-to metal contact. Installation of a foam seal around the units discharge air opening is recommended.*

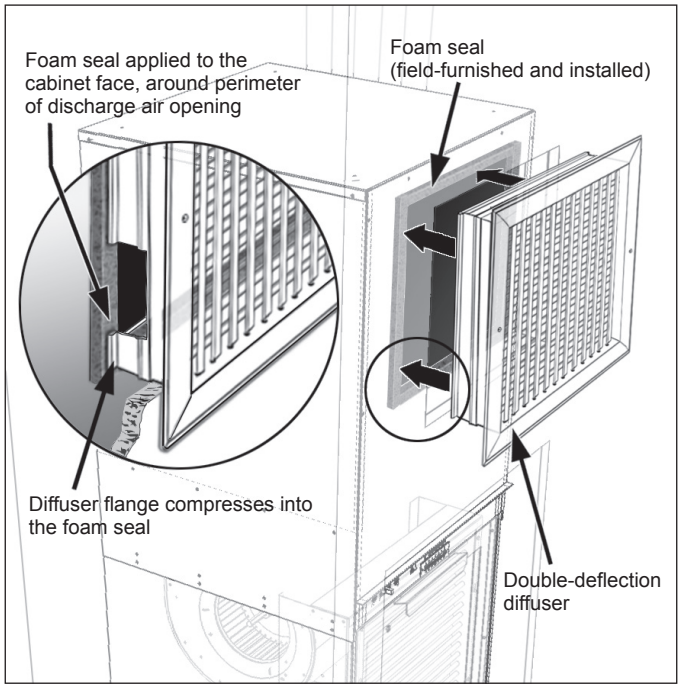
1. Adhere field-provided 1/2" foam seal to the face of the cabinet around the perimeter of the discharge air opening (Figure 43).
2. Insert the diffuser into the wall opening and align the frame with the foam seal.

Note: *To avoid bending the adjustable discharge louvers do not press on them.*

3. Push the diffuser frame in until it compresses against the foam seal and the room side frame is flush against the drywall. Be sure the diffuser frame is level and plumb and secure it with the two (2) screws provided.

Note: *When installed correctly the diffuser frame should seal to the cabinet discharge air opening and no discharge air will be lost between the unit and the wall cavity.*

Figure 43: Installing the 1.75" deep discharge air diffuser



Twin Units Installation

Twin opposite hand units share a common riser system; i.e., supply, return, and drain riser. This is commonly called a “master/secondary” arrangement. The master unit is shipped with the risers attached. These special risers have stub-outs for both the master unit and the secondary unit which must be field connected and the following procedures must be followed for all twin unit installations.

1. Secondary units ship without risers and share common risers with the master unit. Knockout holes on the cabinet are provided for the 6" stub outs to make piping connections to the coil supply and return and the condensate drain.
2. Master units are offered in two-pipe systems with either right-hand or left-hand connections. Secondary units are offered to accommodate internal connections to any of these riser systems or locations.
3. The riser location (right or left) is determined by facing the return air grille panel. The risers are located on either the right or left of the unit. This defines the riser location. See "Cabinet Configurations" on page 17.
4. The riser block-off plates are located in the base of the secondary unit. Block-offs must be installed on the secondary unit before putting it into position.

Figure 44: Twin unit arrangement (side by side)

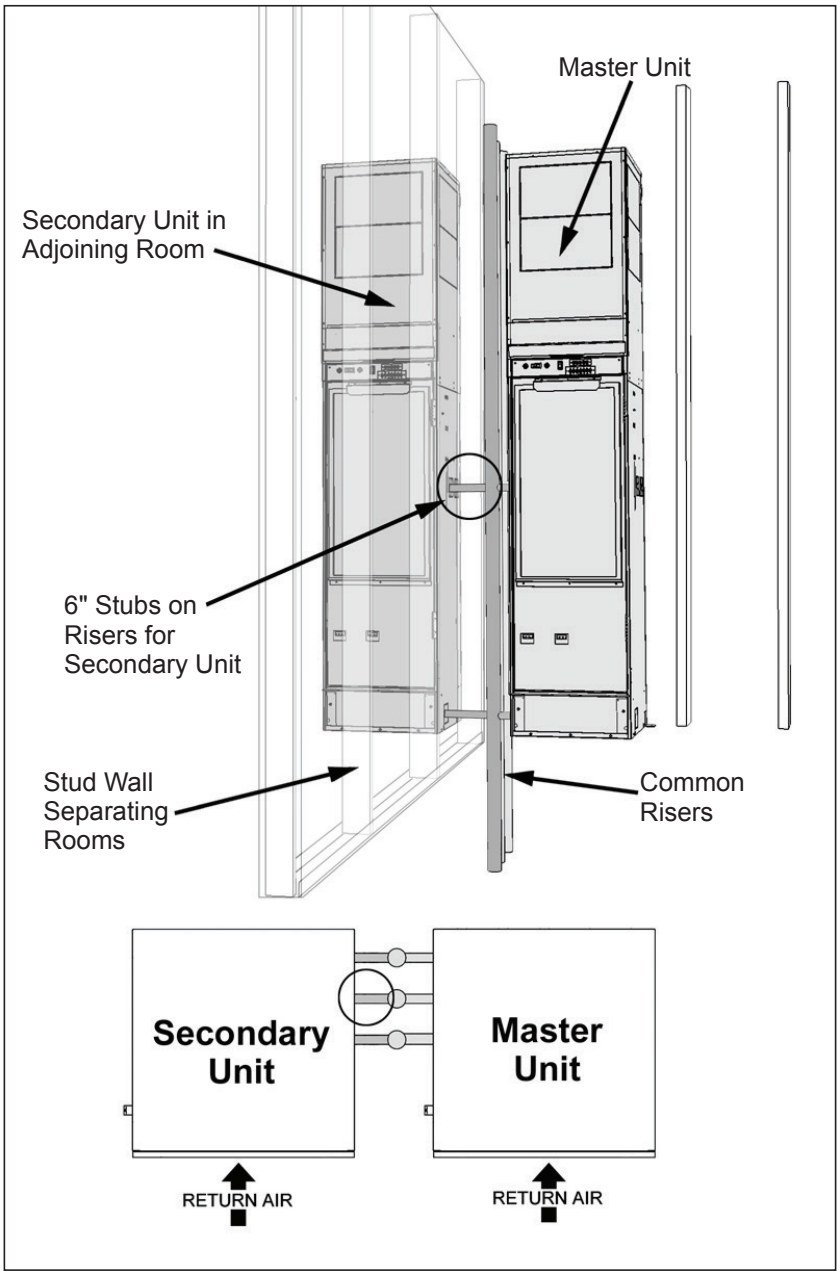


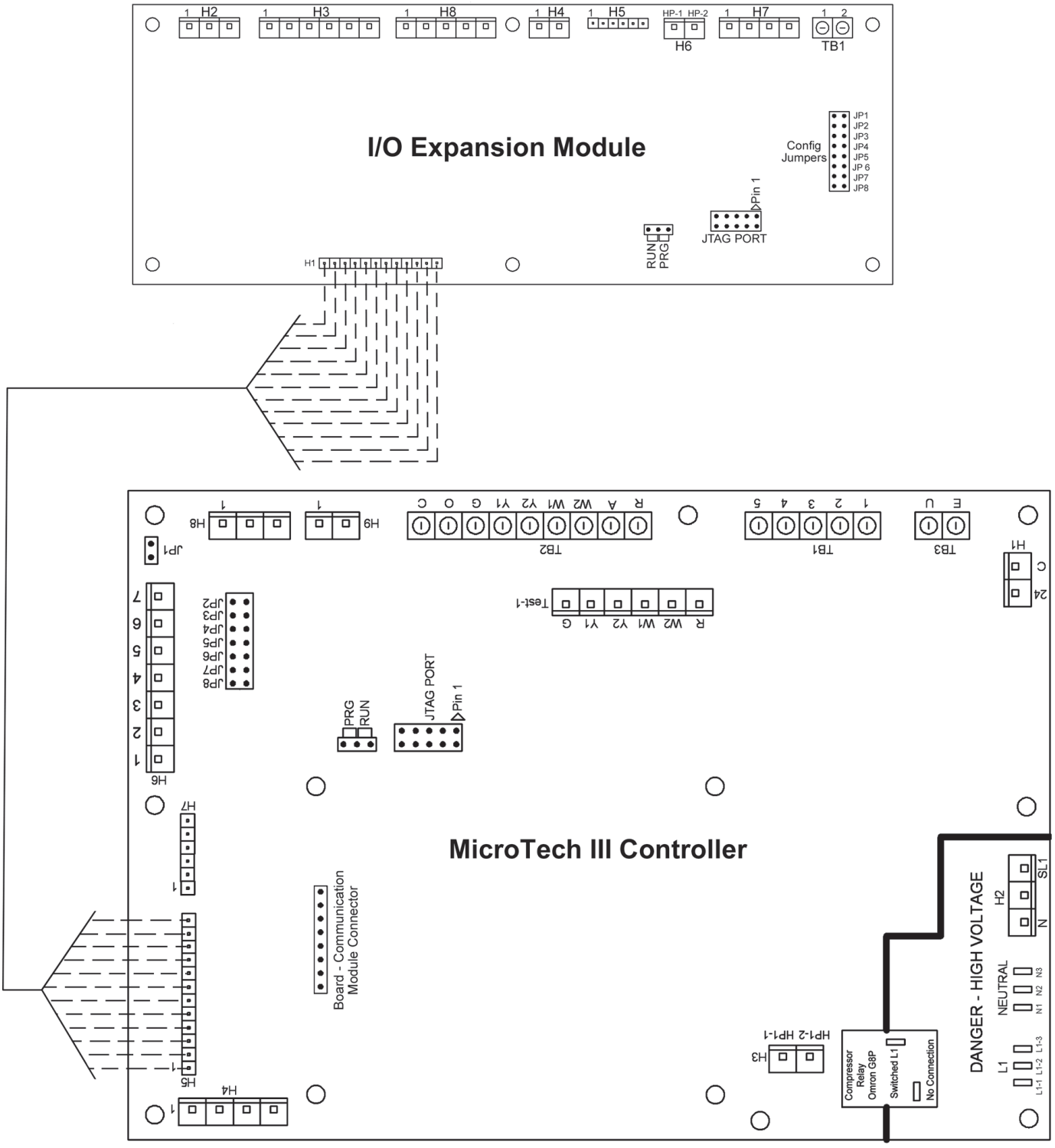
Table 14: MicroTech III unit controller terminals & descriptions

H1 – 1	24	24 VAC Power Input
H1 – 2	C	24 VAC common
H2 – 1	SL1	Fan Main Required Output – Switched L1
H2 – 2		Blank Terminal
H2 – 3	N	Fan Main Required Output – Neutral
H3 – 1	HP1-1	Comp High Pressure Switch (HP1) Input Terminal 1
H3 – 2	HP1-2	Comp High Pressure Switch (HP1) Input Terminal 2
H4 – 1	1	Discharge Air Temp Sensor – Common
H4 – 2		Discharge Air Temp Sensor – Signal
H4 – 3		Leaving Water Temp Sensor – Common
H4 – 4		Leaving Water Temp Sensor – Signal
H5 – 1	1	Connections to I/O Expansion Board
H5 – 2		
H5 – 3		
H5 – 4		
H5 – 5		
H5 – 6		
H5 – 7		
H5 – 8		
H5 – 9		
H5 – 10		
H5 – 11		
H5 – 12		
H6 – 1	1	Condensate Overflow Signal Input
H6 – 2		Compressor Suction Temp Sensor (LT1) – Common
H6 – 3		Compressor Suction Temp Sensor (LT1) – Signal
H6 – 4		Compressor Low Pressure Switch (LP1) – Source Voltage
H6 – 5		Compressor Low Pressure Switch (LP1) – Signal
H6 – 6		Reversing Valve – Common
H6 – 7		Reversing Valve – Output
H7 – 1	1	No Connection
H7 – 2		No Connection
H7 – 3		Red LED Output
H7 – 4		Green LED Output
H7 – 5		Yellow LED Output
H7 – 6		Red-Green-Yellow LED Common
H8 – 1	1	Isolation Valve/Pump Request Relay N/O
H8 – 2		Isolation Valve/Pump Request Relay N/C
H8 – 3		24 VAC Common
H9 – 1	1	Room Temp Sensor & Tenant Override – Signal
H9 – 2		Room Temp Sensor & Tenant Override – Common
TB1 – 1	1	Room Sensor – Status LED Output
TB1 – 2	2	Room Sensor – Fan Mode & Unit Mode Switches
TB1 – 3	3	Room Sensor – Setpoint Adjust Potentiometer
TB1 – 4	4	Room Sensor – Room Temp Sensor & Tenant Override
TB1 – 5	5	Room Sensor – DC Signal Common
TB2 – 1	R	24 VAC
TB2 – 2	A	Thermostat – Alarm Output
TB2 – 3	W2	Thermostat – Heat Stage #2 (W2) Input
TB2 – 4	W1	Thermostat – Heat Stage #1 (W1) Input
TB2 – 5	Y2	Thermostat – Cool Stage #2 (Y2) Input
TB2 – 6	Y1	Thermostat – Cool Stage #1 (Y1) Input
TB2 – 7	G	Thermostat – Fan Input
TB2 – 8	O	Thermostat – Heat Stage #3 (W3) Input
TB2 – 9	C	24 VAC Common
TB3 – 1	E	Emergency Shutdown Input
TB3 – 2	U	Unoccupied Input
L1 – 1	L1 - 1	Line Voltage Terminal 1
L1 – 2	L1 - 2	Line Voltage Terminal 2
L1 – 3	L1 - 3	Line Voltage Terminal 3
N1	N1	Neutral Terminal 1
N2	N2	Neutral Terminal 2
N3	N3	Neutral Terminal 3

Table 15: I/O expansion module connectors/terminals

H1 – 1	1	Connections to Main Board
H1 – 2		
H1 – 3		
H1 – 4		
H1 – 5		
H1 – 6		
H1 – 7		
H1 – 8		
H1 – 9		
H1 – 10		
H1 – 11		
H1 – 12		
H2 – 1	1	Auxiliary Heat Stage #2 Output – N/O
H2 – 2		No Connection
H2 – 3		24 VAC Common
H3 – 1	1	Ext. 24 VAC In
H3 – 2		Ext. 24 VAC Common In
H3 – 3		HGR / Waterside Economizer Output – N/O
H3 – 4		Ext. 24 VAC Common
H3 – 5		EC Fan Motor Variable Speed Signal Output
H3 – 6		EC Fan Motor Variable Speed Signal – Common
H4 – 1	1	Entering Water Temp Sensor – Signal
H4 – 2		Entering Water Temp Sensor – Common
H5 – 1	1	No Connection
H5 – 2		No Connection
H5 – 3		Red LED Output
H5 – 4		Green LED Output
H5 – 5		Yellow LED Output
H5 – 6		Red-Green-Yellow LED Common
H6 – 1	HP2-1	Comp High Capacity High Press Sw (HP2) Input Terminal 1
H6 – 2	HP2-2	Comp High Capacity High Press Sw (HP2) Input Terminal 2
H7 – 1		Fan Speed Table Row Select – Signal
H7 – 2		Fan Speed Table Row Select – Common
H7 – 3		Thermostat – Heat Stage #4 (W4) Input – Signal
H7 – 4		Auxiliary 24 VAC Out
H8 – 1	1	Compressor – High Capacity Output – N/O
H8 – 2		24 VAC Common
H8 – 3		No Connection
H8 – 4		Auxiliary Heat Stage #1 / Hydronic Heat Output N/O (24 VAC)
H8 – 5		24 VAC Common
TB1 – 1	1	Humidistat Signal Input
TB1 – 2	2	Thermostat - Heat Stage #4 (W4) Input – Signal

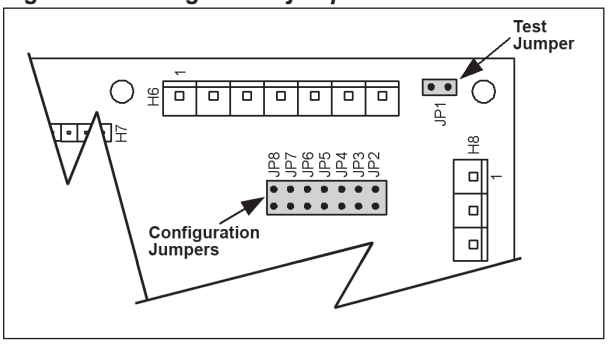
Figure 45: MicroTech SmartSource unit controller & I/O expansion module



Note: *Refer to Table 14 and Table 15 on page 42 for terminal descriptions*

Jumper Configuration Settings

Figure 46: Configuration jumpers location



⚠ WARNING

Proper antifreeze/water solution is required to minimize the potential of fluid freeze-up. Jumper JP3 is factory set for water freeze protection with the jumper open. Operation at fluid temperatures below 32°F with anti-freeze protection requires JP3 to be field configured for the jumper closed. If unit is employing a fresh water system (no anti-freeze protection), it is extremely important that JP3 jumper setting remains in the open position (factory default setting) in order to shut down the unit at the appropriate water temperature to protect your heat pump from freezing. Failure to do so can result in unit damage and fluid leaks.

Table 16: Jumper settings and descriptions

Jumper	Description	Options
JP1	Mode	Open for normal operation mode
		Shorted for service/test operation mode
JP2	Fan operation	Open for continuous fan operation, when not in unoccupied mode.
		Shorted for cycling fan operation
JP3 (See Warning)	Freeze Protection	Open for water freeze protection
		Shorted for systems with anti-freeze protection (15°F (9°C)
JP4	Freeze Fault Protection	Open for none
		Shorted to enable freeze fault protection based on Leaving Water Temperature (LWT)
JP5	Set point adjustment range only applies to network controls with a room temperature sensor	Open for adjustment range of -5.0° to +5.0° F
		Shorted for 55° to 95° F adjustment range
JP6	Room control type	Open for thermostatic room control
		Shorted for room temperature sensor control, MicroTech III only.
JP7	Compressor heating source	Open to enable compressor heating
		Shorted to disable compressor heating
JP8	I/O expansion module	Open when I/O expansion module is not required
		Shorted when I/O expansion module is required

Table 17: I/O expansion module jumper settings

I/O Expansion Description	Jumper(s)	Setting	Description
Fan Row Select for Operating Modes: ▪ Fan Only ▪ Hydronic Heating	**JP1 & JP2**	JP1 = Open JP2 = Open	Fan Row #1 Selected
		JP1 = Shorted JP2 = Open	Fan Row #2 Selected
		JP1 = Open JP2 = Shorted	Fan Row #3 Selected
		JP1 = Shorted JP2 = Shorted	Fan Row #4 Selected
Heating Options	**JP3 & JP4**	JP3 = Open JP4 = Open	None
		JP3 = Shorted JP4 = Shorted	Hydronic Heat
Not Used	**JP5 & JP6**	JP5 = Open JP6 = Open	None
Not Used	**JP7**	JP7 = Open	None
Not Used	**JP8**	JP8 = Open	

MicroTech® III SmartSource Unit Controller

The MicroTech III SmartSource unit controller allows thermostat, Daikin sensor and DDC standalone operation. The R (24VAC) terminal is used to operate thermostat inputs G, Y1, Y2, W1, W2, W3, W4 and TB1-1. The C (0VAC) terminal is used to control inputs U, E and O. No external power sources may be used to operate the MicroTech III controller. All units must be properly grounded per local code requirements.

NOTICE

For information on sequence of operation and troubleshooting refer to OM 1149.

Remote Reset of Automatic Lockouts

The Remote Reset feature provides the means to remotely reset automatic lockouts. There are (3) means to reset an automatic lockout condition:

- Using the thermostat create 2 demands for capacity within 30 seconds
- Press the Room Sensor or Thermostat Timed Override/ Reset Button for more than 10 seconds
- Turn the unit power off

When the cause of the fault condition has been cleared, and the unit transitions from not requiring any capacity to needing any capacity twice within 30 seconds (accomplished by user manipulation of the Heat/Cool/Auto/Off switch on the thermostat), an alarm reset equivalent to a tenant override button reset is generated. The intelligent reset counter and the 24 hour timer are cleared when this type of alarm reset is generated.

Note: *This feature only applies to thermostat controlled systems.*

For room sensor controlled units, pressing the “Override” or “Reset” button for more than 10 seconds will apply a ground signal to the tenant override in(screw terminal connection at TB1 pin 4) will clear the lockout alarm once the cause of the fault condition has been cleared.

A unit power cycle can also be used to clear an automatic lockout if the conditions causing the fault have been cleared.

Table 18: MicroTech III SmartSource unit controller fault & status LED's

Description	Type	Yellow	Green	Red
I/O Expansion Communication Fail	Fault	ON	Flash	Flash
Invalid Configuration	Fault	Flash	Flash	OFF
Low Voltage Brownout	Fault	OFF	Flash	OFF
Emergency Shutdown	Mode	OFF	Flash	OFF
Compressor High Pressure	Fault	OFF	OFF	Flash
Compressor Low Pressure	Fault	OFF	OFF	ON
Compressor Suction Temp Sensor Fail	Fault	Flash	Flash	ON
Compressor Low Suction Temp	Fault	Flash	OFF	OFF
Freeze Fault Detect	Fault	Flash	OFF	Flash
Room Temp Sensor Fail (Room Sensor Control Only)	Fault	Flash	Flash	ON
Leaving Water Temp Sensor Fail	Fault	Flash	Flash	ON
Condensate Overflow	Fault	ON	OFF	OFF
Serial EEPROM Corrupted	Fault	ON	ON	ON
Waterside Economizer Low Temp Cutout (WSE Control & Call for Cooling)	Mode	Flash	ON	Flash
Service Test Mode Enabled	Mode	Flash	Flash	Flash
Unoccupied Mode	Mode	ON	ON	OFF
Occupied, Bypass, Standby, or Tenant Override Modes	Mode	OFF	ON	OFF

Note: *Mode/faults are listed in order of priority.*

Table 19: I/O expansion module fault & status LED's

Description	Type	Yellow	Green	Red
Baseboard Communication Fail	Fault	Flash	OFF	Flash
Entering Water Temp Sensor Fail (Boilerless Electric Heat or Waterside Economizer Only or Hydronic Heat)	Fault	ON	OFF	Flash
Low Entering Water Temperature (No Display On Boilerless Electric Heat)	Fault	OFF	ON	Flash
Fan is OFF	Mode	OFF	ON	OFF
Fan Running at Low Speed (0 to 33%) Duty Cycle	Mode	OFF	Flash	OFF
Fan Running at Medium Speed (34 to 66%) Duty Cycle	Mode	ON	Flash	OFF
Fan Running at High Speed (67 to 100%) Duty Cycle	Mode	Flash	Flash	OFF

Table 20: Fault recovery and reset

Fault Description	Auto Recovery	Tenant Override Button Reset	Network Reset
I/O Expansion Communication Fail	Yes	No	No
Invalid Configuration	No	No	No
Low Voltage Brownout	Yes	No	Yes
All Sensor Failures	No	No	Yes
Compressor High Pressure	No	Yes	Yes
Compressor Low Pressure	No	Yes	Yes
Compressor Low Suction Temp or Freeze Fault Detect (Heating and Cooling Modes)	Yes[1]	Yes	Yes
Compressor Low Suction Temp or Freeze Fault Detect (Dehumidification Mode)	Yes	Yes	Yes
Condensate Overflow	Yes	No	Yes
Low Entering Water Temp	Yes	No	No
Serial EEPROM Corrupted	No	No	No
Waterside Economizer Low Temp Cutout	Yes	No	No

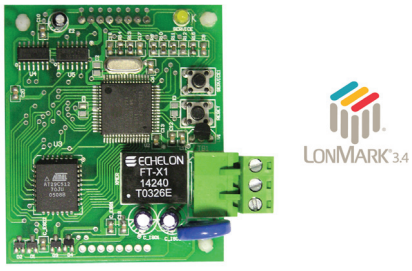
Note: [1] *Indicates auto recover is subject to intelligent alarm reset. Alarm auto recovers on first two occurrences, locked out on third within 24 hour period.*
See "Intelligent Alarm Reset" on page 32 for further details.

MicroTech SmartSource Controller with LonWorks® Communication Module

For installation and operation information on LonWorks Communication Module and other ancillary control components, see:

- IM 927 - MicroTech III Water Source Heat Pump LonWorks Communication Module
- IM 933 - LonMaker Integration Plug-in Tool: For use with the MicroTech III SmartSource Unit Controller
- IM 955 - MicroTech III Wall Sensor for use with MicroTech III SmartSource Unit Controller

Figure 47: LonWorks communication module



MicroTech SmartSource Controller with BACnet® Communication Module

For installation and operation information on MicroTech III SmartSource unit controller and other ancillary components, see:

- IM 928 - MicroTech III BACnet Communication Module
- OM 931 - MicroTech III SmartSource Unit Controller for Water Source Heat Pumps Operation and Maintenance Manual
- IM 955 - MicroTech III Wall Sensor For use with MicroTech III SmartSource Unit Controller

Figure 48: MicroTech III BACnet water source heat pump snap-in communication module

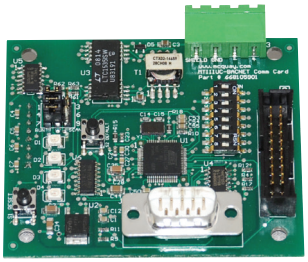
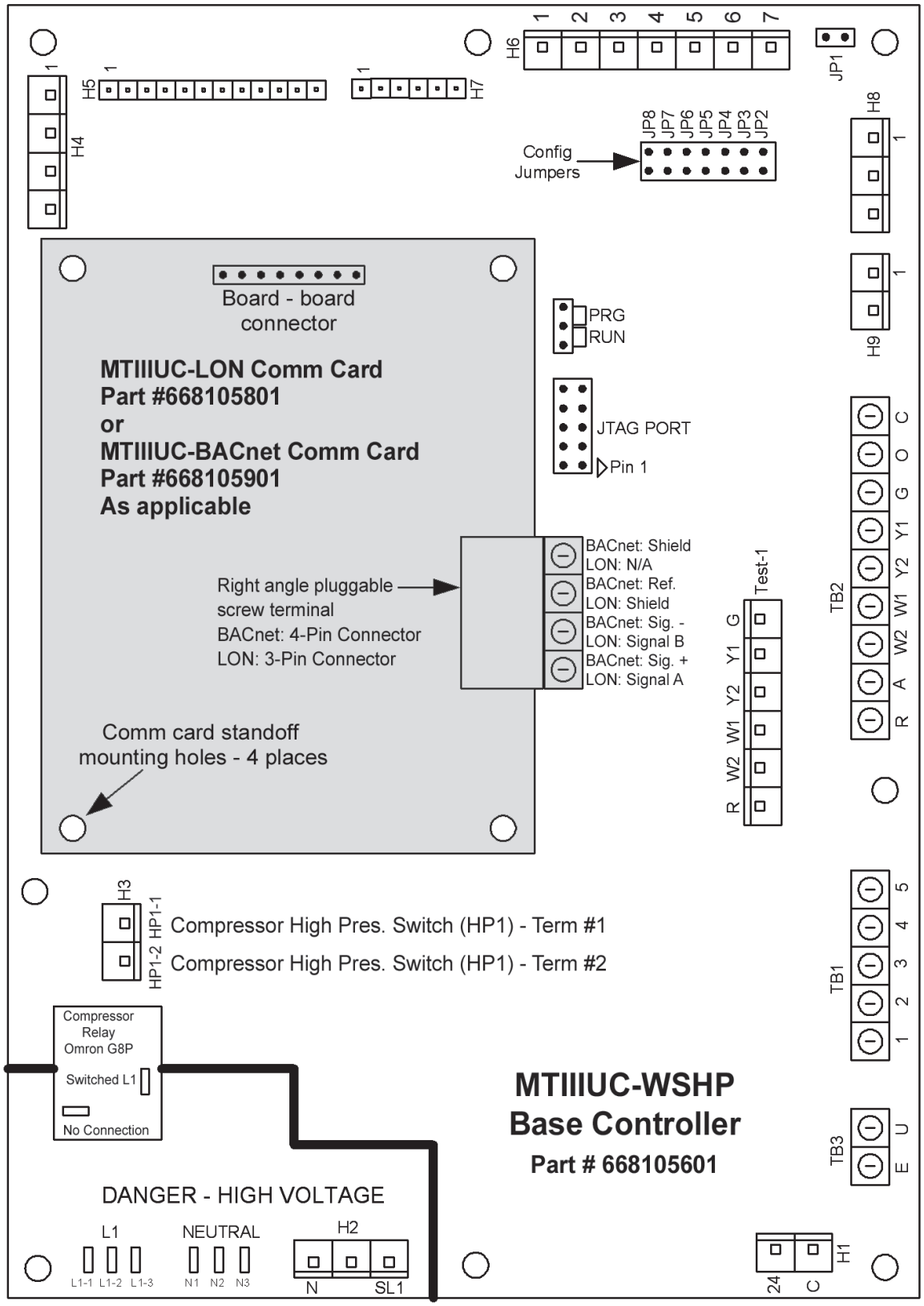


Figure 49: LONWORKS® or BACnet® communication module placement on MicroTech™ III unit controller



Fan Performance for PSC Motor (Sizes 009 - 036)

Table 21: PSC motor CFM values

Unit Size	Rated Airflow	Speed	External Static Pressure (in-H_2O) [Dry Coil and STD Filter) (inches of water column)										
			0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
009	300	High	430	390	350	320	280	–	–	–	–	–	–
		Low	400	360	330	290	250	–	–	–	–	–	–
012	400	High	430	390	350	320	–	–	–	–	–	–	–
		Low	400	360	330	–	–	–	–	–	–	–	–
015	500	High	500	470	450	430	400	370	330	300	–	–	–
		Low	430	400	380	360	340	310	–	–	–	–	–
018	600	High	500	470	450	430	400	370	330	300	–	–	–
		Low	430	400	380	360	340	310	–	–	–	–	–
021	700	High	880	820	780	750	720	690	650	600	520	–	–
		Low	740	710	690	680	650	610	580	540	490	–	–
024	800	High	880	820	780	750	720	690	650	600	520	–	–
		Low	740	710	690	680	650	610	580	540	490	–	–
030	1000	High	1,380	1,360	1,340	1,310	1,280	1,250	1,210	1,170	1,130	1,080	1,020
		Low	1,150	1,140	1,130	1,110	1,090	1,070	1,040	1,000	960	920	870
036	1200	High	1,380	1,360	1,340	1,310	1,280	1,250	1,210	1,170	1,130	1,080	1,020
		Low	1,150	1,140	1,130	1,110	1,090	1,070	1,040	1,000	960	920	870

Note: *Add 0.01" ESP for the optional discharge diffuser, and 0.02" ESP for the optional return air grille.*

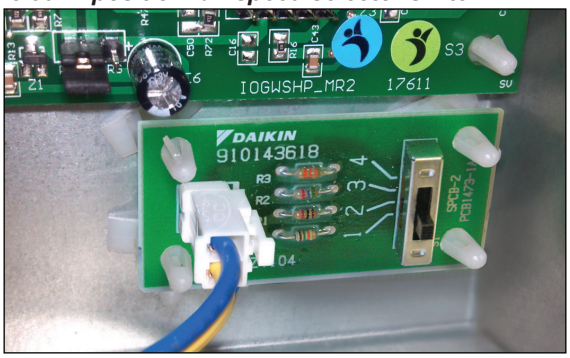
Fan Performance for High Static PSC Motor (Sizes 015 - 018)

Unit Size	Rated Airflow	Speed	External Static Pressure (in-H_2O) [Dry Coil and STD Filter) (inches of water column)										
			0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
015	500	High	700	700	690	670	660	640	620	590	570	540	500
		Low	600	600	590	580	570	550	530	510	480	460	430
018	600	High	700	700	690	670	660	640	620	590	570	540	500
		Low	600	600	590	580	570	550	530	510	480	460	430

Fan Speed Selector Switch

A 4-position fan speed selector switch located in the control box allows CFM settings to be field adjustable. Fan speed control optimizes unit fan speed based on thermostat/room sensor inputs. The fan speed switch allows for manually setting an optimal fan speed specific to the application requirements. Refer to Table 22 and Table 23.

Figure 50: 4-position fan speed selector switch



Fan Performance for Constant Torque EC Motor (Sizes 009-012)

Table 22: Constant torque EC motor CFM values

Unit Size	Setting	Function	External Static Pressure (in-H_2O) [Dry Coil and STD Filter) (inches of water column)								
			0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
009	4 (High)	Stage 2	450	430	410	400	380	360	340	320	300
	3 (Standard)		420	400	380	360	340	320	300	270	250
	2 (Medium)		350	330	310	290	270	250	230	210	190
	1 (Low)		350	330	310	290	270	250	230	210	190
	4 (High)	Stage 1	420	400	380	360	340	320	300	270	250
	3 (Standard)		380	360	340	320	300	280	260	230	210
	2 (Medium)		350	330	310	290	270	250	230	210	190
	1 (Low)		350	330	310	290	270	250	230	210	190
	A	*Fan Only, Hydronic Heat	420	400	380	360	340	320	300	270	250
	B		380	360	340	320	300	280	260	230	210
	C		350	330	310	290	270	250	230	210	190
	D		300	280	260	240	220	200	180	160	140
012	4 (High)	Stage 2	470	450	430	410	390	370	350	330	310
	3 (Standard)		450	430	410	390	370	340	320	300	280
	2 (Medium)		420	400	380	360	340	310	290	270	250
	1 (Low)		400	370	350	330	310	290	260	240	220
	4 (High)	Stage 1	450	430	410	390	370	340	320	300	280
	3 (Standard)		420	400	380	360	340	310	290	270	250
	2 (Medium)		400	370	350	330	310	290	260	240	220
	1 (Low)		400	370	350	330	310	290	260	240	220
	A	*Fan Only, Hydronic Heat	450	430	410	390	370	340	320	300	280
	B		420	400	380	360	340	310	290	270	250
	C		400	370	350	330	310	290	260	240	220
	D		360	330	300	270	240	210	180	150	120

Notes: *1. EC motor is programmed to make soft starts and stops to reduce stress transmitted to the fan housing. They adjust their speed and torque to deliver constant airflow over a wide range of external static pressure.*

2. Units are shipped at setting 3 (standard). Speed adjustment is done by 4-position switch in the control box.

3. The unit is capable of high-low fan performance through the use of a 2-stage thermostat wired to specific terminals for High-Low CFM fan performance. Standard operation with a 1-stage thermostat is indicated as stage 2 fan performance.

** See Figure 51 on page 51 for jumper configuration.*

Fan Performance for Constant CFM EC Motor (Sizes 015 - 036)

Table 23: Single stage units with constant CFM EC motor

Unit Size	MicroTech III Unit Controller					
	[2]Setting	Maximum ESP (in. WC.)	[1]Low CFM Heat	[1]High CFM Heat	[1]Low CFM Cool	[1]High CFM Cool
015 (1-Row Hydronic Coil)	4 (High)	0.40	500	540	500	540
	3 (Standard)		440	500	440	500
	2 (Medium)		390	440	390	440
	1 (Low)		390	390	390	390
018 (1-Row Hydronic Coil)	4 (High)	0.40	600	680	600	680
	3 (Standard)		530	600	530	600
	2 (Medium)		470	530	470	530
	1 (Low)		470	470	470	470
021 (1 or 2-Row Hydronic Coil)	4 (High)	0.40	700	770	700	770
	3 (Standard)		610	700	610	700
	2 (Medium)		530	610	530	610
	1 (Low)		530	530	530	530
024 (1 or 2-Row Hydronic Coil)	4 (High)	0.40	800	900	800	900
	3 (Standard)		700	800	700	800
	2 (Medium)		600	700	600	700
	1 (Low)		600	600	600	600
030 (1 or 2-Row Hydronic Coil)	4 (High)	0.40	1000	1120	1000	1120
	3 (Standard)		880	1000	880	1000
	2 (Medium)		760	880	760	880
	1 (Low)		760	760	760	760
036 (1 or 2-Row Hydronic Coil)	4 (High)	0.40	1200	1310	1200	1310
	3 (Standard)		1050	1200	1050	1200
	2 (Medium)		910	1050	910	1050
	1 (Low)		910	910	910	910

Notes: *[1] The unit is capable of high-low fan performance through the use of a 2-stage thermostat wired to specific terminals for High-Low CFM.*

[2] Units are shipped at setting 3 (standard). Fan speed settings may be changed via the 4-position fan speed selector switch located inside the control box.

[3] Refer to Figure 51 on page 51 for location of jumpers JP1 and JP2 on the I/O expansion module. Refer to Table 25 on page 51 for jumper configurations.

Constant CFM EC Motor with Hydronic Heat - I/O Expansion Module Settings (Sizes 015 - 036)

Table 24: Constant CFM EC motor with hydronic heat - I/O expansion module settings

Unit Size	MicroTech III Unit Controller	[3]I/O Expansion Module		
	[2]Setting	Setting	Fan Only	Hydronic Heat
015 (1-Row Hydronic Coil)	4 (High)	A	500	500
	3 (Standard)	B	440	440
	2 (Medium)	C	390	390
	1 (Low)	D	290	290
018 (1-Row Hydronic Coil)	4 (High)	A	600	600
	3 (Standard)	B	530	530
	2 (Medium)	C	470	470
	1 (Low)	D	360	360
021 (1 or 2-Row Hydronic Coil)	4 (High)	A	700	700
	3 (Standard)	B	610	610
	2 (Medium)	C	530	530
	1 (Low)	D	400	400
024 (1 or 2-Row Hydronic Coil)	4 (High)	A	800	800
	3 (Standard)	B	700	700
	2 (Medium)	C	600	600
	1 (Low)	D	450	450
030 (1 or 2-Row Hydronic Coil)	4 (High)	A	1000	1000
	3 (Standard)	B	880	880
	2 (Medium)	C	760	760
	1 (Low)	D	580	580
036 (1 or 2-Row Hydronic Coil)	4 (High)	A	1200	1200
	3 (Standard)	B	1050	1050
	2 (Medium)	C	910	910
	1 (Low)	D	710	710

Notes: *[1] The unit is capable of high-low fan performance through the use of a 2-stage thermostat wired to specific terminals for High-Low CFM.*
[2] Units are shipped at setting 3 (standard). Fan speed settings may be changed via the 4-position fan speed selector switch located inside the control box.

[3] See Table 25 and Figure 51 for jumper configuration.

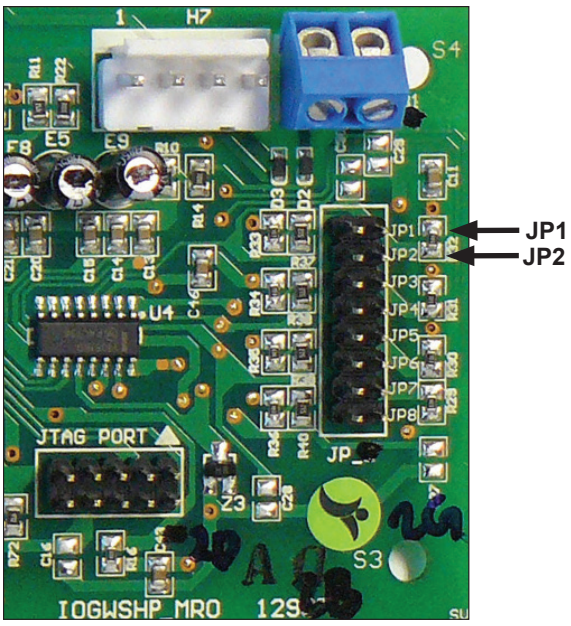
= Hydronic heat data for sizes 015 and 018 in gray tint reflects units with 1-row hydronic coil.

Table 25: I/O expansion module jumper configuration

Setting	I/O Expansion Module Configuration	
	JP1	JP2
A	Open	Open
B	Shorted	Open
C	Open	Shorted
D	Shorted	Shorted

Note: *Refer to Figure 51 for location of jumpers JP1 and JP2 on the I/O expansion module.*

Figure 51: JP1 & JP2 location on the I/O expansion module

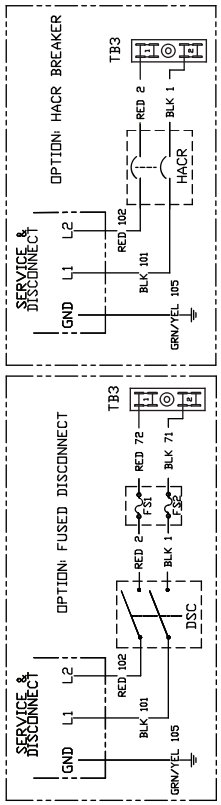


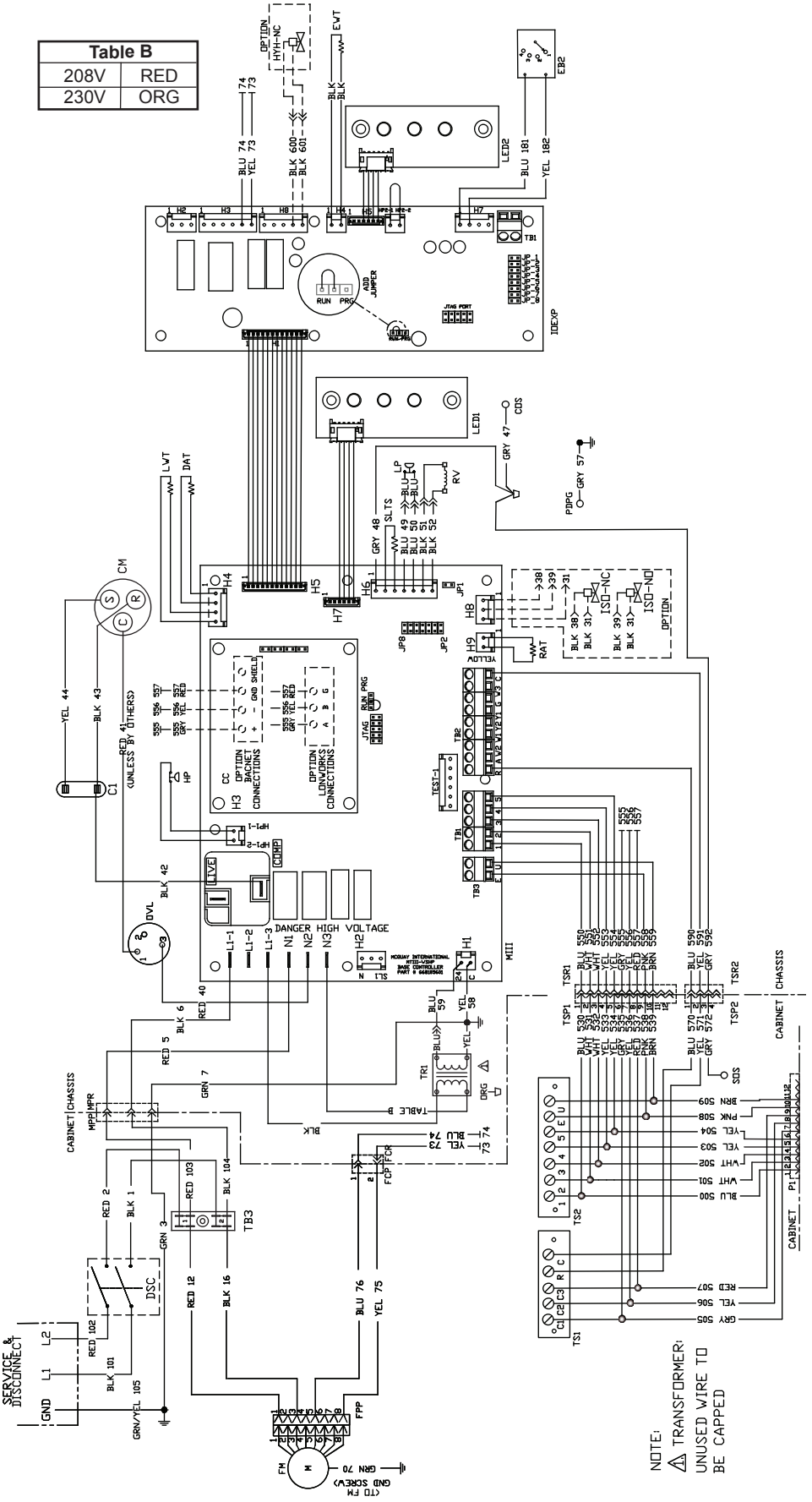
MicroTech III Unit Controller, EC Fan, Sensor Control with Communication Module 208-230/60/1 Unit Sizes 009-012

Legend

Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Communication Card - Optional
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp. Sensor
DSC	Disconnect Switch
EB2	Fan Speed Selector
EWT	Entering Water Temp Sensor
FCP	Fan Connector Plug
FCR	Fan Connector Receptacle
FM	Fan Motor
FS1, 2	Fuse
HACR	HACR Breaker
HP	High Pressure Switch
HYH	Hydronic Heat Valve - Optional
IOEXP	MicroTech III I/O Expansion Board
ISO-**	Isolation Valve - Optional
LED1, 2	LED Annunciator / Harness
LP	Low Pressure Switch
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
MPP	Main Power Connector Plug
MPR	Main Power Connector Receptacle
OVL	Compressor Overload
P1	Tstat Plug
PDPG	Primary Drain Pan Ground
RV	Reversing Valve Solenoid
SOS	Secondary Overflow Sensor
SLTS	Suction Line Temp Sensor
TS1	Terminal Strip 1
TS2	Terminal Strip 2
TSP	Terminal Strip Connector Plug
TSR	Terminal Strip Connector Receptacle
TR1	Transformer - 24V

Table B	
208V	RED
230V	ORG

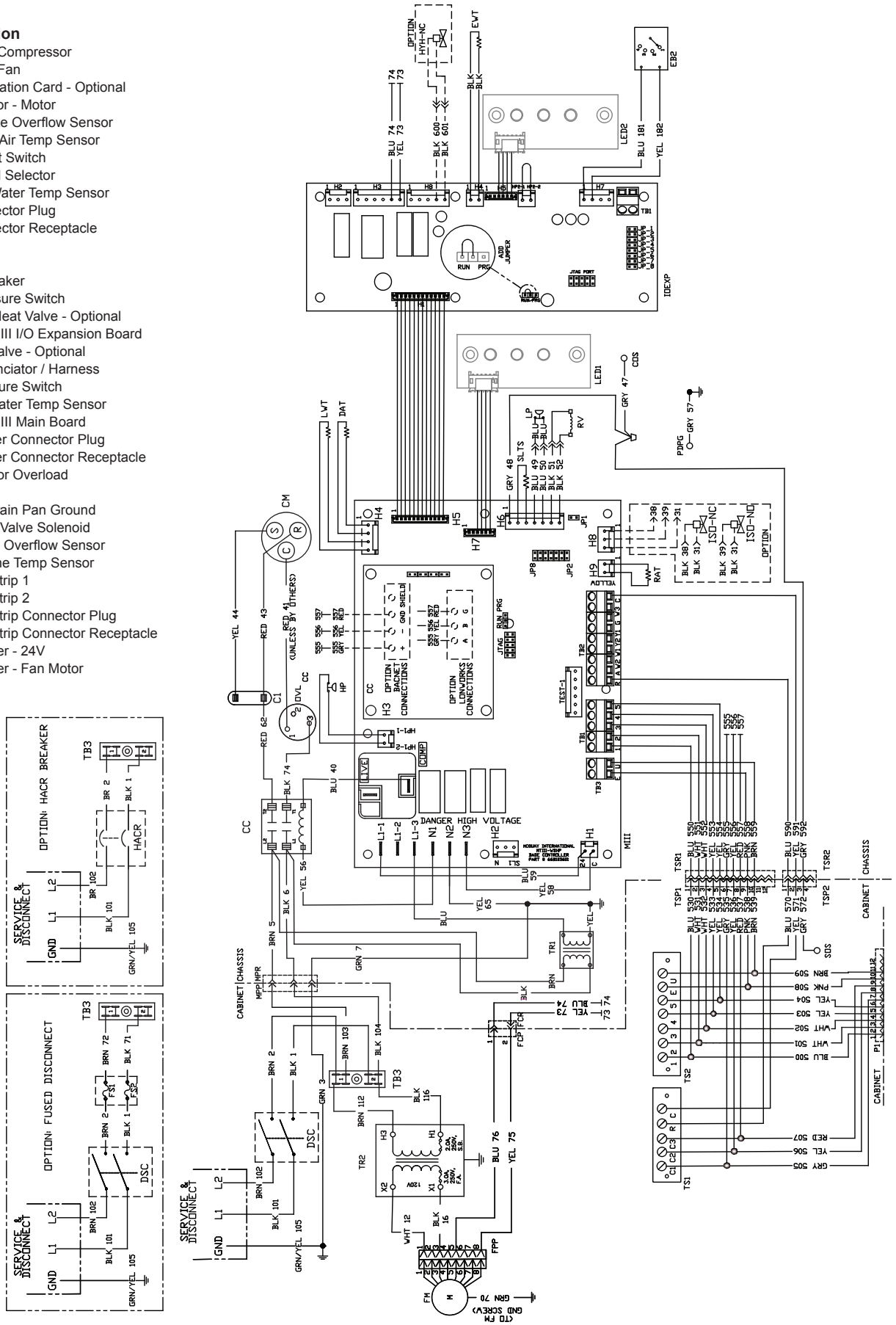




MicroTech III Unit Controller, EC Motor, Sensor Control with Communication Module 265-277/60/1 Unit Sizes 009-012

Legend

Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Communication Card - Optional
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
DSC	Disconnect Switch
EB2	Fan Speed Selector
EWT	Entering Water Temp Sensor
FCP	Fan Connector Plug
FCR	Fan Connector Receptacle
FM	Fan Motor
FS1, 2	Fuse
HACR	HACR Breaker
HP	High Pressure Switch
HYH	Hydronic Heat Valve - Optional
IOEXP	MicroTech III I/O Expansion Board
ISO-**	Isolation Valve - Optional
LED1, 2	LED Annunciator / Harness
LP	Low Pressure Switch
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
MPP	Main Power Connector Plug
MPR	Main Power Connector Receptacle
OVL	Compressor Overload
P1	Tstat Plug
PDPG	Primary Drain Pan Ground
RV	Reversing Valve Solenoid
SOS	Secondary Overflow Sensor
SLTS	Suction Line Temp Sensor
TS1	Terminal Strip 1
TS2	Terminal Strip 2
TSP	Terminal Strip Connector Plug
TSR	Terminal Strip Connector Receptacle
TR1	Transformer - 24V
TR2	Transformer - Fan Motor

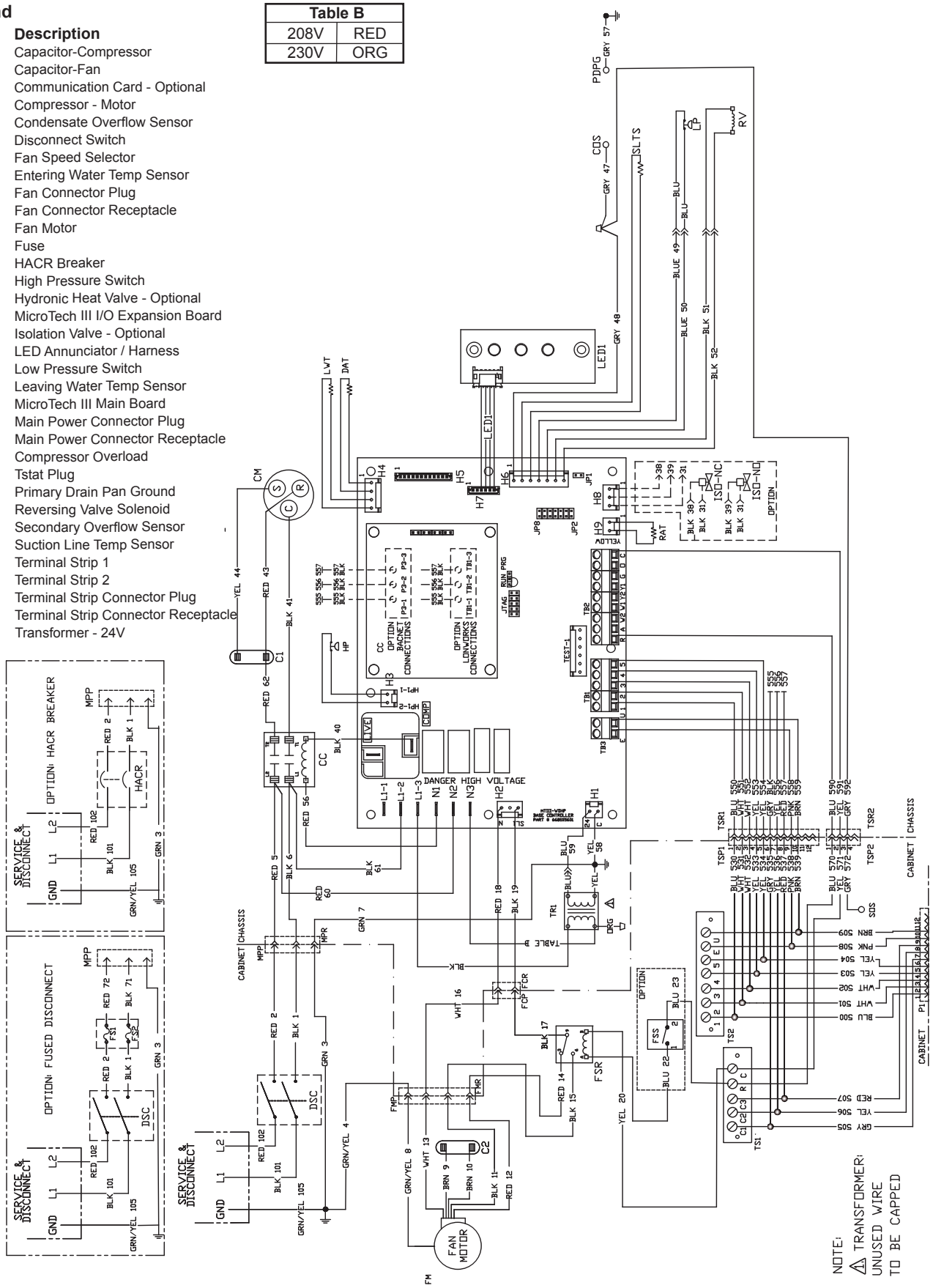


MicroTech III Unit Controller, PSC Motor, Sensor Control with Communication Module 208-230/60/1 Unit Size 021

Legend

Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Communication Card - Optional
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DSC	Disconnect Switch
EB2	Fan Speed Selector
EWT	Entering Water Temp Sensor
FCP	Fan Connector Plug
FCR	Fan Connector Receptacle
FM	Fan Motor
FS1, 2	Fuse
HACR	HACR Breaker
HP	High Pressure Switch
HYH	Hydronic Heat Valve - Optional
IOEXP	MicroTech III I/O Expansion Board
ISO-**	Isolation Valve - Optional
LED1, 2	LED Annunciator / Harness
LP	Low Pressure Switch
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
MPP	Main Power Connector Plug
MPR	Main Power Connector Receptacle
OVL	Compressor Overload
P1	Tstat Plug
PDPG	Primary Drain Pan Ground
RV	Reversing Valve Solenoid
SOS	Secondary Overflow Sensor
SLTS	Suction Line Temp Sensor
TS1	Terminal Strip 1
TS2	Terminal Strip 2
TSP	Terminal Strip Connector Plug
TSR	Terminal Strip Connector Receptacle
TR1	Transformer - 24V

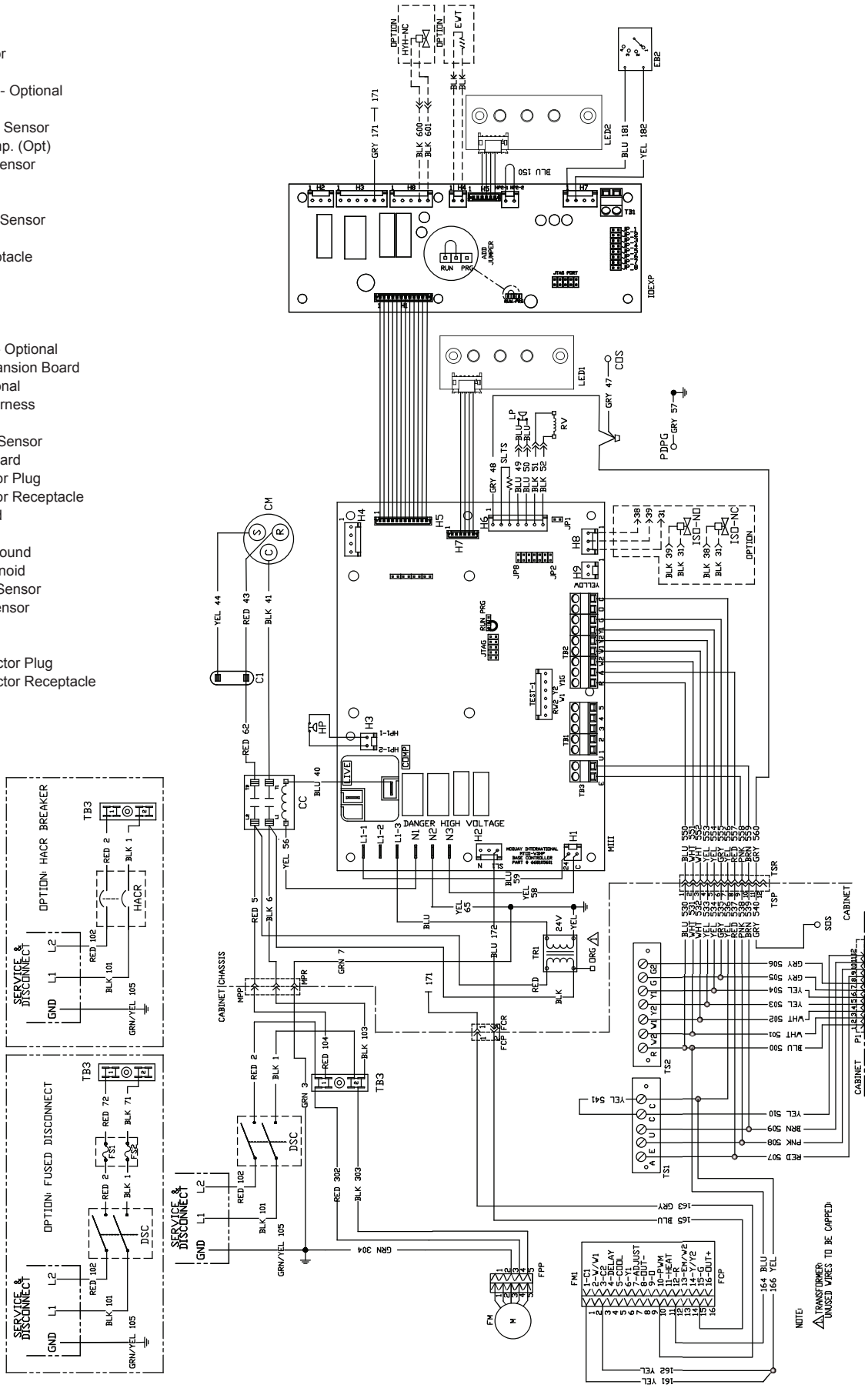
Table B	
208V	RED
230V	ORG



MicroTech III Unit Controller, EC Motor, Thermostat Control
208-230/60/1 Unit Size 021

Legend

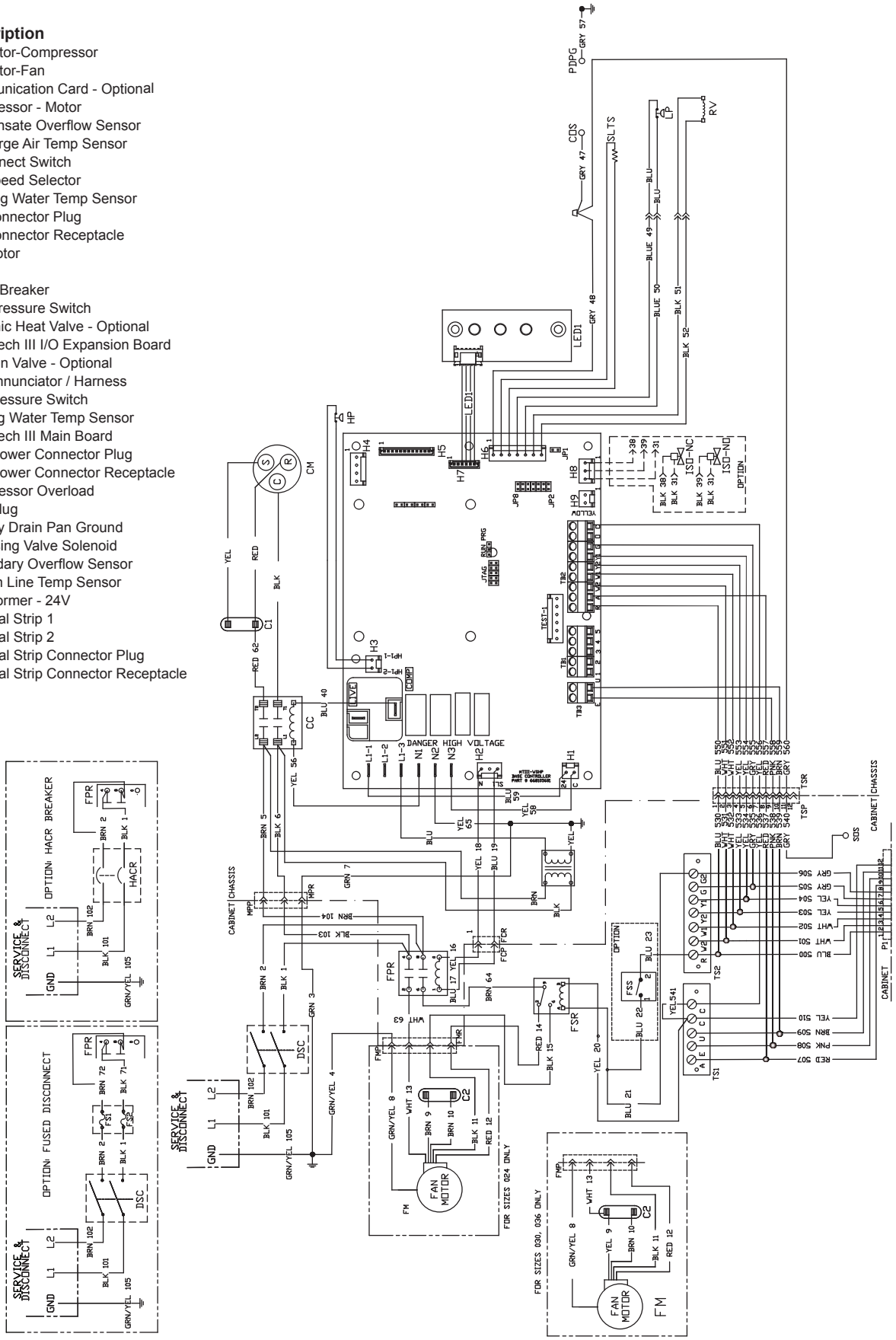
Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Communication Card - Optional
CM	Compressor - Motor
COS	Condensate Overflow Sensor
CUR	Current Sensor - Comp. (Opt)
DAT	Discharge Air Temp Sensor
DSC	Disconnect Switch
EB2	Fan Speed Selector
EWT	Entering Water Temp Sensor
FCP	Fan Connector Plug
FCR	Fan Connector Receptacle
FM	Fan Motor
FS1, 2	Fuse
HACR	HACR Breaker
HP	High Pressure Switch
HYH	Hydronic Heat Valve - Optional
IOEXP	MicroTech III I/O Expansion Board
ISO-**	Isolation Valve - Optional
LED1, 2	LED Annunciator / Harness
LP	Low Pressure Switch
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
MPP	Main Power Connector Plug
MPR	Main Power Connector Receptacle
OVL	Compressor Overload
P1	Tstat Plug
PDPG	Primary Drain Pan Ground
RV	Reversing Valve Solenoid
SOS	Secondary Overflow Sensor
SLTS	Suction Line Temp Sensor
TS1	Terminal Strip 1
TS2	Terminal Strip 2
TSP	Terminal Strip Connector Plug
TSR	Terminal Strip Connector Receptacle
TR1	Transformer - 24V



MicroTech III Unit Controller, PSC Motor, Thermostat Control 265-277/60/1 Unit Sizes 024-036

Legend

Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Communication Card - Optional
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
DSC	Disconnect Switch
EB2	Fan Speed Selector
EWT	Entering Water Temp Sensor
FCP	Fan Connector Plug
FCR	Fan Connector Receptacle
FM	Fan Motor
FS1, 2	Fuse
HACR	HACR Breaker
HP	High Pressure Switch
HYH	Hydronic Heat Valve - Optional
IOEXP	MicroTech III I/O Expansion Board
ISO-**	Isolation Valve - Optional
LED1, 2	LED Annunciator / Harness
LP	Low Pressure Switch
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
MPP	Main Power Connector Plug
MPR	Main Power Connector Receptacle
OVL	Compressor Overload
P1	Tstat Plug
PDPG	Primary Drain Pan Ground
RV	Reversing Valve Solenoid
SOS	Secondary Overflow Sensor
SLTS	Suction Line Temp Sensor
TR1	Transformer - 24V
TS1	Terminal Strip 1
TS2	Terminal Strip 2
TSP	Terminal Strip Connector Plug
TSR	Terminal Strip Connector Receptacle

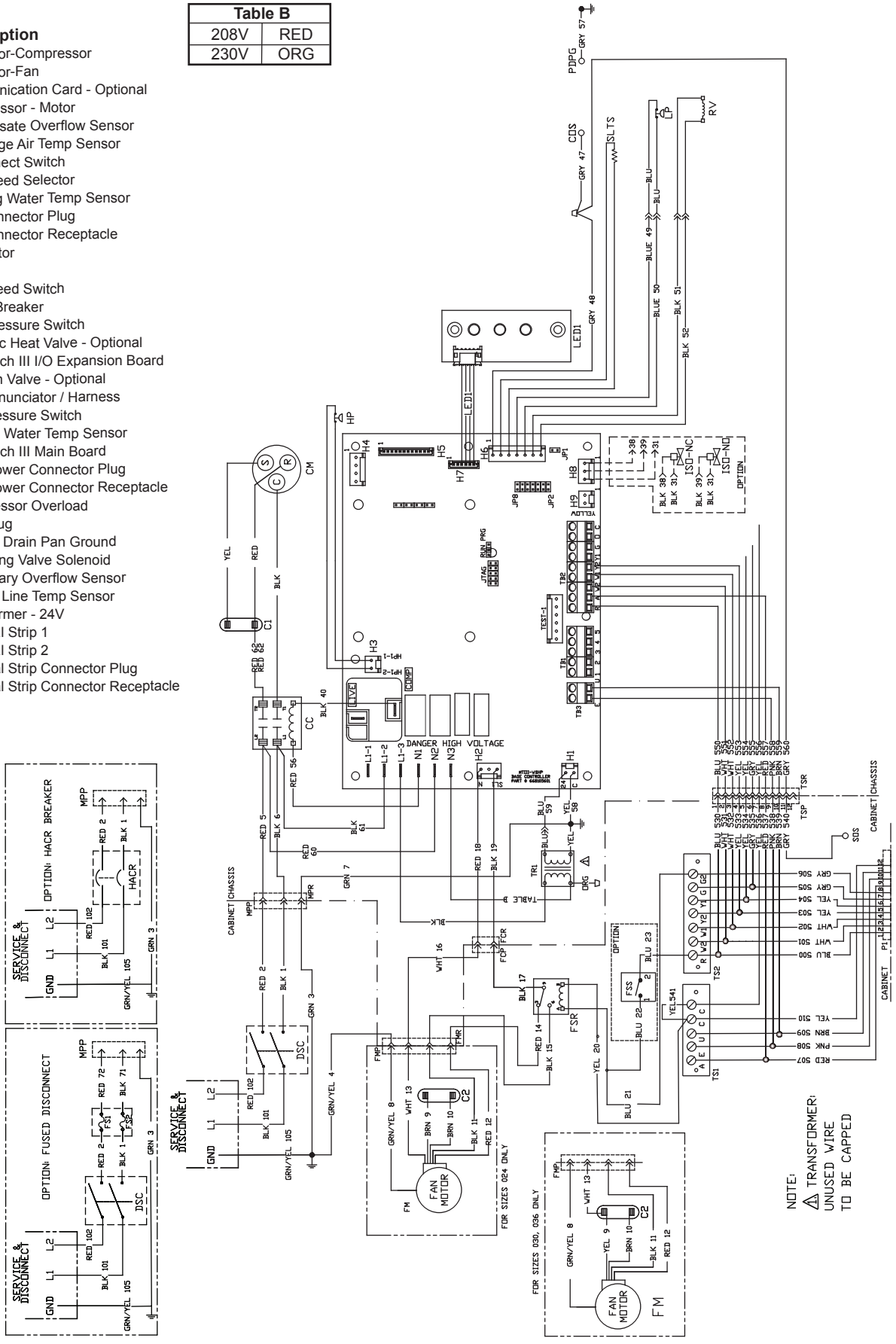


MicroTech III Unit Controller, PSC Motor, Thermostat Control 208-230/60/1 Unit Sizes 024-036

Legend

Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Communication Card - Optional
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
DSC	Disconnect Switch
EB2	Fan Speed Selector
EWT	Entering Water Temp Sensor
FCP	Fan Connector Plug
FCR	Fan Connector Receptacle
FM	Fan Motor
FS1, 2	Fuse
FSS	Fan Speed Switch
HACR	HACR Breaker
HP	High Pressure Switch
HYH	Hydronic Heat Valve - Optional
IOEXP	MicroTech III I/O Expansion Board
ISO-**	Isolation Valve - Optional
LED1, 2	LED Annunciator / Harness
LP	Low Pressure Switch
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
MPP	Main Power Connector Plug
MPR	Main Power Connector Receptacle
OVL	Compressor Overload
P1	Tstat Plug
PDPG	Primary Drain Pan Ground
RV	Reversing Valve Solenoid
SOS	Secondary Overflow Sensor
SLTS	Suction Line Temp Sensor
TR1	Transformer - 24V
TS1	Terminal Strip 1
TS2	Terminal Strip 2
TSP	Terminal Strip Connector Plug
TSR	Terminal Strip Connector Receptacle

Table B	
208V	RED
230V	ORG



Information for Initial Start-up

⚠ CAUTION

Units must be checked for water leaks upon initial water system start-up. Water leaks may be a result of mishandling or damage during shipping. Failure by the installing contractor to check for leaks upon start-up of the water system could result in property damage.

Check, Test & Start Procedure

NOTICE

Complete the "Water Source Heat Pump Equipment Check, Test and Start Form" on page 62.

1. Open all valves to full open position and turn on power to the conditioner.
2. Set thermostat for “Fan Only” operation by selecting “Off” at the system switch and “On” at the fan switch. If “Auto” fan operation is selected, the fan will cycle with the compressor. Check for proper air delivery.
3. Set thermostat to “Cool.” If the thermostat is an automatic changeover type, simply set the cooling temperature to the coolest position. On manual changeover types additionally select “Cool” at the system switch.
   Again, many conditioners have time delays which protect the compressor(s) against short cycling. After a few minutes of operation, check the discharge grilles for cool air delivery. Measure the temperature difference between entering and leaving water. It should be approximately 1½ times greater than the heating mode temperature difference. For example, if the cooling temperature difference is 15°F (8°C), the heating temperature difference should have been 10°F (5°C).
   Without automatic flow control valves, target a cooling temperature difference of 10°F to 14°F (5°C to 8°C). Adjust the combination shutoff/balancing valve in the return line to a water flow rate which will result in the 10˚F to 14°F (5°C to 8°C) difference.
4. Set thermostat to “Heat.” If the thermostat is the automatic changeover type, set system switch to the “Auto” position and depress the heat setting to the warmest selection. Some conditioners have built-in time delays which prevent the compressor from immediately starting. With most control schemes, the fan will start immediately. After a few minutes of compressor operation, check for warm air delivery at discharge grille. If this is a “cold building” start-up, leave unit running until return air to the unit is at least 65°F (18°C).
   Measure the temperature difference between entering and leaving air and entering and leaving water. With entering water of 60°F to 80°F (16°C to 27°C), leaving water should be 6°F to 12°F (3.3°C to 6.6°C) cooler, and the air temperature rise through the machine should not exceed 35°F (19°C). If the air temperature exceeds 35°F (19°C), then the water flow rate is inadequate.
5. Check the elevation and cleanliness of the condensate line. If the air is too dry for sufficient dehumidification, slowly pour enough water into the condensate pan to ensure proper drainage.
6. If the conditioner does not operate, check the following points:
   a. Is supply voltage to the machine compatible?
   b. Is thermostat type appropriate?
   c. Is thermostat wiring correct?
7. If the conditioner operates but stops after a brief period:
   a. Is there proper airflow? Check for dirty filter, incorrect fan rotation (3-phase fan motors only), or incorrect ductwork.
   b. Is there proper water flow rate within temperature limits? Check water balancing; back flush unit if dirt-clogged.
8. Check for vibrating refrigerant piping, fan wheels, etc.
9. Do not lubricate the fan motor during the first year of operation as it is pre lubricated at the factory.
10. Field supplied relays installed on the input terminals W1, W2, W3, W4, Humidistat, Y1, Y2 and G may introduce electrical noise. Never install relay coils in series with the inputs.

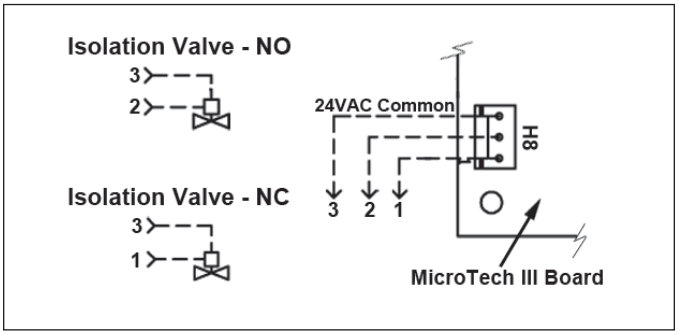
Motorized Isolation Valve and Relay

The motorized valve kit may be ordered as a factory-installed options.

Wired as shown in Figure 52, the motorized valve will open on a call for compressor operation. Valves for unit sizes 009 to 018 are 1/2".

Using a Normally Closed (N/C), power open valve, wire as illustrated in Figure 52.

Figure 52: Normally closed, power open motorized valve & relay wiring detail



Note: *Connectors on valve must be cut off and stripped back and the wires twisted to make connections to the IV/PR Terminals*

The in and outs of R-410A

R-410A is a non-ozone depleting blend of two refrigerants - HFC-125 and HFC-32 in a fifty percent mixture. R-410A exhibits higher operating pressure and refrigeration capacity than R-22. R-410A is intended for use in new air conditioning applications that have traditionally been used HCFC-22 (R-22). Due to higher capacity and pressure of R-410A, it must not be used in existing R-22 systems.

Although R-410A is non-flammable at ambient temperature and atmospheric pressure, it can become combustible under pressure when mixed with air.

Note: *R-410A should not be mixed with air under pressure for leak testing. Pressure mixtures of dry nitrogen and R-410A can be used for leak testing.*

Lubrication

R-410A should be used only with polyester (POE) oil. The HFC refrigerant components in R-410A will not be compatible with mineral oil or alkylbenzene lubricants. R-410A systems will be charged with the OEM recommended lubricant, ready for use with R-410A.

Charging

Due to the zeotropic nature of R-410A, it should be charged as a liquid. In situations where vapor is normally charged into a system, a valve should be installed in the charging line to flash the liquid to vapor while charging.

Make certain that the recycle or recovery equipment used is designed for R-410A. The pressure of R-410A refrigerant is approximately 60 percent greater than that of R-22. Pressure gauges require a range up to 800 PSIG high side and 250 PSIG low side. Recovery cylinders require a 400 PSIG rating – do not put R-410A in a 300 PSIG rated cylinder.

⚠ WARNING

Recycle/recovery equipment must be designated for R-410A. R-410A pressure is greater than R-22. Improper equipment can cause severe injury or death.

Note: *Because a water source heat pump operates under a wide range of water and air temperatures, the values printed below are to be taken as suggested pressure and temperatures. All Daikin water source heat pumps are designed for commercial use. The units are designed for the cooling mode of operation and fail safe to cooling. The reversing valve is energized for the heating mode of operation.*

Superheat	*Head Pressure*	*Water Delta T*
8 to 14 degrees	335-355 PSIG	10° to 14°

Note: *All information above is based on ISO standard 13256-1 and tested at these conditions.*

General Maintenance

- Normal maintenance on all units is generally limited to filter changes. Units are provided with permanently lubricated motors and require no oiling even though oil caps may be provided.
- Filter changes are required at regular intervals. The time period between changes will depend upon the project requirements. Some applications such as motels produce a lot of lint from carpeting and linen changes, and will require more frequent filter changes. Check filters at 60-day intervals for the first year until experience is acquired. If light cannot be seen through the filter when held up to sunlight or a bright light, it should be changed. A more critical standard may be desirable.
- The condensate drain pan should be checked annually and cleaned and flushed as required.
- Record performance measurements of volts, amps, and water temperature differences (both heating and cooling). A comparison of logged data with start-up and other annual data is useful as an indicator of general equipment condition.
- Periodic lockouts almost always are caused by air or water problems. The lockout (shutdown) of the unit is a normal protective result. Check for dirt in the water system, water flow rates, water temperatures, airflow rates (may be a dirty filter), and air temperatures. If the lockout occurs in the morning following a return from night setback, entering air below machine limits may be the cause.

Note: *Because a water source heat pump operates under a wide range of water and air temperatures, the values printed below are to be taken as suggested pressure and temperatures.) All Daikin water source heat pumps are designed for commercial use. The units are designed for the cooling mode of operation and fail safe to cooling. The reversing valve is energized for the heating mode of operation.*

Superheat	Head Pressure	Water Delta T
8 to 14 degrees	335-355 PSIG	10° to 14°

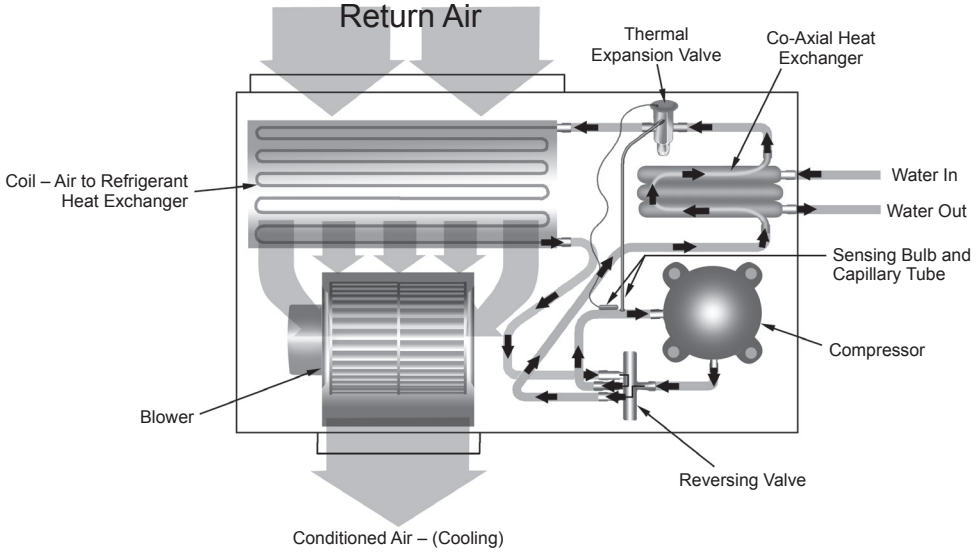
Note: *All information above is based on ISO standard 13256-1 and tested at these conditions.*

Table 26: Troubleshooting refrigeration circuit

Symptom	Head Pressure	Suction Pressure	Compressor Amp Draw	Super Heat	Subcooling	Air Temp Differential	Water (Loops) Temp Differential	Safety Lock Out
Charge	Low	Low	Low	High	Low	Low	Low	Low Pressure
Undercharge System (Possible Leak)								
Overcharge System	High	High	High	Normal	High	Normal / Low	Normal	High Pressure
Low Air Flow Heating	High	High	High	High / Normal	Low	High	Low	High Pressure
Low Air Flow Cooling	Low	Low	Low	Low / Normal	High	High	Low	Low Temp
Low Water Flow Heating	Low / Normal	Low / Normal	Low	Low	High	Low	High	Low Temp
Low Water Flow Cooling	High	High	High	High	Low	Low	High	High Pressure
High Air Flow Heating	Low	Low	Low	Low	High	Low	Low	Low Temp
High Air Flow Cooling	Low	High	Normal	High	Low	Low	Normal	High Pressure
High Water Flow Heating	Normal	Low	Normal	High	Normal	Normal	Low	High Pressure
High Water Flow Cooling	Low	Low	Low	Low	High	Normal	Low	Low Temp
TXV Restricted	High	Low	Normal / Low	High	High	Low	Low	

Typical Refrigeration Cycles

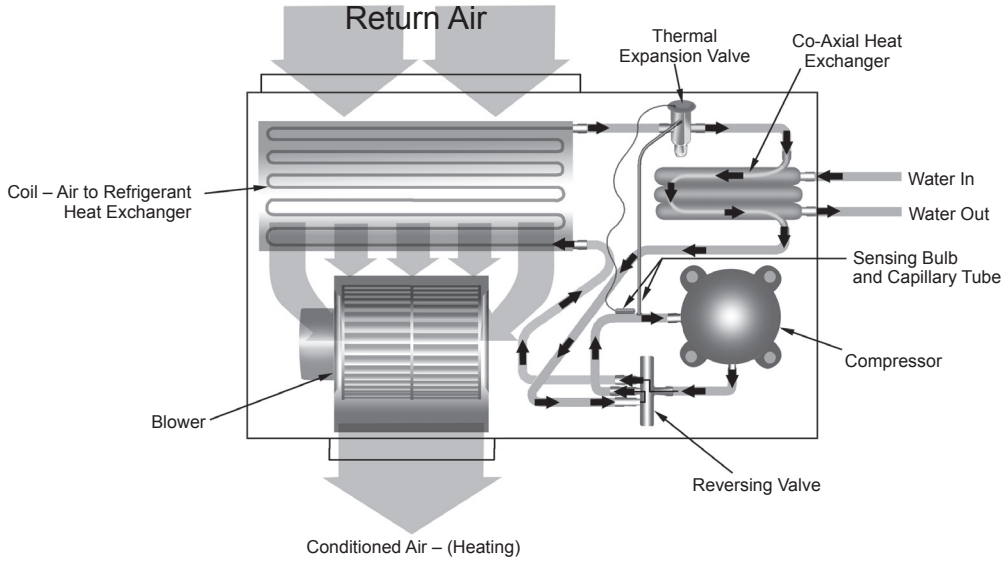
Figure 53: Cooling mode – (single circuit only shown)



Cooling Refrigeration Cycle

When the wall thermostat is calling for COOLING, the reversing valve directs the flow of the refrigerant, a hot gas, leaving the compressor to the water-to-refrigerant heat exchanger. Here the heat is removed by the water and the hot gas condenses to become a liquid. The liquid then flows through a thermal expansion metering system to the air-to-refrigerant heat exchanger coil. The liquid then evaporates becoming a gas, at the same time absorbing heat and cooling the air passing over the surfaces of the coil. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.

Figure 54: Heating mode – (single circuit only shown)



Heating Refrigeration Cycle

When the wall thermostat is calling for HEATING, the reversing valve directs the flow of the refrigerant, a hot gas, leaving the compressor to the air-to-refrigerant heat exchanger coil. Here the heat is removed by the air passing over the surfaces of the coil and the hot gas condenses to become a liquid. The liquid then flows through a capillary thermal expansion metering system to the water-to-refrigerant heat exchanger. The liquid then evaporates becoming a gas, at the same time absorbing heat and cooling the water. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.

Water Source Heat Pump Equipment Check, Test and Start Form

This form must be completed and submitted within ten (10) days of start-up to comply with the terms of the Daikin warranty. Forms should be returned to Daikin Warranty Department.

Installation Data

Job Name _____ Check, Test & Start Date _____

City or Town _____ State _____ Zip _____

Who is Performing CTS _____

General Contractor _____

Equipment Type (Check all that apply)

☐ Closed Loop ☐ Open Loop

☐ Geothermal ☐ Other (specify)_____

Essential Items Check of System – *Note:* *"No" answers below require notice to installer by memorandum (attached copy.)*

Essential Items Check

A. Voltage Check_____ Volts Loop Temp._____ °F Heating Set For _____ °F Cooling System Water P.H. Levels _____

B. Yes	No	Condition	Comments
☐	☐	Loop Water Flushed Clean	
☐	☐	Closed Type Cooling Tower	
☐	☐	Water Flow Rate to Heat Pump Balanced	
☐	☐	Standby Pump Installed	
☐	☐	System Controls Functioning	
☐	☐	Outdoor Portion of Water System Freeze Protected	
☐	☐	Loop System Free of Air	
☐	☐	Filters Clean	
☐	☐	Condensate Traps Installed	

Note: "No" answers below require notice to installer by memorandum (attached copy.)

☐	☐	Outdoor Air to Heat Pumps:	
☐	☐	Other Conditions Found:	

Please include any suggestions or comments for Daikin Applied: _____

_____

_____

_____

Above System is in Proper Working Order

Note: *This form must be filled out and sent to the warranty administrator before any service money can be released.*

_____
Date

_____
Signature for Sales Representative

_____
Signature for Customer

For Internal Use

Release:

SM _____

CTS _____

T _____

_____
Service Manager Approval

_____
Date

Form WS-CTS-00.01 (Rev. 4/14)

Unit Check / Equipment Data

Installation Data

Job Name _____ Check Test Date: _____

City _____ State _____ Zip _____

Daikin Model # _____

Daikin Serial # _____ Job site Unit ID # (HP #) _____

General Contractor: _____ Mechanical Contractor: _____

Technician Performing Start-Up: Name _____ Employer: _____

Complete equipment data from measurements taken at the locations indicated on the drawing below.

Equipment Data

Flow Rate **EWP - LWP = ΔP**

① EWP - PSI In _____ minus ② LWP - PSI Out _____ equals ΔP _____

The first step in finding GPM is to subtract leaving water pressure from entering water pressure. The difference between the two is referred to as ΔP. ΔP can be converted to GPM by looking in the equipment specification catalog.
Caution ΔP ≠ GPM

Note: A conversion table must be used to find GPM from (Delta) ΔP measurements.

Loop Fluid Temperature Rise / Drop through Coaxial Heat Exchanger **EWT - LWT = ΔT**

③ EWT - °F Out _____ minus ④ LWT - °F Out _____ equals Fluid ΔT _____

ΔT is the rise or drop in the fluid temperature as it passes through the Coaxial.

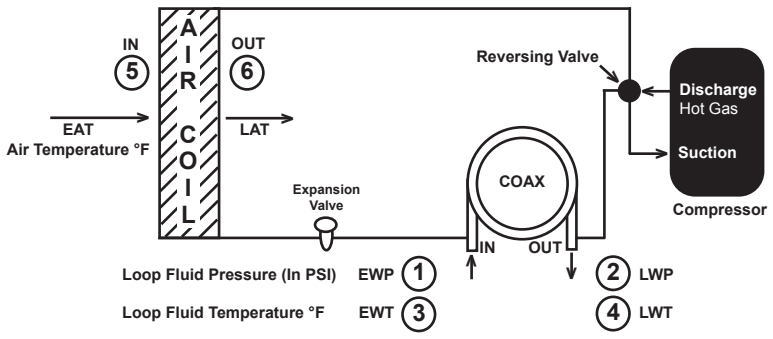
Air Temperature Rise / Drop through the air coil **ΔT x CFM x 1.08 = BTUH Sensible**

⑤ EAT - °F In _____ minus ⑥ LAT - °F Out _____ equals Air ΔT _____

Note: Perform Check, Test and Start-Up in the Cooling Mode Only.

EWT - Entering Water Temperature
LWT - Leaving Water Temperature
EWP - Entering Water Pressure
LWP - Leaving Water Pressure
EAT - Entering Air Temperature
LAT - Leaving Air Temperature
Δ- Delta (Differential)
CFM - Cubic Feet/Minute
BTUH - British Thermal Units/Hour

Check, Test & Start



Form No. _____

Commercial Check, Test and Start Worksheet

(Complete all equipment measurements indicated for each unit per installation on previous page)

	Model	Serial #	H.P. #	EWT ③	LWT ④	EWP ①	LWP ②	EAT ⑤	LAT ⑥	Volts	Amps Cool-ing	Check Air Filter and Coil	Comments (more comments on next sheet)
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
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42.													

Part No._____

Notes / Comments

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Daikin Applied Training and Development

Now that you have made an investment in modern, efficient Daikin Applied equipment, its care should be a high priority. For training information on all Daikin Applied HVAC products, please visit us at www.DaikinApplied.com and click on Training, or call 540-248-9646 and ask for the Training Department.

Warranty

All Daikin Applied equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local Daikin Applied representative for warranty details. Refer to Form 933-430285Y. To find your local Daikin Applied representative, go to www.DaikinApplied.com.

Aftermarket Services

To find your local parts office, visit www.DaikinApplied.com or call 800-37PARTS (800-377-2787).
To find your local service office, visit www.DaikinApplied.com or call 800-432-1342.

This document contains the most current product information as of this printing. For the most up-to-date product information, please go to www.DaikinApplied.com.

Products manufactured in an ISO Certified Facility.