Installation and Maintenance Manual IM 447-11

Group: **WSHP**
Part Number: **910153322**
Date: **April 2014**

Legacy Console Water Source Heat Pumps 3/4 to 1½ Ton

Unit Sizes 009-019

R-410A Models – For Replacement of McQuay Console Models:

WAA, WAF, WAG, WAH, WAS, WAX, WCB, WCQ, WDA, WDB, WDC, WDD, WDE, WDF, WDG, WDH, WDJ, WDL ,WDN, WDS, WDU, WDX, WDY, WDZ, WFQ, WLA, WLB, WLC, WLL, WLZ, WMA, WMB, WMC, WMD, WME, WMF, WMG, WMH, WMJ, WMK, WML, WMM, WMN, WMO, WMP, WMQ, WMR, WMS, WMT, WMU, WMV, WMW, WMX, WMY, WMZ, WSQ, WST, WXA, WXB, WXC, WXD, WXE, WXF, WXG, WXJ, WXK, WXQ, WXS, WXU, WZA, WZC, WZD, WZE, WZF, WZG, WZH, WZK, WZL, WZM, WZP, WZQ, WZS, WZZ

Nomenclature

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

Category	Code Item	Code Option	Code Designation & Description *(Bold-Italic = Standard)*
Product Category	**01**	**1**	W = Water Source Heat Pump
Product Identifier	**02**	**2-4**	WXH = Slope Top Wall Mtd/High Sill/DDC Less Board/Chassis Only WXL = Flat Top Wall Mtd/High Sill/DDC Less Board/Chassis Only WXM = Flat Top Wall Mtd/Low Sill/DDC Less Board/Chassis Only WXN = Flat Top Wall Mtd/High Sill/DDC Less Board WXP = Flat Top Wall Mtd/Low Sill/DDC Less Board WXR = Slope Top Wall Mtd/High Sill/DDC Less Board WXT = Slope Top Wall Mtd/Low Sill/DDC Less Board/Chassis Only WXV = Slope Top Wall Mtd/Low Sill/DDC Less Board WZB = Flat Top Wall Mtd/Low Sill/Mark IV WZJ = Flat Top Wall Mtd/High Sill/Mark IV WZN = Slope Top Wall Mtd/Low Sill/Mark IV WZU = Slope Top Wall Mtd/High Sill/Mark IV/Chassis Only WZV = Slope Top Wall Mtd/Low Sill/Mark IV/Chassis Only WZW = Flat Top Wall Mtd/High Sill/Mark IV/Chassis Only WZX = Flat Top Wall Mtd/Low Sill/Mark IV/Chassis Only WZY = Slope Top Wall Mtd/High Sill/Mark IV
Design Series (Vintage)	**03**	**5**	2 = Design Series 2 3 = Design Series 3
Nominal Capacity	**04**	**6-8**	***009* = *9,000 Btuh Nominal Cooling*** 012 = 12,000 Btuh Nominal Cooling 015 = 15,000 Btuh Nominal Cooling 019 = 19,000 Btuh Nominal Cooling
Voltage	**05**	**9**	A = 115-60-1 (Size 009 and 012 only) ***E* = *208-230/60/1*** J = 265/277-60-1 (Size 009 and 015 only)
Coil Options	**06**	**10**	G = Cupro-Nickel Coax Coil, Geothermal **S** = ***Copper-Steel Coax Coil*** T = Cupro-Nickel Coax Coil W = Copper-Steel Coax, Geothermal
Heating Options (Not available in 115/60/1 voltage)	**07**	**11-12**	***00* = *None*** 20 = 1.0 kW Electric Heat Nominal 30 = 2.0 kW Electric Heat Nominal ***Note:** See Table 7 on page 14 for allowable maximum kW based on voltage selection*
Hand Orientation	**08**	**13**	U = Right ***V* = *Left***
Controls ***Note:** Code 00 designed for use with field-installed Alerton control board*	**09**	**14-15**	11 = Unit-Mounted ACO ***12* = *Unit-Mounted MCO*** 13 = 24V Wall T-Stat Setup 25 = Unit-Mounted ACO with Low Limit, NSB and Override 00 = None (DDC Less Control)*
Discharge	**10**	**16-17**	***AA* = *Top***
Return Air	**11**	**18-19**	13 = Front (Low sill only) ***14* = *Bottom (High sill only)***
Power Connection	**12**	**20**	***A* = *Std. Electrical Junction Box*** C = Cord (Chassis Only) P = Power Cord w/Fused Disconnect (Available with cabinet and chassis combination)
Color	**13**	***21***	B = Putty Beige (Flat-top only) C = Cupola White (Slope-top and Flat-top) G = Soft Gray (Flat-top only) ***I* = *Antique Ivory (Standard color for slope-top, option for flat-top)*** Z = None

Product Identifiers

Previous Model	Replacement Model	Cabinet		Subbase Height		Controls		Chassis Only[2]
		Slope Top	Flat Top	High Sill	Low Sill	Mark IV	[1]DDC Less Board	
WAH, WDD, WDN	WXH	•		•			•	•
WDC, WDZ, WXG	WXL		•	•			•	•
–	WXM		•		•		•	•
WAF, WAX, WDF, WDG, WDL, WDU, WDX, WXC, WXF, WXJ, WXQ, WZK, WZK	WXN		•	•			•	
WAA, WDA, WXE	WXP		•		•		•	
WAG, WAS, WDH, WDS, WDY, WZC, WZD, WZG, WZH, WST, WDS	WXR	•		•			•	
WDE	WXT	•			•		•	•
WDB, WDJ, WXA, WXB, WZL	WXV	•			•		•	
WCB, WLB, WMB, WMJ, WMW, WXD, WXU	WZB		•		•	•		
WFQ, WLL, WME, WMF, WMX, WXS, WZF, WZP	WZJ		•	•		•		
WLC, WMA, WMP, WSQ, WZA	WZN	•			•	•		
WMG, WMN, WZQ	WZU	•		•		•		•
WCQ, WMH, WMM, WXK, WZZ	WZV	•			•	•		•
WMC, WMK, WMT, WMU, WZM	WZW		•	•		•		•
WMD, WML, WMQ, WMV, WZE	WZX		•		•	•		•
WLA, WLZ, WMO, WMR, WMS, WMY, WMZ, WZS	WZY	•		•		•		

[1] *Field-supplied control board*

[2] *Subbase not included*

Physical Data

Table 1: Physical Data

Unit Size		009	012	015	019
Fan Wheel - D x W (in.)		5-3⁄4 x 9.15	5-3⁄4 x 9.15	6 x 7.8	6 x 7.8
Fan Motor (hp)		1/24	1/15	1/8	1/8
Coil Face Area (ft.[2])		1.4	1.4	1.9	1.9
Coil Rows		3	3	3	3
Refrigerant Charge (oz.)		21.5	21.5	33.0	33.5
Filter Size (in.)		9-3⁄4 x 23-3⁄4	9-3⁄4 x 23-3⁄4	9-3⁄4 x 31-3⁄4	9-3⁄4 x 31-3⁄4
Water Connections, Tube (in.)		5/8 O.D.	5/8 O.D.	5/8 O.D.	5/8 O.D.
Condensate Connection, I.D. (In.)*		3/4	3/4	3/4	3/4
Weight, Operating (lbs.)	Cabinet & Chassis	164	166	185	193
	Chassis Only	125	127	129	131
Weight, Shipping (lbs.)	Cabinet & Chassis	184	186	215	223
	Chassis Only	145	146	153	156

***** *Condensate hoses are 14" long.*

Receiving and Storage

Upon receipt of the equipment, check carton for visible damage. Make a notation on the shipper's delivery ticket before signing. If there is any evidence of rough handling, the cartons should be opened at once 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.

Do not stand or transport the machines on end. For storing, each carton is marked with "up" arrows.

In the event that elevator transfer makes upended positioning unavoidable, absolutely insure that the machine is in the normal upright position for at least 24 hours before operating.

Temporary storage at the jobsite must be indoors, completely sheltered from rain, snow, etc. High or low temperatures naturally associated with weather patterns will not harm the conditioners. Excessively high temperatures of 140°F (60°C) may deteriorate certain plastic materials and cause permanent damage. In addition, the solid-state circuit boards may experience operation problems.

Note: *Care should be taken when handling this equipment. Rough handling can create damage to internal electrical and refrigeration components.*

IMPORTANT

This product was carefully packed and thoroughly inspected before leaving the factory. Responsibility for its safe delivery was assumed by the carrier upon acceptance of the shipment. Claims for loss or damage sustained in transit must therefore be made upon the carrier as follows:

VISIBLE LOSS OR DAMAGE

Any external evidence of loss or damage must be noted on the freight bill or carrier's receipt, and signed by the carrier's agent. Failure to adequately describe such external evidence of loss or damage may result in the carrier's refusal to honor a damage claim. The form required to file such a claim will be supplied by the carrier.

CONCEALED LOSS OR DAMAGE

Concealed loss or damage means loss or damage which does not become apparent until the product has been unpacked. The contents may be damaged in transit due to rough handling even though the carton may not show external damages. When the damage is discovered upon unpacking, make a written request for inspection by the carrier's agent within fifteen (15) days of the delivery date and file a claim with the carrier.

Pre-Installation

⚠ 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.

General:

Units must be installed in accordance with all applicable codes.

To prevent damage, this equipment should not be operated for supplementary heating and cooling during the construction period.

Inspect the carton for any specific tagging numbers indicated by Daikin per a request from the installing contractor. At this time, the voltage, capacity and model should be checked against the plans.

Check the unit size against the plans to be sure that the unit will be installed in the correct location.

Units should be kept in shipping carton until installed. At the time the unit is to be placed in its final position and only then should the carton be removed. Retain the carton and cut away one side and bottom. Take the remaining portion of the carton and place it over the unit. This will insure the unit is protected from paint spotting, dirt, dust and lint that can affect proper unit operation, and will also prevent needless cleaning adding to installation cost.

The installing contractor will find it beneficial to confer with other contractors; i.e., plumbing, electrical, pipe fitters, etc., before installing any conditioners.

Remove the front panel by removing a screw on each side of the cabinet at the subbase.

All piping and electrical wiring should be flexible so that vibrations are not transmitted to the building structure. Ensure all electrical connections are in place and tight.

Locate the unit in an area that allows easy removal or accessibility for service personnel to perform maintenance and repair.

If units are placed on a concrete floor or other hard surface, it is recommended that the floor be free from all construction debris that may add to the operating noise level of the unit. It is recommended that the unit be placed on rubber matting to prevent distortion and/or vibration.

Unit Location

1. Console water source heat pumps are designed to be installed in a controlled environment.
2. All units are to be installed against a wall.
3. Each unit should be located on the architectural plans. The supply, return, and condensation piping should be located accordingly, making sure the piping will fit into the confines of the subbase and cabinet.

Installing the Unit

⚠ WARNING

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.

⚠ CAUTION

Sharp edges can cause personal injury. Avoid contact with them.

1. Consult job blueprints for unit location. Clean area where unit is to be installed, removing all construction dirt and debris.

IMPORTANT

Clean unit mounting area of all construction debris. Check that the floor is level and at 90 degrees to the wall. Daikin McQuay recommends the placement of a sound absorbing mat beneath the unit footprint before continuing to the next installation step.

2. Remove unit from shipping carton and save the carton. Remove the front panel by removing a screw on each end of the cabinet. Lift the cabinet up, forward and off.
3. Each chassis is mounted to cabinet backwrap and subbase assembly by six screws for shipment. Remove four screws, two on each side of the chassis at the subbase.

STOP! *If an outside air damper kit is to be installed, refer to "Field Installed Outside Air Damper (Accessory)" on page 21 for the manual damper or the motorized damper kit and install it now.*

4. Position cabinet backwrap and subbase against the wall where unit is to be installed. Ensure adequate room exists for piping and electrical connection in the subbase by checking the connection end of the subbase.
5. Using a carpenter's square and level, make sure unit is level and that it is at a 90-degree angle with the wall and floor.

Note: *If the floor and wall are not at right angles, it will be necessary to shim the subbase for proper installation. Daikin will not accept responsibility for units that may need to be shimmed. Poor or inadequate installation could create noisy unit operation.*

6. The cabinet backwrap has slots on the back flange to mount the assembly to the wall. It is the contractor's responsibility to select the correct fastener for each unit, using a minimum of three (3) fasteners, Figure 1.
7. After securing the subbase and backwrap assembly in place, insert the chassis if it has been removed. Next, the electrical connection should be made, Figure 2 on page 8

Figure 1: Cabinet backwrap & subbase

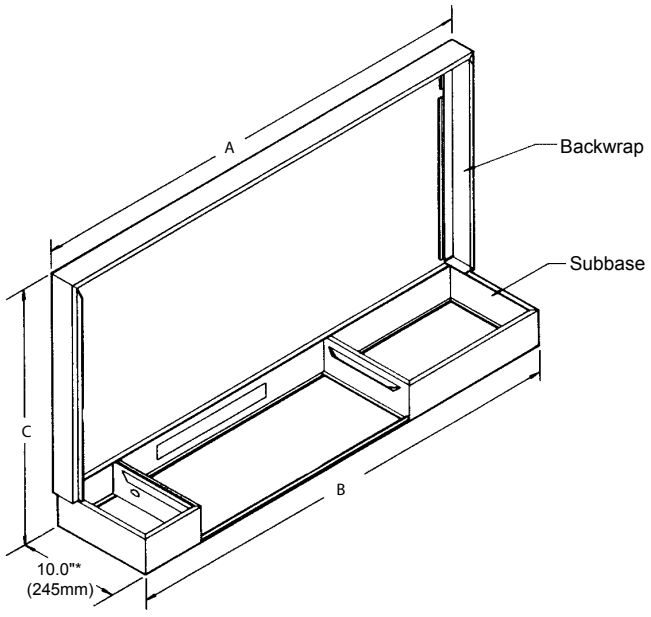
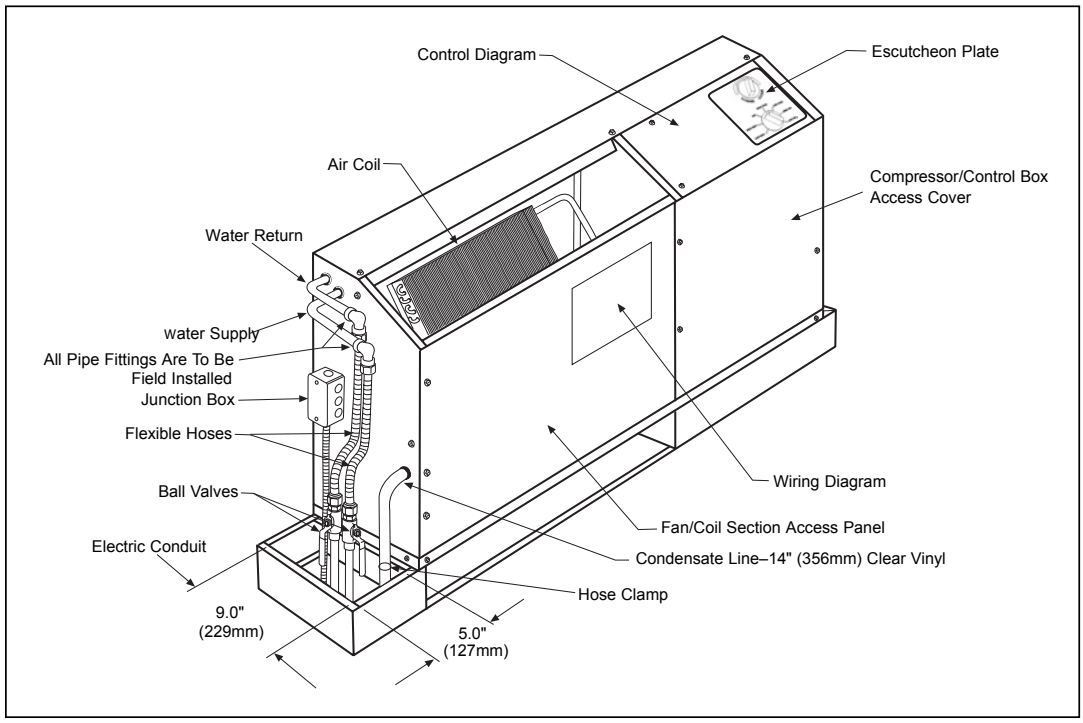


Table 2: Dimensions in inches (mm)

Unit Type	Unit Size	A	B	C
Standard Height	009-012	46 (1168)	45 (1143)	25 (635)
	015-019	54 (1372)	53 (1346)	25 (635)

Note: *Total unit is 10-3/4″ (273mm) deep. The cabinet extends beyond the subbase 1/4″ (6mm) in the back and 1/2″ (14mm) in the front.

Figure 2: Chassis (Left-hand slope top unit shown)



Water Connections

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

Note: *It will be helpful to read, "Piping" on page 10*

Unit Piping Connection

Each heat pump is supplied with extended copper tubing on the water-to-refrigerant coil and 1/2" (12.7mm) OD tubing. The connections are for both the supply and return water connections.

Note: ***Valves*** *– Shut off Combination Balancing Valves,* ***Hoses*** *– Supply Return, Condensate Drain Hose and 90º Elbows are all factory available as accessories, (to be mounted in the field by others).*

Shutoff/Balancing Valve

Each heat pump requires a shutoff valve on both the supply and return lines for easy serviceability and removal if it becomes necessary.

We suggest using our combination shutoff/balancing valves installed in the field between the contractor's piping and the heat pump unit. Constructed of brass and rated at 400 psig (2758 kPa) maximum working pressure. Valves have a built-in adjustable memory stop to eliminate rebalancing. The valve installed on the return line acts as a balancing valve to adjust the proper water flow. Each shutoff/balancing valve has 1/2" FPT × 1/2" FPT threaded connections.

Suggested Hose Kit Installation

Field installed piping can be brought up from the floor or through the wall.

Notes: 1. *Hoses are available in multiple lengths to acommodate various piping locations and optional components.*

2. *Make sure the pipes fit the confines of the piping compartment of the heat pump unit. See Figure 4 on page 9.*

Attach the field installed combination shut/off balancing valve to the building water supply and return piping. Next add the female pipe adapter connection to unit supply and return coil connection by sweating them in place using silver solder.

Next, using the specified hose kit, screw the fixed end into the shut-off/balancing valve. Remove the 1/2" adapter from the other end of the hose. Insert the adapter into the female fitting. Using two crescent wrenches, one to hold the pipe connection and the second to tighten the adapter, insert the swivel end of the hose on the adapter and tighten. This completes the hose connection to standard heat pump equipment.

Adding Motorized & Valve Assemblies

All console water source heat pumps can be field installed with a motorized valve. All valves are mounted on the return line of each unit. All valve assemblies terminate with 1/2" NPT threaded connections and will also accommodate factory supplied hose kits.

Note: *All plumbing connections are made the same way whether or not the unit has valve packages. Whether or not you utilize our hose kits and shutoff/balancing valve all piping connections will have to conform with all local piping and building codes. The ability to remove the unit in order to perform repairs is imperative.*

Note: *Valves, hoses and 90-degree elbows are factory available accessories, to be field-mounted by others.*

Pipe Elbows

90-degree, 1/2" SWT × 1/2" FPT Cast Bronze elbow fittings can be ordered to make sweat connections to the unit supply and return pipe stubs to accept the threaded connection of flexible hoses.

Figure 3: 90 Degree Pipe Elbow (See Table 3 for letter dimensions)

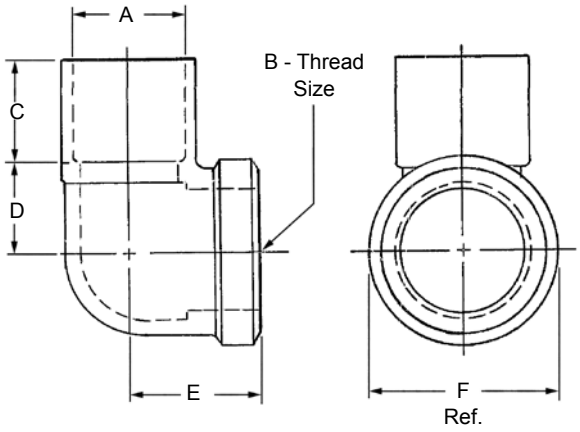


Table 3: 90 Degree Pipe Elbow Dimensions for Figure 3

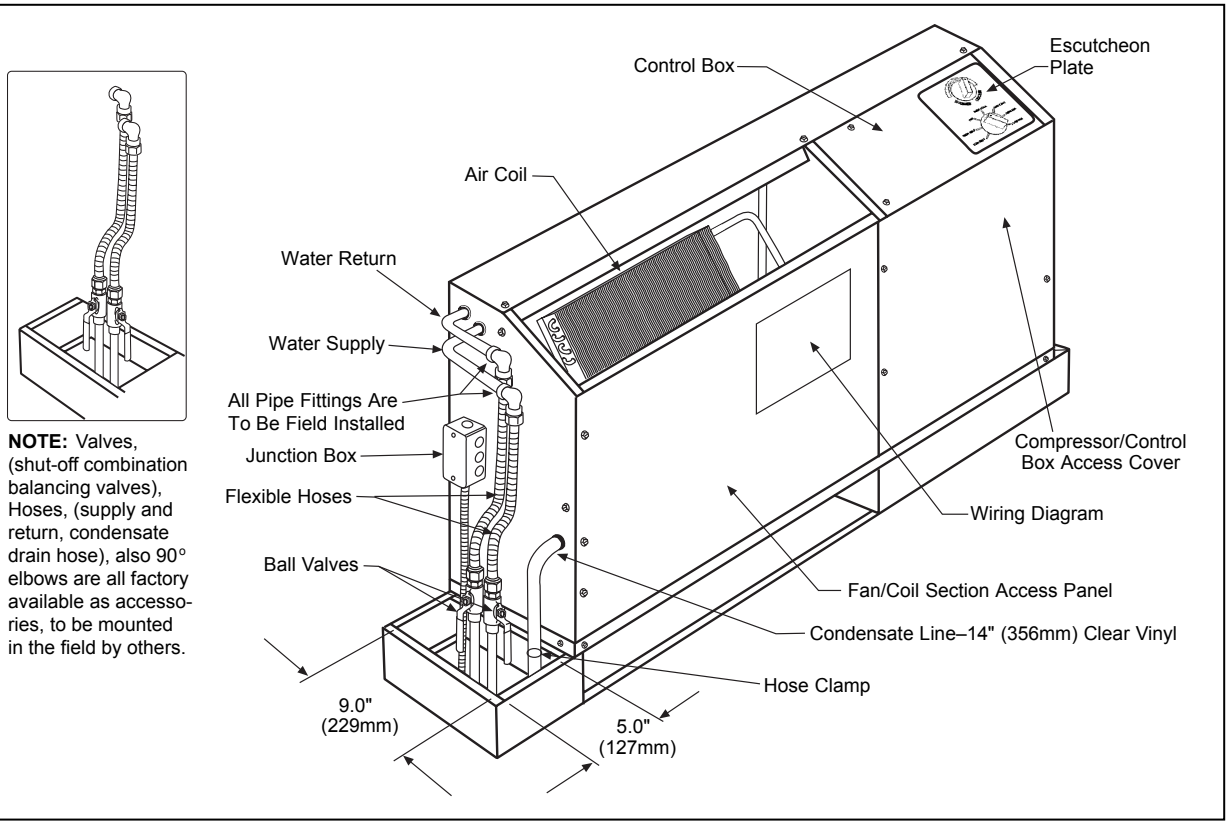
A - Nominal Size	A	B	C	D	E	F
1/2" × 1/2"	.627"/.631"	1/2" FPT	.50	.43	.81	1.08

Condensate Hose Connection

Each unit is supplied with a 3/4" (19mm) I.D. clear vinyl condensate hose internally trapped within the chassis. The hose extends 14" (356mm) out of the chassis within the piping compartment to reach the floor or the back wall.

Field condensate piping must enter within the confines of the cabinet (back wall or floor) similar to the supply and return piping. Slide the vinyl hose over the condensate pipe and clamp it.

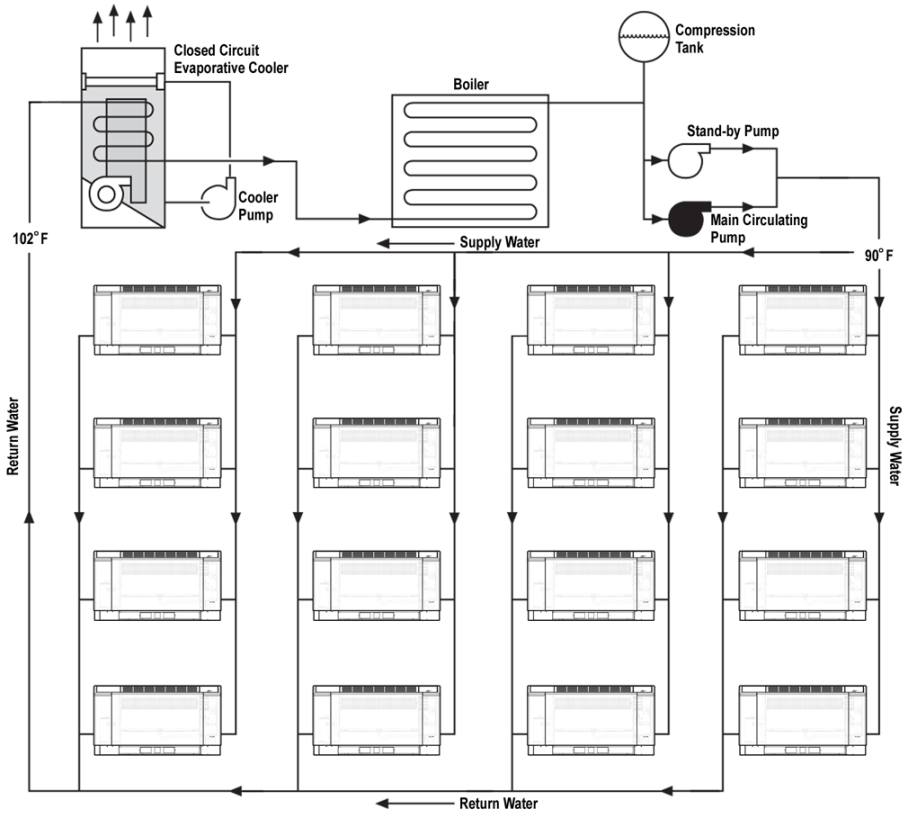
Figure 4: Hose kit installation (field-installed)



Piping

1. All units are recommended to 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 are connected to the same loop. A simple way to check for proper water balance is to take a differential temperature reading across the water connections when in the cooling mode. To insure proper water flow, the differential should be 10˚F to 14˚F (-5˚C to -8˚C). A direct return system may also be made to work acceptably, but proper water flow balancing is more difficult to achieve and maintain.
2. The piping can be steel, copper or PVC, but must comply with local codes.
3. Supply and return runouts are usually connected to the unit by short lengths of high pressure flexible hose which are sound attenuators for both unit operating noise and hydraulic pumping noise. Note: When using the flex hose connections you must add a 90 degree elbow kit, for making the connection. This elbow is sweat on one end – female 1/2" FPT on the other end. One end of the hose should have a swivel fitting to facilitate removal for service. Hard piping can also be brought directly to the unit, although it is not recommended since additional noise
4. Some flexible hose threaded fittings are supplied with sealant compound. If not, apply Teflon tape to assure a tight seal.
5. Supply and return shutoff valves are required at each conditioner. The return valve is used for balancing and should have a “memory stop” so that it can always be closed off, but can only be re-opened to the proper position for the flow required.
6. No unit should be connected to the supply and return piping until the water system has been cleaned and flushed completely. After the cleaning and flushing has taken place, the initial connection should have all valves wide open in preparation for water system flushing.
7. Condensate piping can be steel, copper, or PVC. Each unit is supplied with a clear vinyl condensate hose.
8. Units are internally trapped. Copper or PVC condensate lines can be used. A means of disconnection must be furnished to facilitate chassis removal.
9. No point of the drain system may be above the drain pan of any unit.
10. Automatic flow control devices must not be installed prior to system cleaning and flushing.
11. A high point of the piping system must be vented.
12. Check local code for the need for electric fittings.

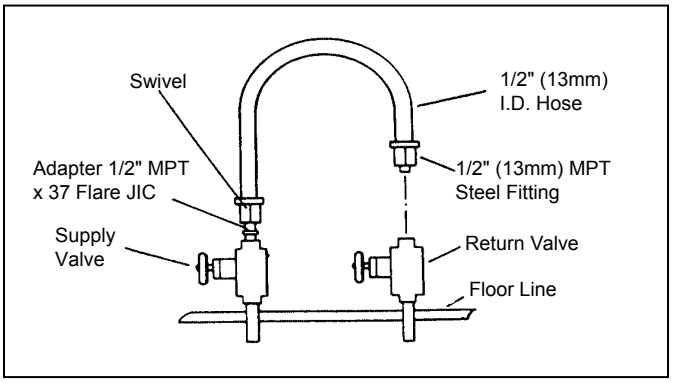
Figure 5: Typical 2-Pipe Reverse Return Configuration



Cleaning and Flushing System

1. Prior to first operation of any conditioner, the water circulating system must be cleaned and flushed of all construction dirt and debris. If the conditioners are equipped with water shutoff valves, either electric or pressure operated, the supply and return runouts must be connected together at each conditioner location. This will prevent the introduction of dirt into the unit. Additionally, pressure operated valves only open when the compressor is operating.

Figure 6: Temporary Connection for Flushing System Piping



2. The system should be filled at the city water makeup connection with all air vents open. After filling, vents should be closed. The contractor should start main circulator with pressure reducing valve makeup open. Vents should be checked in sequence to bleed off any trapped air to assure 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 piping. Drains at the lowest point(s) in the system should be opened for initial flush and blowdown, 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 if required, to see clear, clean drain water.

3. Supplemental heater and circulator pump should be shut off. All drains and vents should be opened to completely drain down the system. Short circuited supply and return runouts should now be connected to the conditioner supply and return connections. Teflon tape is recommended versus pipe dope for pipe thread connections. Use no sealers at the swivel flare connections of hoses.

4. Trisodium phosphate was formerly recommended as a cleaning agent during flushing. However, many states and localities ban the introduction of phosphates into their sewage systems. The current recommendation is to simply flush longer with 80˚F (27˚C) water.

5. Refill the system with clean water. Test 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.

6. Set the system control and alarm panel heat add setpoint to 70˚F (21˚C) and 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 air vented and loop temperatures stabilized, each of the conditioners will be ready for check, test, and start-up and for air and water balancing.

7. It is not Daikin's policy to make recommendations on water treatment. The general contractor or owner should contact a local water treatment company regarding water treatment. However, this topic is critical and care should be taken to make sure it is done properly to prevent problems related to flow. A fouled closed loop water system will lead to premature component failure.

Standard Electrical Connection

Each chassis comes with a junction box mounted on the side of the chassis and contains the field electrical connection.

Note: *If electrical wiring or conduit comes through the floor, all wires or conduit should be sealed at this point. It will prevent any condensation or water leakage that may occur due to lack of preventive maintenance. Each unit has an internal condensate trap that will require cleaning. We suggest wiring coming through the wall should also be sealed to stop cold air infiltration through the wall cavity which could affect unit thermostat operation.*

Remove the junction box cover, selecting the proper knockout and remove it. Install a strain relief and pass the wires through the strain relief into the junction box making the connection and reinstall the junction box cover.

Note: *Check the local code concerning correct electrical connection.*

Cord & Plug Electrical Connection (Field Installed)

Cord connected equipment comes with a box and appropriate voltage receptacle. However, a disconnect switch and fuses can also be provided in the box. As an option, the box comes factory mounted on the backwrap and is ready to be field wired to the incoming power. The box is mounted on the same side as the piping.

It is the responsibility of the installing contractor to make the proper electrical connection to the electrical box, using the same method as described in the standard electrical connection. See Figure 7 and Figure 8 on page 12.

Figure 7: Standard electrical connection - Junction box

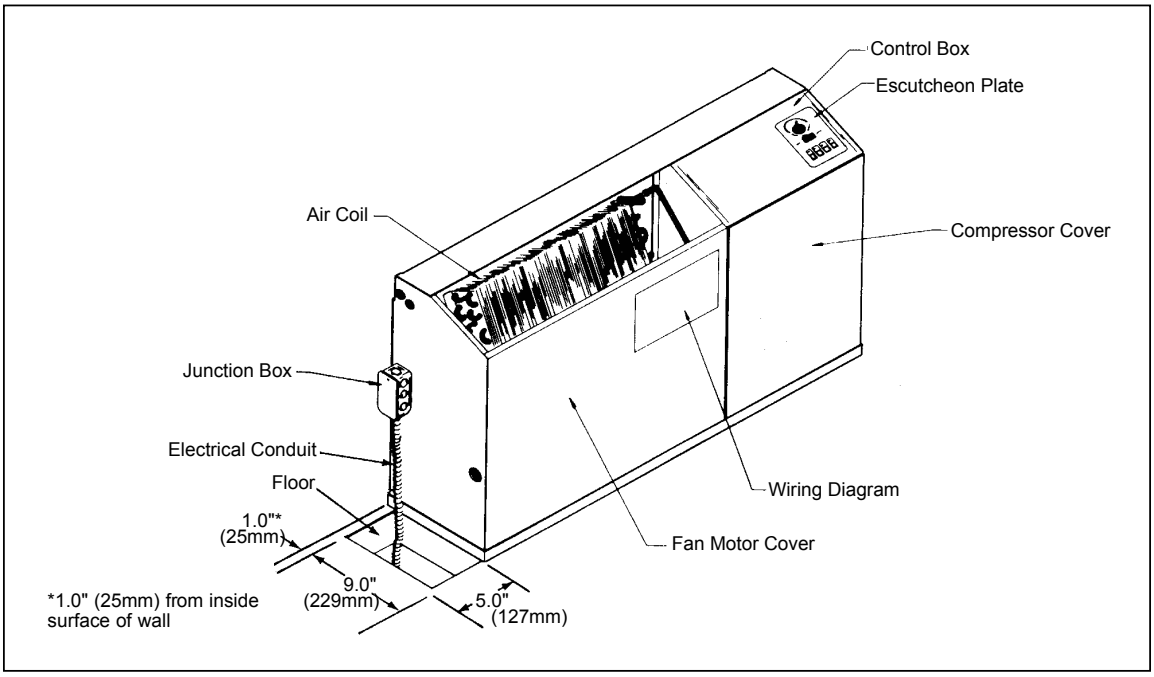


Figure 8: Cord & plug connection (field-installed)

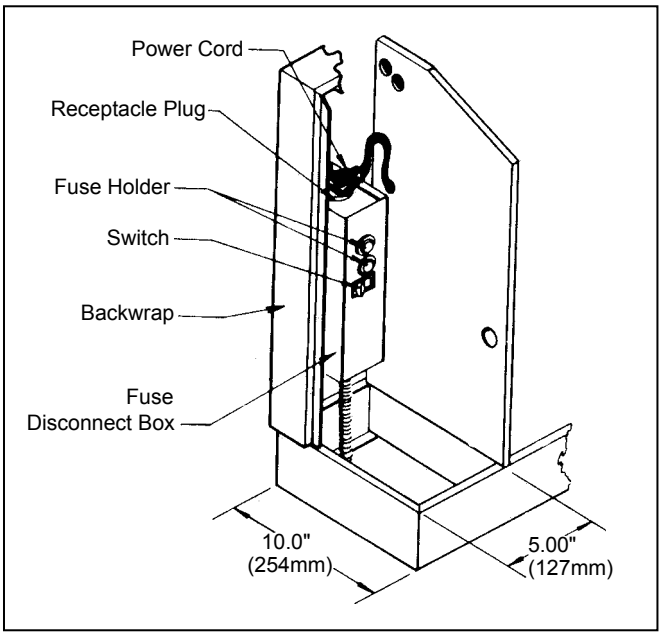
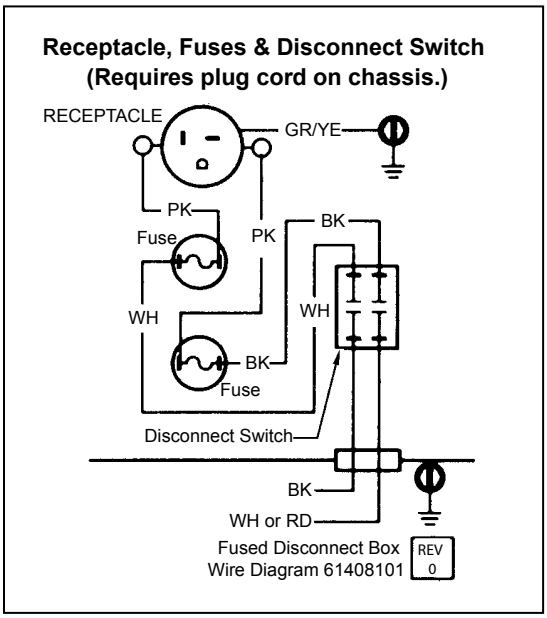


Figure 9: Cabinet power connection (field-installed)



Operating Limits

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 may be adversely affected.

Additional Information

Units are designed to start and operate with entering air at 40˚F (4˚C), with entering water at 70˚F (21˚C), with both air and water at the flow rates used in the ISO Standard 13256-1 rating test, for initial start-up in winter.

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

Table 4: Air limits in °F (°C)

Air Limits	Cooling	Heating
Minimum Ambient Air[1]	40°F (4°C)	40°F (4°C)
Rated Ambient	80°F (27°C)	70°F (21°C)
Maximum Ambient Air[2]	100°F (38°C)	85°F (29°C)
Minimum Entering Air[1]	50°F (10°C)	40°F (4°C)
Rated Entering Air	80/67°F (27°/19°C)	70°F (21°C)
Maximum Entering Air[2]	100/83°F (38/28°C)	80°F (27°C)

Table 5: Fluid limits

Fluid Limits	Cooling	Heating
Minimum Entering	30°F (-1°C)	20°F (-6°C)
Normal Entering	77°F (25°C)	40°F (4°C)
Maximum Entering	110°F (43°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. Extended range unit 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.

Electrical Data

General

1. Be sure the available power is the same voltage and volt operation unless specified for 230 volts. phase as that shown on the unit serial plate. Line and voltage wiring must be done in accordance with local codes or the National Electrical Code, whichever is applicable.

2. Apply correct line voltage to the unit. A disconnect switch near the unit is required by code. Power to the unit must be sized correctly and have dual element (Class RK5) fuses or HACR circuit breaker for branch circuit overcurrent protection. See the nameplate for correct ratings.

3. All 208-230V single phase units are factory wired for 208 volt operation unless specified for 230 volts.

Operating Voltages

115/60/1.....104 volts min.; 127 volts max.
208-230/60/1 .....197 volts min.; 253 volts max.
265/60/1.....238 volts min.; 292 volts max.
230/50/1.....197 volts min.; 253 volts max.

Note: *Voltages listed are to show voltage range. However, units operating circuit overcurrent protection. See the nameplate for with overvoltage or undervoltage for extended periods of time will experience correct ratings. premature component failure.*

Unit Electrical Data Table

Table 6: Unit Electrical Data

Unit Size	Power			Compressor		Motor FLA	Total Unit FLA	Min. Volts	Min. Circuit Ampacity	Max. Fuse Size
	Volt	Hz	Phase	RLA	LRA					
009	115	60	1	8.0	50	0.63	8.63	104	10.6	15
	208/230	60	1	3.7	22	0.40	4.10	197	5.0	15
	265	60	1	3.5	22	0.35	3.85	240	4.7	15
012	115	60	1	9.5	50	1.60	11.10	104	13.5	20
	208/230	60	1	4.7	25	0.60	5.30	197	6.5	15
015	208/230	60	1	5.6	29	0.82	6.42	197	7.8	15
	265	60	1	5.0	28	0.55	5.55	240	6.8	15
019	208/230	60	1	7.4	33	0.82	8.22	197	10.1	15

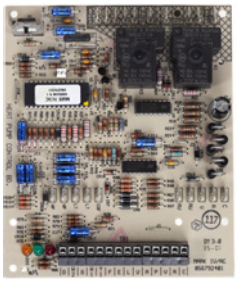
Units with Boilerless System Electric Heat

Table 7: Units with Boilerless System Electric Heat

Unit Size	Power	Electric Heater			Compressor		Motor FLA	Total Unit FLA	Min. Volts	Min. Circuit Ampacity	Max. Fuse Size
	Volt/Hz/Phase	kW		Amps	RLA	LRA					
		Nominal	Actual								
009	208/60/1	1.0	0.62	3.0	3.7	22	0.40	4.10	197	5.0	15
	230/60/1		0.75	3.3	3.7	22	0.40	4.10	197	5.0	15
	265/60/1		1.00	3.8	3.5	22	0.35	3.85	240	5.2	15
	208/60/1	2.0	1.23	5.9	3.7	22.0	0.40	4.10	197	5.0	15
	230/60/1		1.5	6.5	3.7	22.0	0.40	4.10	197	5.0	15
	265/60/1		2.0	7.5	3.5	22.0	0.35	3.85	240	5.2	15
012	208/60/1	1.0	0.62	3.0	4.7	25	0.60	5.30	197	6.5	15
	230/60/1		0.75	3.3	4.7	25	0.60	5.30	197	6.5	15
	208/60/1	2.0	1.23	5.9	4.7	25.0	0.60	5.30	197	6.5	15
	230/60/1		1.5	6.5	4.7	25.0	0.60	5.30	197	6.5	15
015	208/60/1	2.0	1.23	5.9	5.6	29	0.82	6.42	197	8.4	15
	230/60/1		1.50	6.5	5.6	29	0.82	6.42	197	9.9	15
	265/60/1		2.00	7.5	5.0	28	0.55	5.55	240	10.1	15
019	208/60/1	2.0	1.23	5.9	7.4	33	0.82	8.22	197	10.1	15
	230/60/1		1.50	6.5	7.4	33	0.82	8.22	197	10.1	15

Unit Operation – General

Mark IV/AC-Control Units



Note: *At start-up of unit, ensure that temperature, flow rate and voltage are within specified limits required for proper unit operation. Each unit has its own control or remote control, utilizing an internal thermostat (unit mounted) and touch-pad selector switch or a wall mounted thermostat (remote control units).*

Each unit has a Mark IV/AC version printed circuit board. Its control is available in unit mounted or remote wall thermostat. The Mark IV/AC controller has a 14-pin low voltage terminal strip for a hardwired interface for all the necessary field connections interfacing to external equipment (see Table 8). The low voltage output from the low voltage terminal strip is always 24 volts AC. Terminals F and V on the low voltage terminal strip supply 24 volts DC-power.

Table 8: 14-Position Terminal Strip

Pin	Designation	Description
1	C	Transformer ground (0vac)
2	R	Transformer supply (24vac)
3	V	– DC power connection
4	P	Pump request output
5	A	Alarm fault output
6	U	Unoccupied input
7	L	Load shed input
8	E	Remote shutdown input
9	F	+DC power connection
10	Y1	Occupied cooling mode input
11	W1	Occupied heating mode input
12	G	Fan only input
13	W2	Unoccupied heating mode input
14	O	Tenant override input

The 24 volt low voltage terminal strip is set up so R-G or F-G energizes the fan, R-Y1 or F-Y1 energizes the compressor for cooling operation, R-W1 or F-W1 energizes the compressor and reversing valve for heating operation. The reversing valve is energized in the heating mode. The circuit board has a fan interlock circuit to energize the fan whenever the compressor's on if the thermostat logic fails to do so.

Remember the output to the wall stat can be AC current or DC current. Terminal (R) on the wall stat can be connected to terminal (R) on the PC board for AC voltage or to terminal (F) on the PC board for DC voltage.

AC current DC current

R to G = fan only F to G = fan only

R to Y1 = cooling F to Y1 = cooling

R to W1 = heat F to W1 = heat

Continuous Fan: Units are factory wired for continuous operation. When power is applied and the start switch is depressed, the fan will run.

Cooling or Heating – Auto Operation: Rotate the thermostat knob to either warmer or cooler. Select fan speed. Depress the start button. Unit will start within 0 to 32 seconds.

Lockout Circuit: Each unit has its own lockout circuit to lock out compressor operation when an abnormal condition should appear. During unit operation, the compressor will be automatically turned off due to one of the two safety openings. High pressure is set at 600 psi (4136 kPa) and low temperature switch is set at 28˚F (-2˚C). Condensate overflow and brownout protection are also included.

Remote Reset of Automatic Lockouts: The Remote Reset feature provides the means to remotely reset automatic lockouts generated by high-pressure and/or low-temperature (in heating) faults. When the Mark IV board is in automatic lockout due to one of these faults, and the cause of the fault condition has been alleviated, energizing the O-terminal for 10 seconds or more will force the Mark IV board to clear the lockout. A unit power cycle can also be used to clear an automatic lockout if the conditions causing the fault have been alleviated.

Fault Retry To Minimize Nuisance Trips: The Fault Retry feature helps to minimize nuisance trips of automatic lockouts caused by high-pressure and/or low-temperature (in heating) faults. This feature clears faults the first two times they occur within a 24-hour period and triggers an automatic lockout on the 3rd fault. The retry count is reset to zero every 24 hours.

Cooling or Heating – Manual Operation: Rotate the thermostat knob to either warmer or cooler. Select fan speed, depress the heat or cool button, and unit will start within 0 to 32 seconds.

The Mark IV/AC-circuit board system has built-in features such as random start, compressor time delay, night setback, load shed, shutdown, condensate overflow protection, defrost cycle, brownout, and LED/fault outputs. Table 9 shows the LED and fault output sequences. The 24 volt low voltage terminal strip is set so R-G energizes the fan. R-W1 energizes the fan and compressor and reversing valve for heating operation.

The reversing valve is set up to be energized in the heating mode. The circuit board has a fan interlock circuit to energize the fan whenever the compressor is on.

The Mark IV/AC control board has a lockout circuit to stop compressor operation if any one of its safeties opens (high pressure or low temperature). If the low temperature thermostat opens, the unit will go into the cooling mode for 60 seconds to defrost any slush in the water-to-refrigerant heat exchanger. After 60 seconds, the compressor is locked out. If the condensate sensor detects a filled drain pan, the compressor operation will be suspended only in the cooling mode.

The unit is reset by opening and closing the disconnect switch on the main power supply to the unit in the event the unit compressor operation has been suspended due to low temperature (freezestat) switch, or high pressure switch.

The Mark IV/AC control circuit has a fault output signal to an LED on a wall thermostat. Table 9 shows in which function the fault output is “on” (sending a signal to the LED).

Table 9: Mark IV/AC LED & fault outputs

Indication	LED			Fault
	Yellow	Green	Red	Output
Normal Mode	Off	On	Off	Off
Pressure Fault	Off	On	Flash	On
Low Temperature Fault*	Flash	Off	Off	On
Condensate Overflow**	On	Dim	Off	On
Brownout	Off	Flash	Off	On
Load Shed	Off	Off	On	Off
Unoccupied Mode	On	On	Off	Off
Unit Shutdown	Off	Flash	Off	On

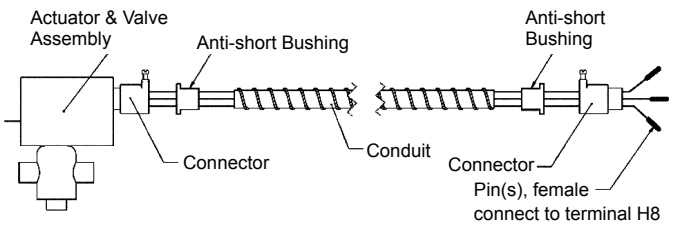
*** Only in the heating mode** **** Only in the cooling mode**

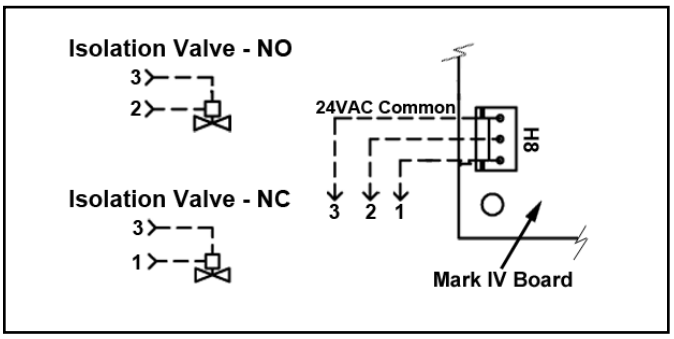
Motorized Valve & Relay for Unit Sizes 009 to 019

Wired as shown below the motorized valve will open on a call for compressor operation. Valves for unit sizes 009 to 019 are 1/2" power-open spring-return. Other thermostat combinations may be used. Valve and auxiliary relay are purchased separately.

Note: *The wiring shown below can only be used when the “P” terminal is not being used as a pump restart signal to other equipment. If the “P” terminal must be used as a pump restart signal to other equipment, then wire the auxiliary relay’s yellow wire to “Y1”, white wire to “W1”, and orange wire to “C”, then the valve will open on a call for occupied heating or cooling from the thermostat.*

Figure 10: Normally Closed, Power Open Motorized Valve Wiring

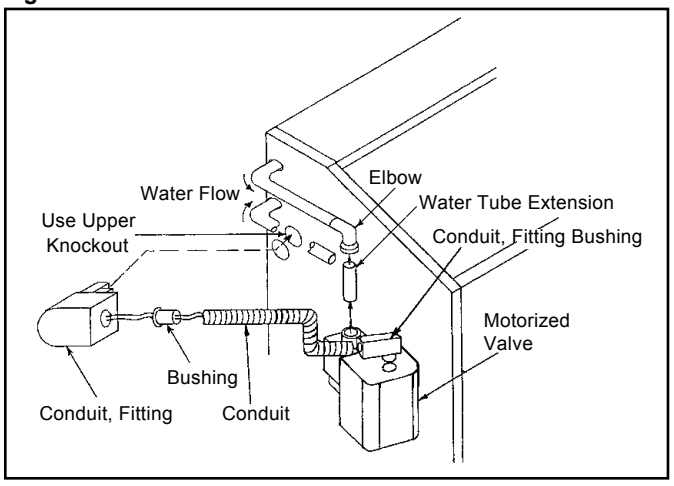


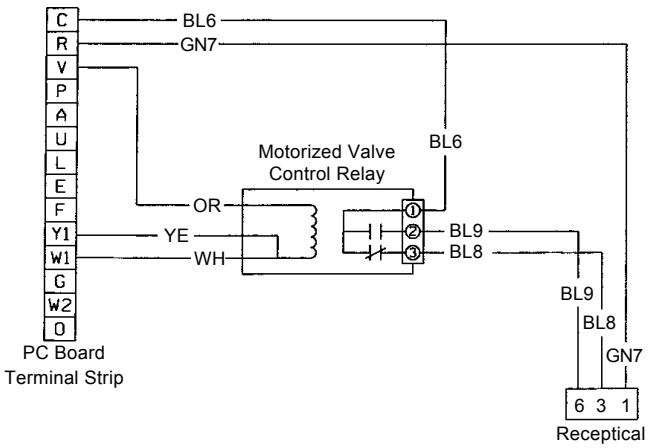


Notes: *1. Connectors on valve must be cut off and stripped back and the wires twisted to make connections to the H8 (IV/PR) terminals on the Mark IV controller.*

2. All plumbing connections are made the same, whether or not the unit has valve packages. Plumbing connections must conform with local piping and building codes. The ability to remove the unit in order to perform repairs is imperative.

Figure 11: Motorized Valve Kit

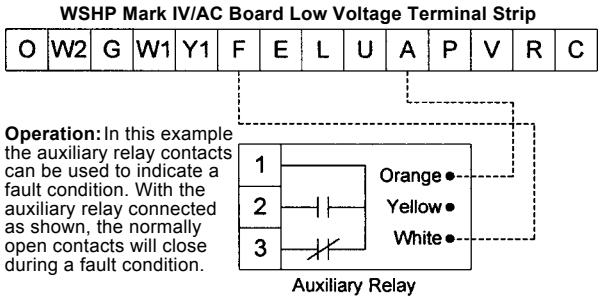




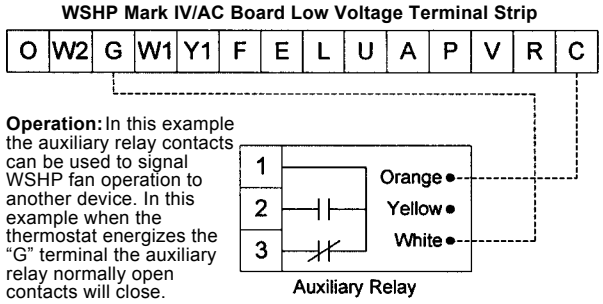
Notes: 1. Use soft solder process on water tubing outside of chassis.
2. Route wires along with power leads.
3. Left hand installation shown - right hand installation is “mirror” opposite.
4. Motorized valve (511) to be parallel to the end panel.
5. Copper to be washed prior to soldering.
6. Route conduit so it does not interfere with manual operation of motorized valve.

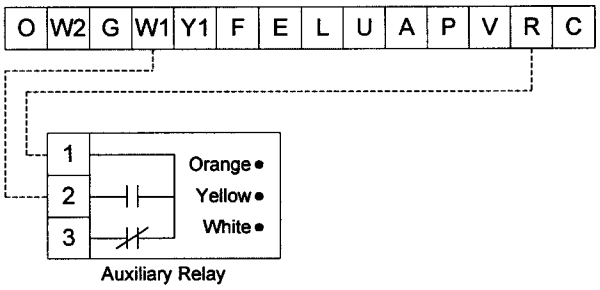
Control Options on Mark IV/AC Units

Figure 12: Auxiliary Relay



Note: The auxiliary relay is designed to interface external equipment with the Mark IV/AC board. The auxiliary relay has been provided with the components necessary to protect from electrical damage that may occur to the Mark IV/AC board when using standard off-the-self relays. The auxiliary relay can be used to provide fault signals, unit operation signals, or to provide a means for remote equipment to control the Mark IV/AC board. The orange, yellow, and white connections are short flying leads pre-attached to the board. The diagrams shown are some connection examples.

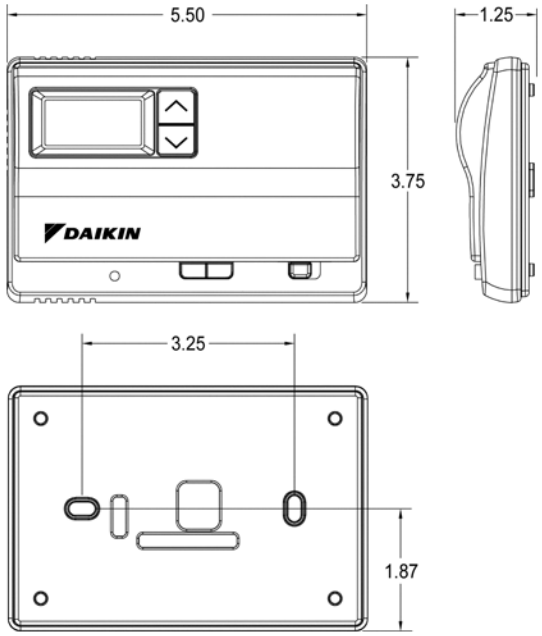




Thermostat Connection Diagrams

Programmable Electronic Thermostat Two-Stage Heat/Two-Stage Cool, 7-Day Programmable

Dimensions



Specifications

Electrical Rating:

- 24 VAC (18 to 30 VAC/VDC)
- 1 amp maximum per terminal
- 4 amp maximum total load
- Easy access terminal block

Temperature Control Ranges:

- 45°F to 90°F (7°C to 32°C), Accuracy: ± 1°F (± 0.5°C)

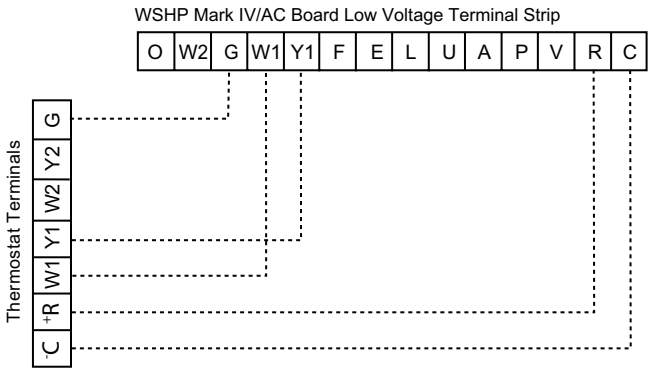
System Configurations:

- Two-stage heat/Two-stage cool

Terminations:

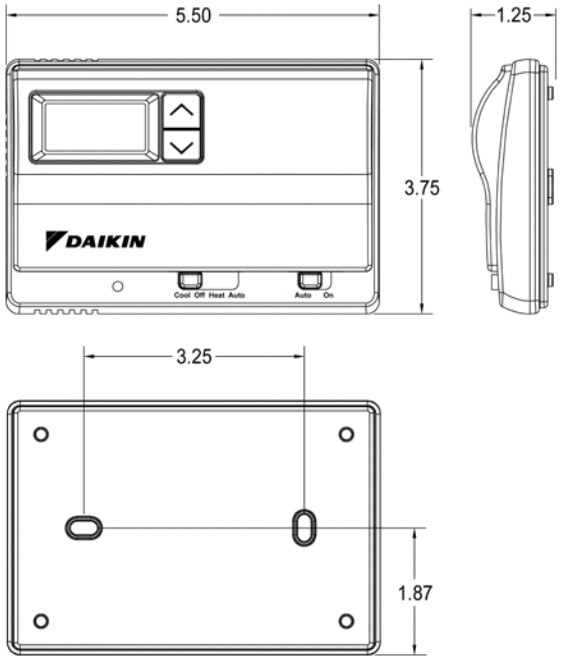
- R, C, W1, Y1, W2, Y2, G, S1, S2

Figure 13: Wiring



Non-Programmable, Auto or Manual Changeover Two Stage Heat/Two Stage Cool, Night Setback Override

Dimensions



Specifications

Electrical Rating:

- 24 VAC (18 to 30 VAC/VDC)
- 1 amp maximum per terminal
- 4 amp maximum total load
- Easy access terminal block

Temperature Control Ranges:

- 45°F to 90°F (7°C to 32°C), Accuracy: ± 1°F (± 0.5°C)

System Configurations:

- Two-stage heat / two-stage cool

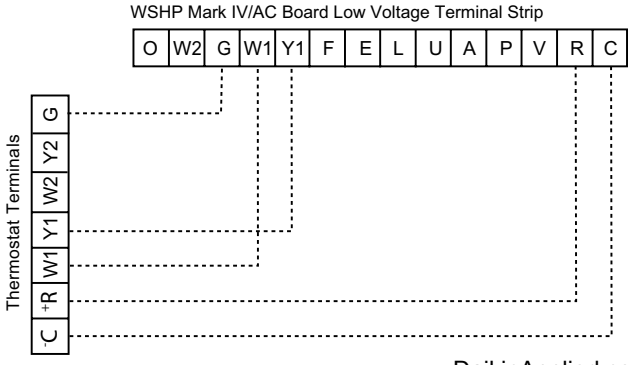
Timing:

- Backlight Operation: 13 seconds after mode change or button press

Terminations:

- +R, -C, W1, Y1, W2, Y2, G, O, S1, S2

Figure 14: Wiring



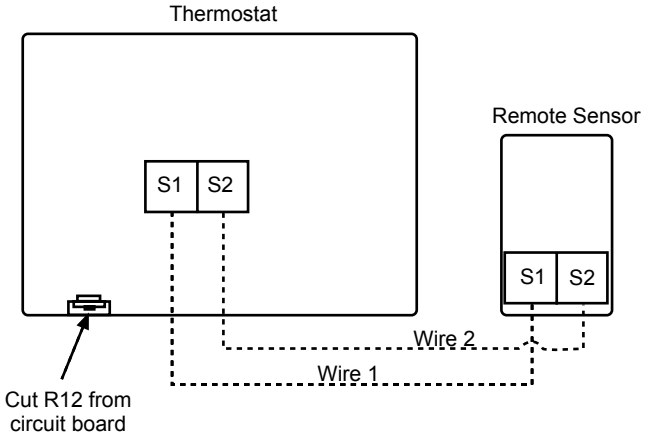
Optional Remote Sensor

(Used with Thermostats 668375301 & 668375401)

The fast, easy solution for temperature sensing problems.

- For tamper prone areas
- Poor airflow areas
- Troubled applications
- Foam gasket prevents drafts through wall opening
- Mounts to standared 2" × 4" outlet box
- 2-3/4"W × 4-1/2"H

Figure 15: Remote Sensor Wiring



Optional Remote Sensor Installation

1. Remove cover from remote sensor housing.
2. Select an appropriate location for mounting the remote sensor.
3. Mount remote sensor unit using hardware provided.
4. Install two strand shielded wire between remote sensor and thermostat. Shielded wire must be used.

Note: *Do not run remote sensor wire in conduit with other wires.*

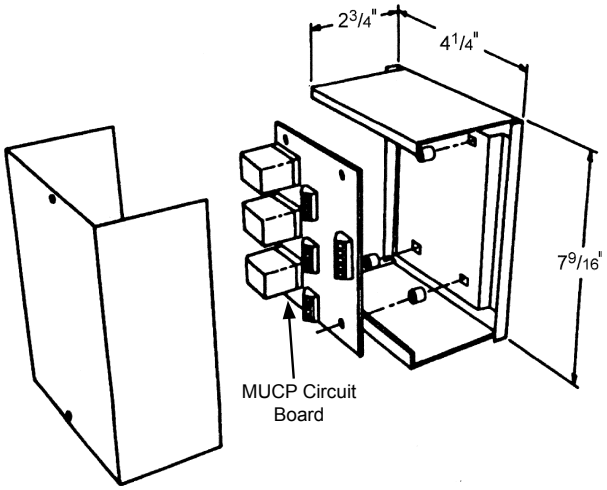
- Wire 1 should run between the S1 terminal on the thermostat and the S1 terminal on the remote sensor
- Wire 2 should run between the S2 terminal on the thermostat and the S2 terminal on the remote sensor
- Connect the shielding of the wire to the S2 terminal on the thermostat

5. Disable the main sensor (R12) on the thermostat by cutting it from the circuit board.

Multiple Unit Control Panel for Mark IV

Up to 3 Units (Part No. 056794201)

Figure 16: Multiple Unit Control Panel and Board



The multiple unit control board is an accessory used when you need to control up to 3-units from a single thermostat. The board is typically mounted in the unit control box closest to the thermostat. A maximum of 2 boards may be used together if up to 6-units must be connected and controlled from a single thermostat.

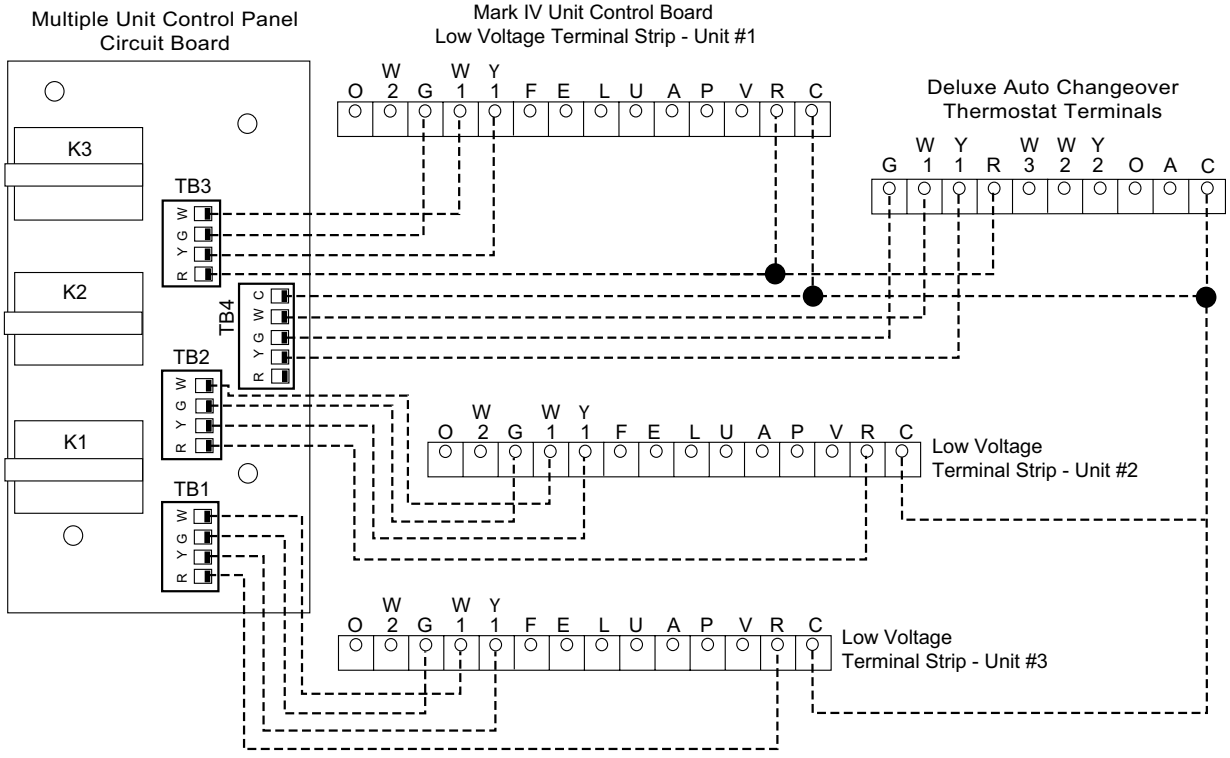
Low voltage wiring between terminal blocks and the Daikin wall thermostat should be made in conformancewith applicable codes. A color-coded low voltage cable is recommended.

This version of the board uses VAC relays and should not be used in combination with any other accessories or equipment that require VDC connections to the “G”, “W1”, or “Y1” terminals (i.e. Boilerless System Kit).

The multiple unit control board provides the components necessary to protect the Mark IV/AC board from electrical damage that may occur when using standard off-the-shelf relays.

Do not use the unoccupied (U-terminal) feature with the multiple unit control board.

Figure 17: Wiring MUCP up to 3 units



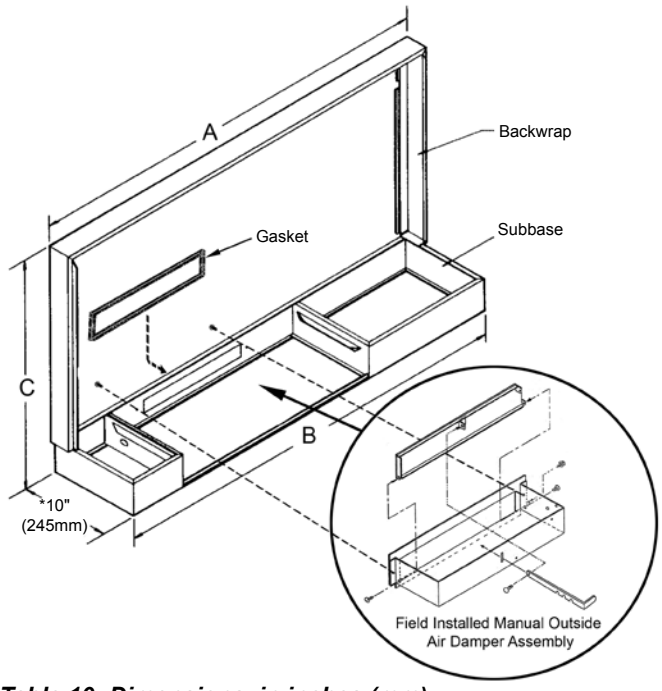
Field Installed Outside Air Damper (Accessory)

⚠ CAUTION

To prevent infiltration of ambient conditions, it is the responsibility of the contractor to assure that factory installed gasketing matches up with the wall opening, or that additional material is used to assure a positive seal. Cold Weather Operation: Console water source heat pumps may experience erratic operation during cold ambient conditions with the outside air damper in the open position. Refer to the “Operating Limits” in the unit catalog 1140-x.

Manual Outside Air Damper

Figure 18: Rear inlet - typical manual damper installation



Motorized Outside Air Damper

Figure 19: Rear inlet - typical motorized damper installation

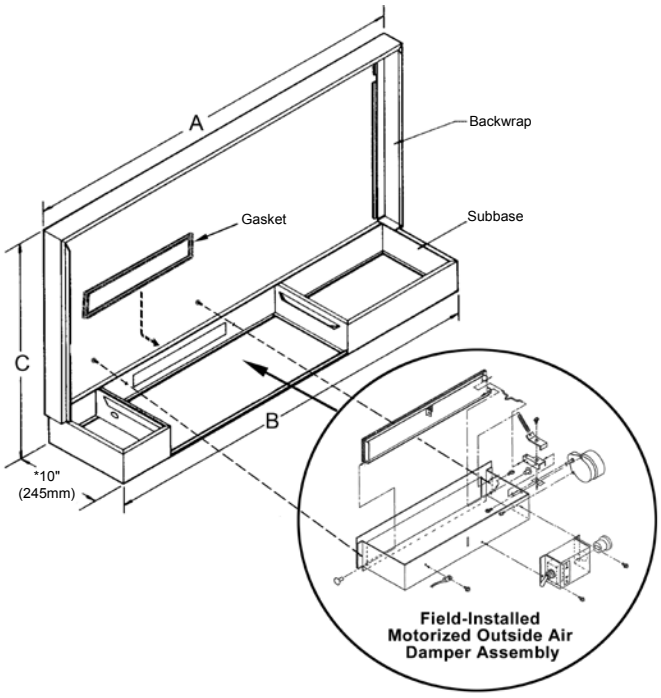
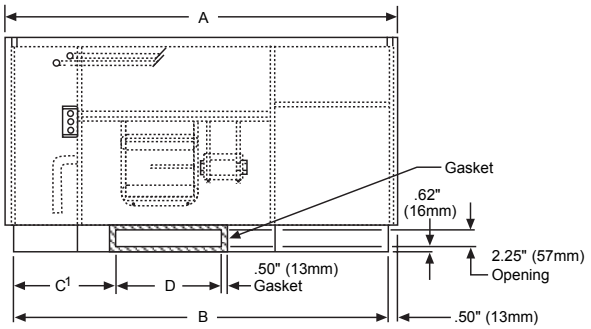


Table 10: Dimensions, in inches (mm)

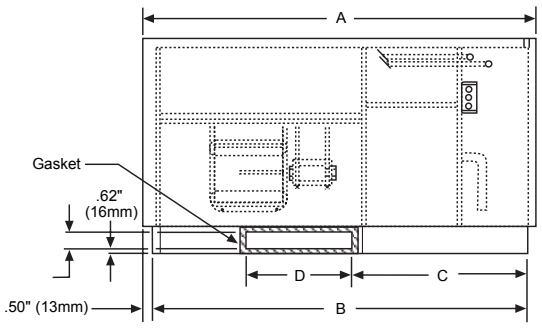
Unit Type	Unit Size	A	B	C
Standard Height	009-012	46 (1168)	45 (1143)	25 (635)
	015-019	54 (1372)	53 (1346)	25 (635)

Note: *Total unit is 10-3/4″ deep. The cabinet extends beyond the subbase 1/4″ (6mm) in the back and 1/2″ (14mm) in the front.

Figure 20: Left-hand & right-hand views



Front View - Left Hand Piping
Back Panel With Outside Air Damper Inlet



Front View - Right Hand Piping
Back Panel With Outside Air Damper Inlet

Table 11: Outside air damper opening location

Unit Size	A	B	C	C1	D	E
009 - 012	46 (1168)	45 (1143)	21.09 (536)	11.38 (289)	12.53 (318)	2.25 (57)
015 - 019	54 (1372)	53 (1346)	22.25 (565)	22.25 (565)	12.53 (318)	2.25 (57)

Motorized Outside Air Damper Wiring

Figure 21: Right-hand unit installation detail

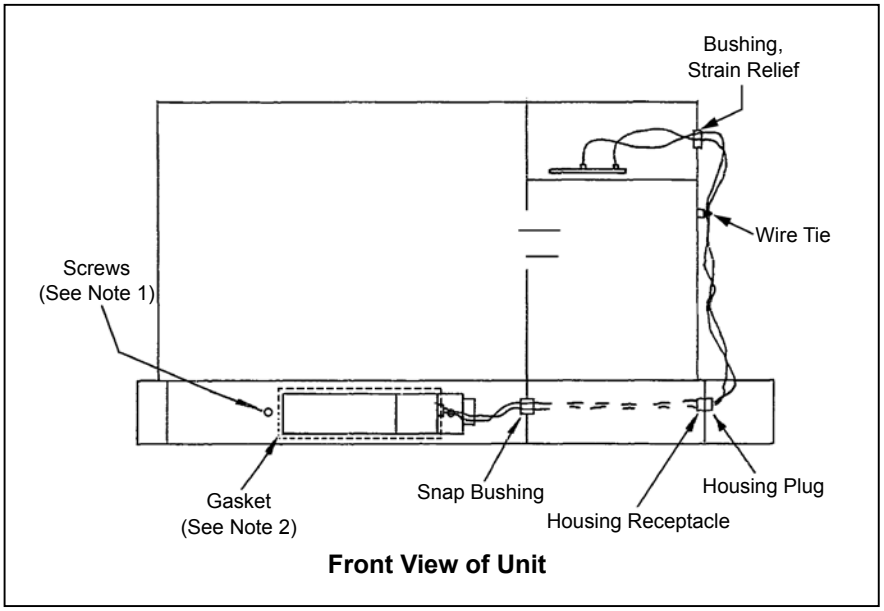
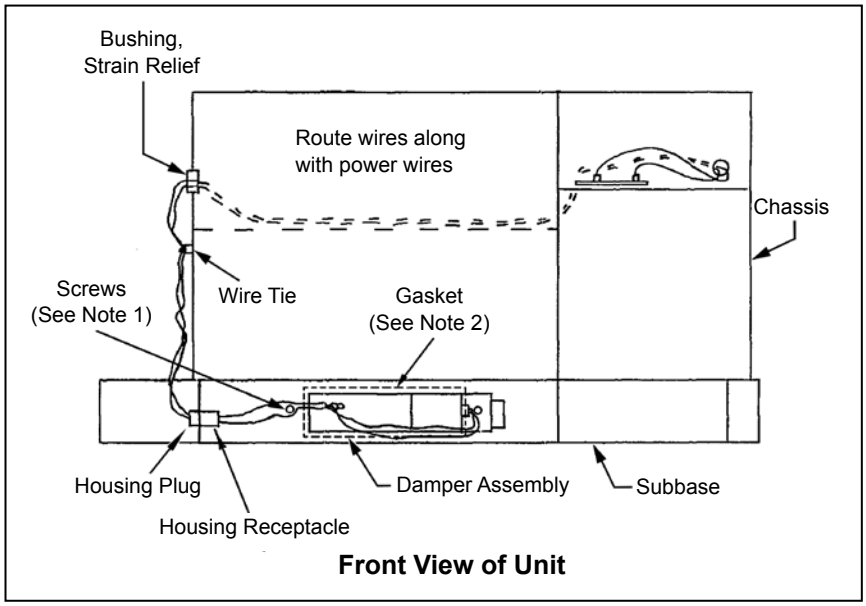


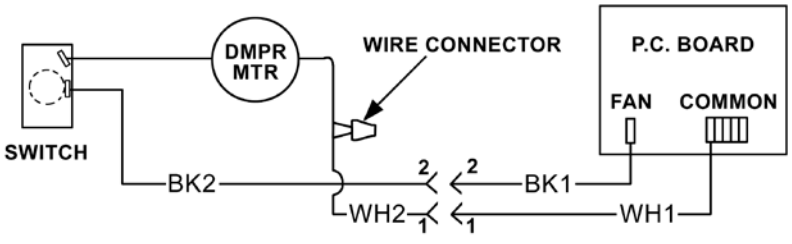
Figure 22: Left-hand unit installation detail



Notes: *1. Remove appropriate knock-outs and install damper using two (2) #8-18 screws provided.*

2. Install gasket material as shown to prevent infiltration of ambient conditions. It is the responsibility of the installing contractor to assure that field-installed gasketing matches up with the wall opening or that additional material is used to assure a positive seal.

Figure 23: Mark IV Motorized Damper typical wiring diagram



Unit Operation Check List

- ☐ Connect supply power to the unit and confirm green LED illuminates on the Mark IV control board.
- ☐ Adjust all valves to their full open positions. Turn on the line power to all heat pumps.

Note: *Room temperature should be within the minimum-maximum ranges. During start-up checks, loop water temperature entering the heat pump should be between 55°F [13°C] and 90°F [32°C]. If either return air temperature or water temperature are at a minimum or maximum level, the other must be at normal condition for proper operation of the heat pump.*

- ☐ Adjust the unit thermostat to the fan only position and check for fan operation.
- ☐ With the thermostat in "Auto" adjust to minimum setpoint. Compressor start-up could take up to 6 minutes depending on thermostat configuration. Verify compressor operates and cool air is delivered. Complete start-up sheet beginning on page 32 of this manual. Confirm unit capacity is within 10% of the catalog THR. It is not necessary to connect refrigeration gauges unless unit troubleshooting is required and all external air and water conditions are verified to be adequate.
- ☐ Verify the condensate trap fills to provide a air seal with the drain system.
- ☐ Adjust thermostat to warmest setting and confirm compressor operation. Confirm warm air is delivered after a few minutes of operation.
- ☐ Check for vibration, noise and water leaks. Inspect piping and wiring for rubbing. Make adjustments as needed for rubbing lines or wiring. It is the responsibility of the installer to make final unit adjustments.
- ☐ If unit does not operate properly perform troubleshooting as needed.

Troubleshooting

Should a major problem develop, refer to the following information for possible cause and corrective steps.

Neither fan nor compressor runs:

1. The fuse may be blown or the circuit breaker is open. Check electrical circuits and motor windings for shorts or grounds. Investigate for possible overloading. Replace fuse or reset circuit breakers after fault is corrected.
2. Wires may be loose or broken. Replace or tighten.
3. Supply voltage may be too low. Check it with the power company.
4. Control system may be faulty. Check thermostat for correct wiring and check 24 volt transformer for burnout.

Fan operates but compressor does not:

1. Check capacitor.
2. Wires may be loose or broken. Replace or tighten.
3. The high pressure may have tripped due to:
   a. Fouled or plugged condenser.
   b. Lack of or no condenser water.
   c. Too warm condenser water.
   d. Not enough airflow over the coil due to dirty filters.
   e. Coil or fan motor failure.
4. The low temperature switch may have tripped due to:
   a. Fouled or plugged condenser.
   b. Lack of or no condenser water.
   c. Too cold condenser water.
   d. Not enough airflow over the coil due to dirty filters.
   e. Coil or fan motor failure.
5. Check thermostat setting, calibration and wiring.
6. The compressor overload protection is open. If the compressor dome is extremely hot, the overload will not reset until cooled down. If the overload is external, replace it. If the overload is internal, replace the compressor.
7. The internal winding of the compressor motor may be grounded to the compressor shell. If so, replace the compressor.
8. The compressor winding may be open. Check continuity with ohmmeter. If the winding is open, replace the compressor.

Compressor attempts to start but doesn't:

1. Check capacitor.
2. Check for defective compressor by making resistance check on winding.
3. Check run capacitor.

Compressor runs in short cycle:

1. Check thermostat mounting and location.
2. Check all relays, relaying and contacts.
3. Check run capacitor.
4. Check high pressure switch.
5. Check low temperature switch.
6. See if reversing valve has not fully shifted to either side.

Insufficient cooling or heating:

1. Check thermostat for improper location.
2. Airflow may be insufficient. Check and clean the filter, or placement of furniture or other articles that may cause restrictions such as drapes, etc.
3. The reversing valve may be defective, creating a bypass of refrigerant. If the unit will not heat, check the reversing valve coil.
4. Check capillary tubes for possible restriction of refrigerant flow.
5. Check for restriction in water flow.

Insufficient water flow through condenser:

1. Check to see that valves are open all the way.
2. Check for air in lines.
3. Check circulating pump.

Water drips from conditioner:

1. Check for plugged condensate drain.
2. Check for dirty filter.
3. Check to see if condensate drain runs uphill.
4. See if blower motor is up to speed.
5. Check for loose or mispositioned blower.
6. Are drains properly trapped?

Noisy unit operation:

1. Check for fan wheel hitting the housing. Adjust for clearance.
2. Check for bent fan wheel. Replace if damaged.
3. Check for loose fan wheel on shaft. Tighten.
4. Make sure compressor is floating free on its isolator mounts.
5. Check for tubing touching compressor or other surface. Readjust tubing by bending slightly.
6. Check screws on all panels. Tighten.
7. Check for chattering or humming in the contactor relays due to low voltage or a defective holding coil. Replace component.
8. Check water balance to unit for proper water flow rate.

Maintenance

1. Filter changes are required at the 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. It is suggested that the filter be checked 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.
2. The condensate drain pan should be checked annually and cleaned and flushed as required.

Note: *Mark IV/AC equipment has a condensate overflow control device. In cooling, if compressor will not operate, it may be due to unit compressor lockout on condensate overflow.*

3. Recording of performance measurement of volt amps and water temperature differences (both heating and cooling) is recommended. A comparison of logged data with start-up and other annual data is useful as an indicator of general equipment condition.
4. Inspect and clean air coil using a soft bristle brush and a vacuum as neccessary.
5. Inspect condensate drain lines twice per year and clean as needed to prevent build-up lint and other particles that could cause overflow.
6. Periodic lockouts almost always are caused by air or water problems. The lockout (shutdown) of the conditioner is a normal protective result. Check for dirt in the water system, water flow rates, water temperature, airflow rates (may be 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.
7. When checking unit operation, it is important to gather the correct information.
   a. Take voltage reading.
   b. Amp reading in both cooling and heating mode operation. Fan and compressor Amp readings should be recorded annually and should not be greater than 10% over nameplate rating.
   c. Water temperature difference in both cooling and heating mode.
   d. Air temperature difference in both cooling and heating mode. Air temperature difference in cooling mode should include both wet and dry bulb temperatures.
8. Also record model, catalog, and serial numbers.

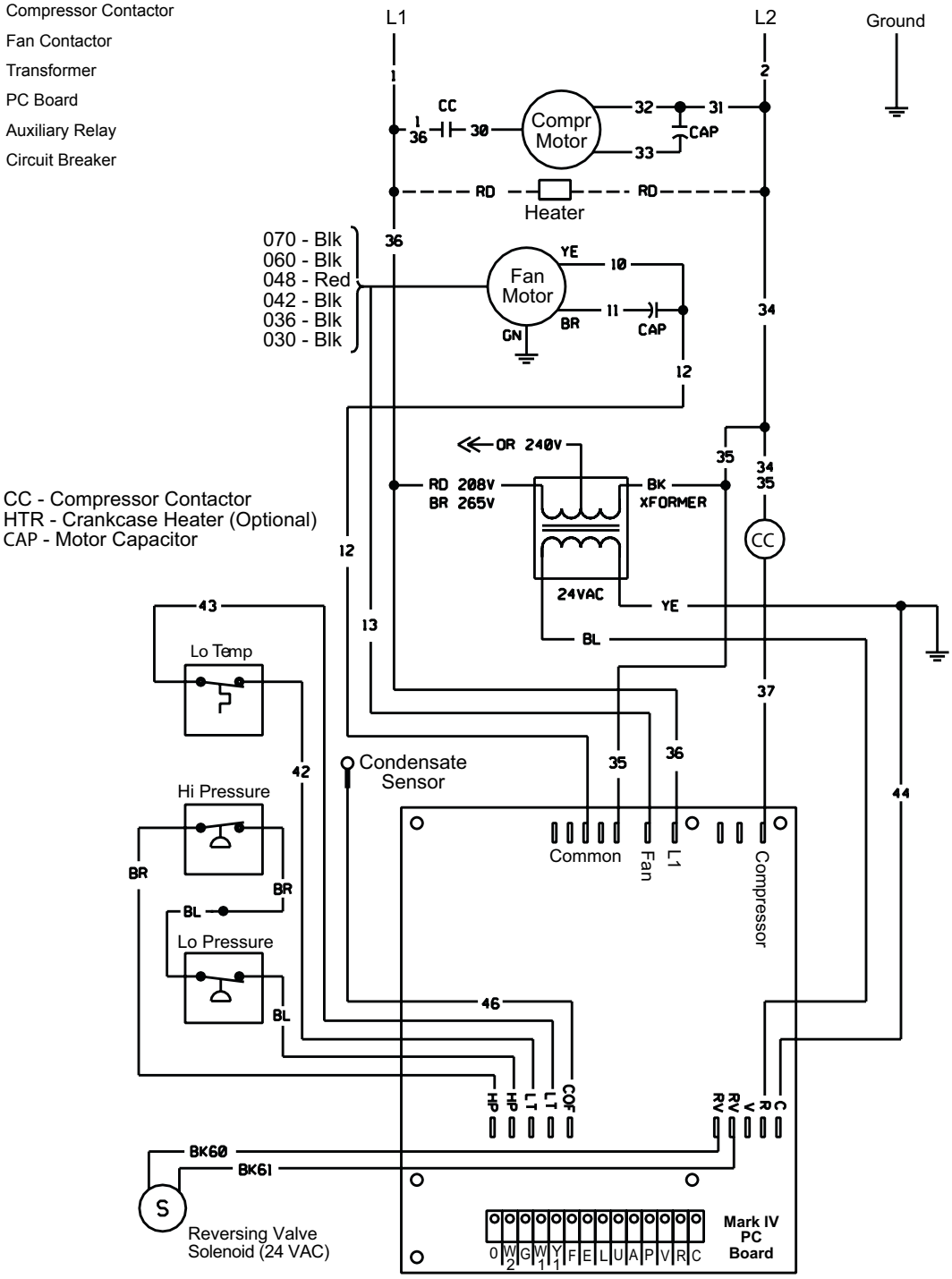
NOTICE

It is not neccesary or recommended to check refrigerant pressures on a regular schedule. They should only be checked if a water and air side evaluation would require further evaluation of the unit performance.

Typical Mark IV/AC

Component Layout

1 Compressor Contactor
2 Fan Contactor
3 Transformer
4 PC Board
5 Auxiliary Relay
6 Circuit Breaker



Notes:

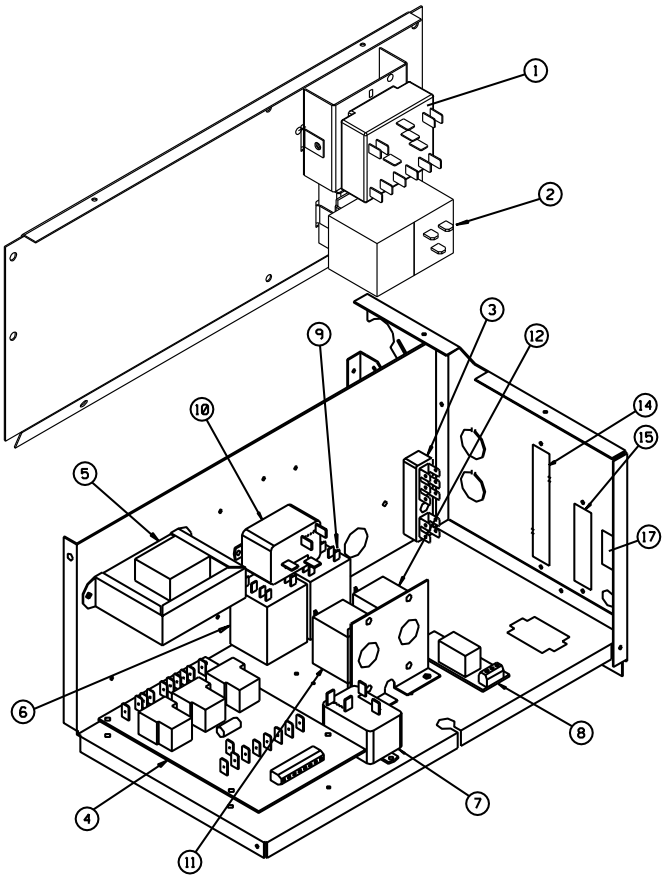
1. Unit is factory wired for 208V operation. If 230V power supply is used, transformer must be rewired by disconnecting the power lead from the red transformerprimary wire and connecting the power lead to the orange transformer primary wire. Place an insulation cap on the red transformer primary wire.
2. All temperature and pressure switches are normally closed.
3. Component layout shown below is typical. Some components may not be used on this model or voltage.
4. Mark IV/AC controller board contains a static sensitive microprocessor. Proper grounding of field service personnel should be observed or damage to controller may result.
5. Terminal block on Mark IV/AC board provides 24 VAC at terminals R and C. All other outputs are 24 VDC.
6. Field supplied relays installed on the input terminals (W1, W2, Y1 or G) may interfere with proper unit operation. Never install relay coils in series with inputs.
7. For more information pertaining to the Mark IV/AC controller, refer to OM120.

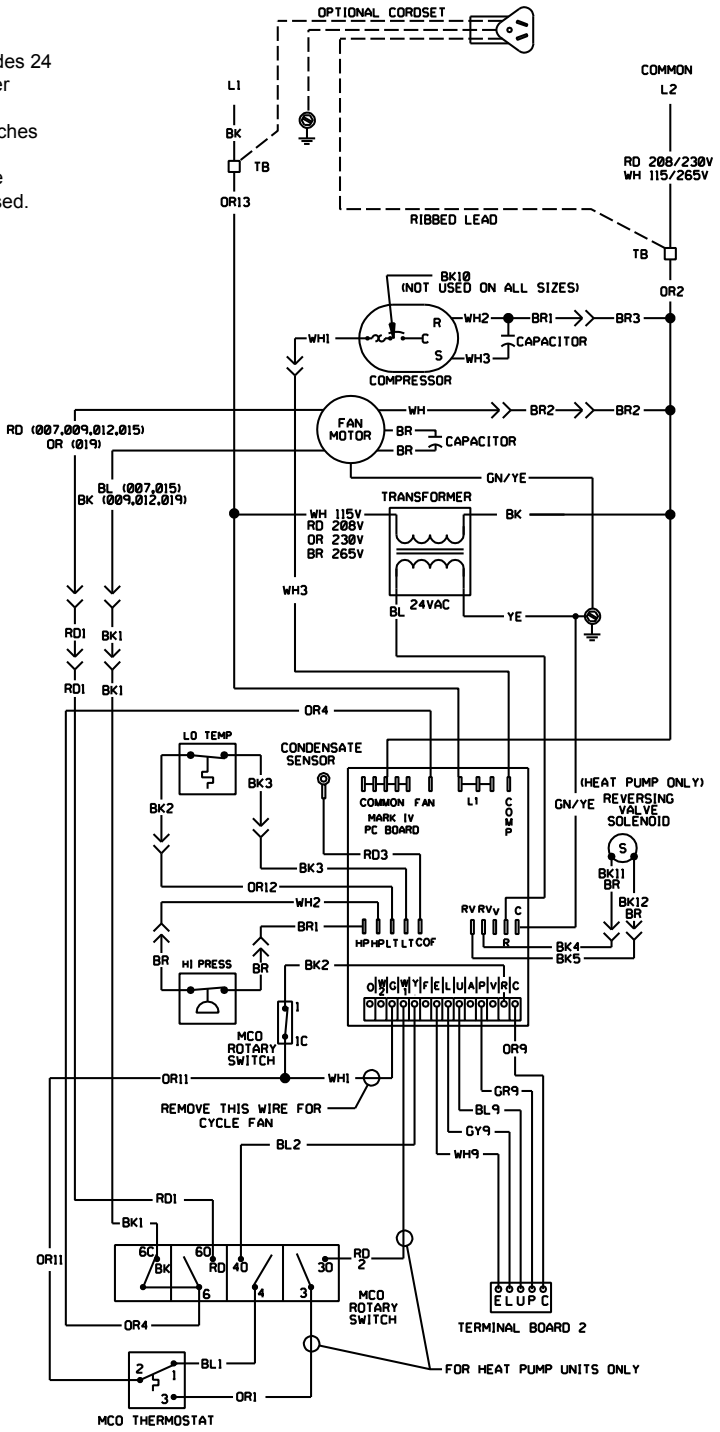
Console WSHP Size 009–019, All Voltages, 60Hz / Single Phase, Mark IV Board with Manual Changeover (MCO)

» - Plug Connection
TB - Terminal Block
ACO - Automatic Changeover
MCO - Manual Changeover
BR - Boilerless Relay
HR - Heater Relay

Component Layout
1. Rotary Switch
2. Thermostat
3. Terminal Block
4. PC Board
5. Transformer
6. Boilerless Relay
7. Shutdown Relay
8. Auxiliary Relay
9. Heater Relay
10. Water Reg Valve Relay
11. Low Limit Thermostat
12. Night Setback Thermostat
14. Terminal Board 1
15. Terminal Board 2
17. Standby Electric Heat Switch

Notes:
1. Terminal block on PC board provides 24 VAC at terminals C and R. All other terminals are 24 VDC output.
2. All temperature and pressure switches are normally closed.
3. Component layout is typical, some components shown may not be used.



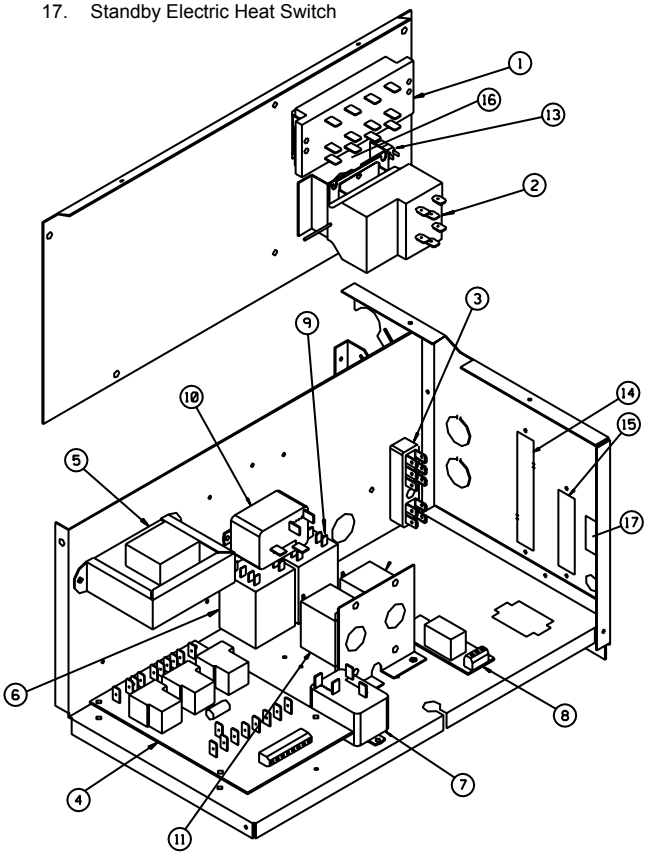


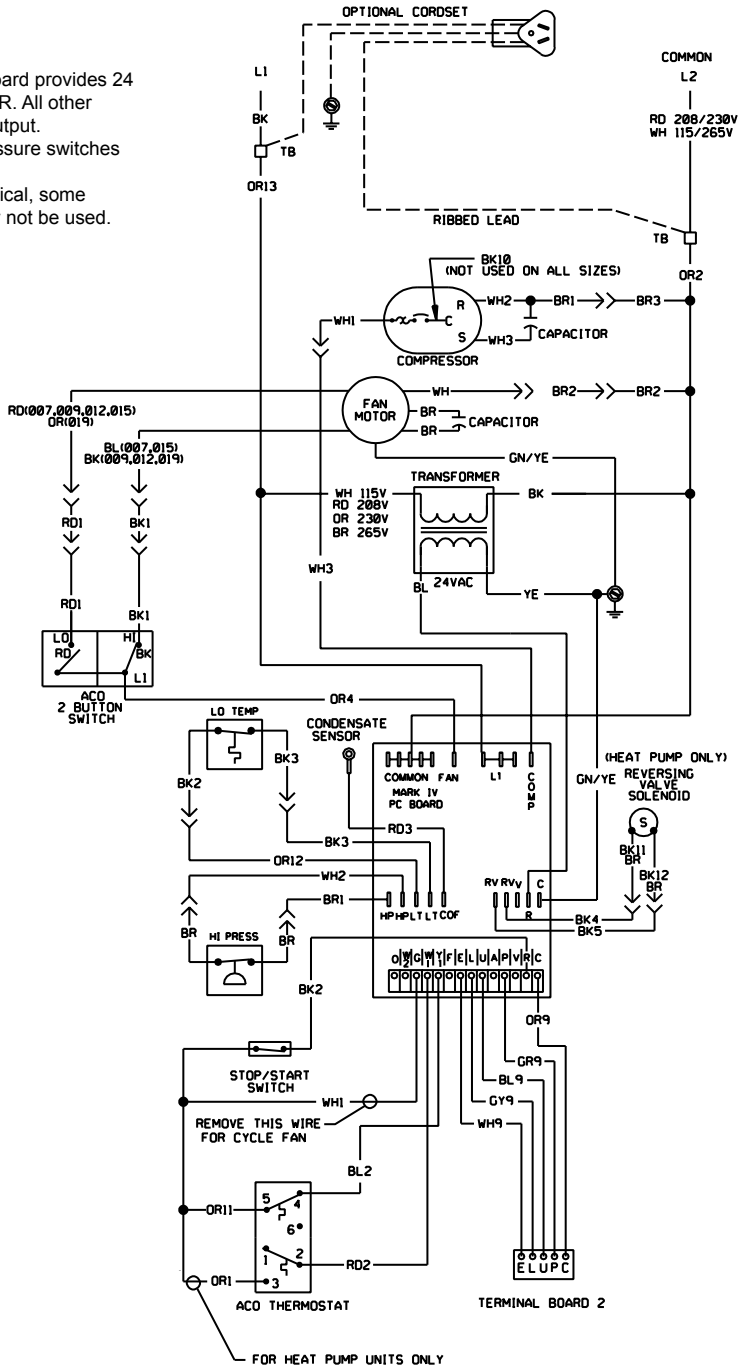
Console WSHP Size 009–019, All Voltages, 60Hz / Single Phase, Mark IV Board with Auto Changeover (ACO)

» - Plug Connection
TB - Terminal Block
ACO - Automatic Changeover
MCO - Manual Changeover
BR - Boilerless Relay
HR - Heater Relay

Component Layout
1. Tap-Touch Switch
2. Thermostat
3. Terminal Block
4. PC Board
5. Transformer
6. Boilerless Relay
7. Shutdown Relay
8. Auxiliary Relay
9. Heater Relay
10. Water Reg Valve Relay
11. Low Limit Thermostat
12. Night Setback Thermostat
13. Override Switch
14. Terminal Board 1
15. Terminal Board 2
16. Stop/Start Switch
17. Standby Electric Heat Switch

Notes:
1. Terminal block on PC board provides 24 VAC at terminals C and R. All other terminals are 24 VDC output.
2. All temperature and pressure switches are normally closed.
3. Component layout is typical, some components shown may not be used.



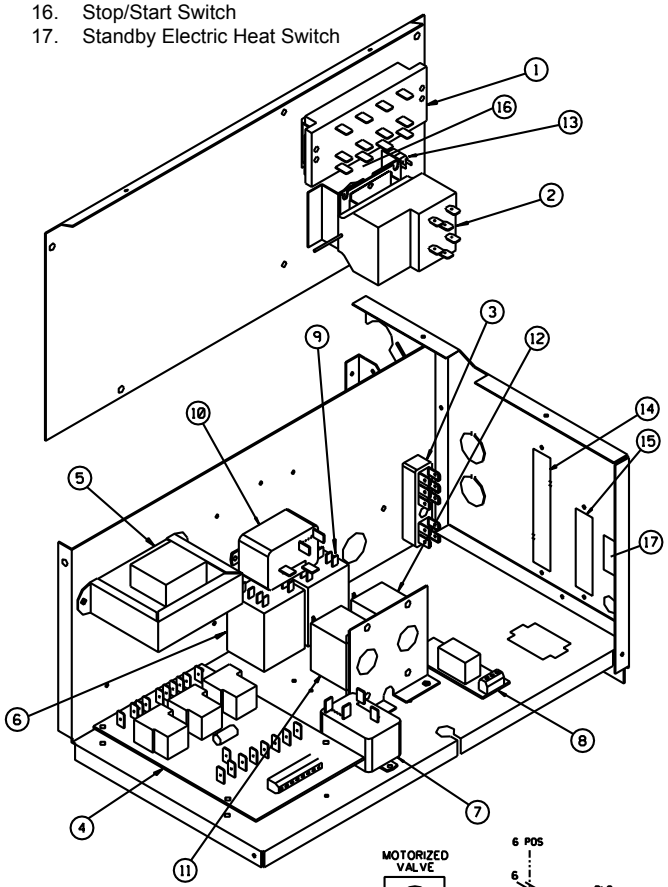


Console WSHP Size 009–019, All Voltages, 60Hz / Single Phase, Mark IV Board with Auto Changeover (ACO) Remote Thermostat

» - Plug Connection
TB - Terminal Block
ACO - Automatic Changeover
MCO - Manual Changeover
BR - Boilerless Relay
HR - Heater Relay

Component Layout
1. Tap-Touch Switch
2. Thermostat
3. Terminal Block
4. PC Board
5. Transformer
6. Boilerless Relay
7. Shutdown Relay
8. Auxiliary Relay
9. Heater Relay
10. Water Reg Valve Relay
11. Low Limit Thermostat
12. Night Setback Thermostat
13. Override Switch
14. Terminal Board 1
15. Terminal Board 2
16. Stop/Start Switch
17. Standby Electric Heat Switch

Notes:
1. Terminal block on PC board provides 24 VAC at terminals C and R. All other terminals are 24 VDC output.
2. All temperature and pressure switches are normally closed.
3. Component layout is typical, some components shown may not be used.

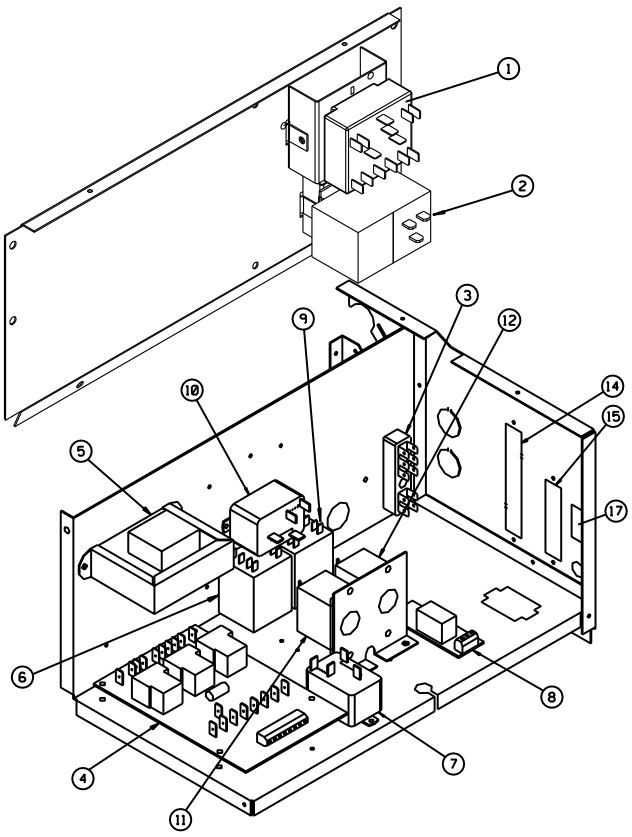


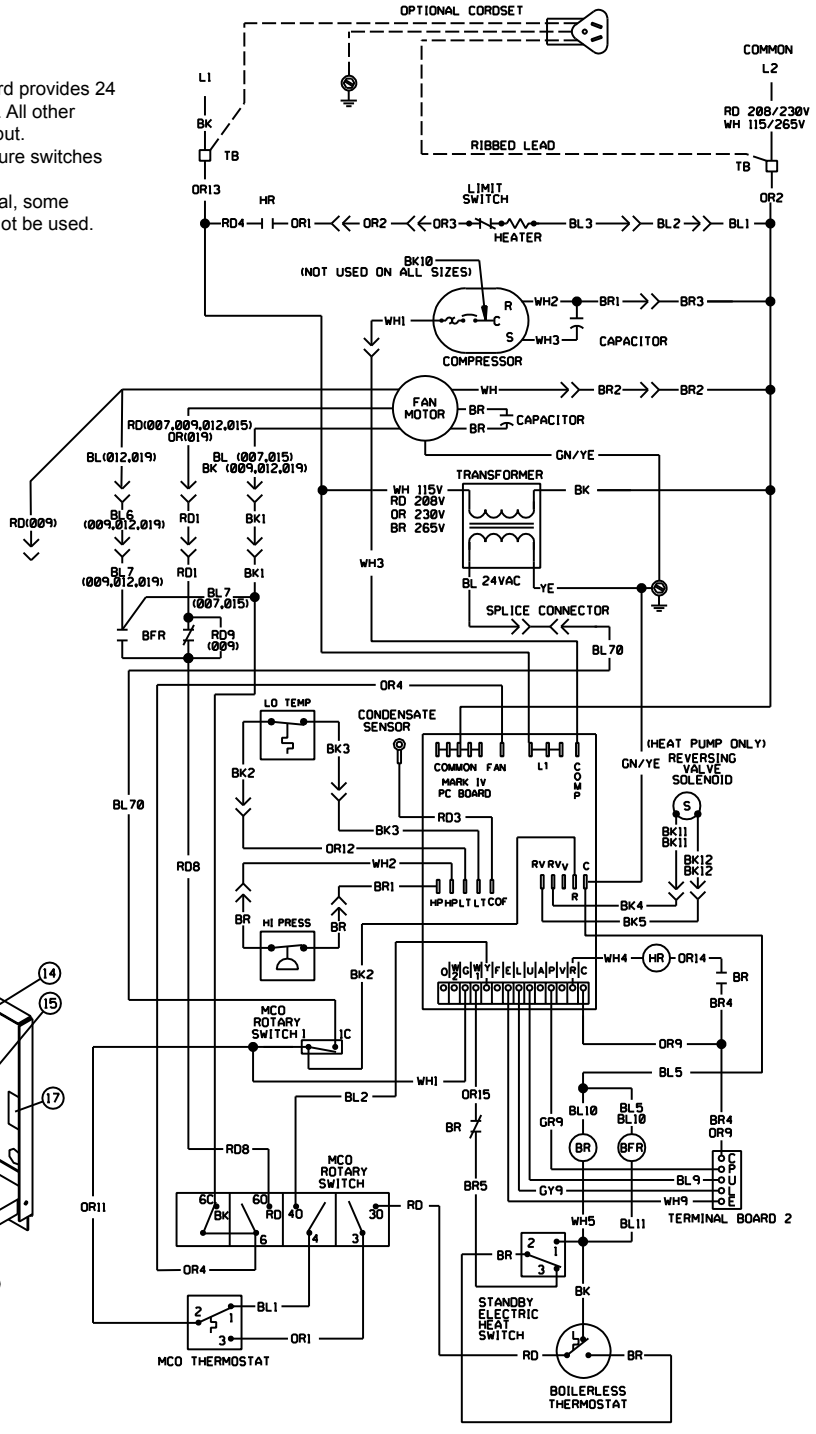
Console WSHP Size 009–019, All Voltages, 60Hz / Single Phase, Mark IV Board with Manual Changeover (MCO) Boilerless Constant Fan

>> - Plug Connection
TB - Terminal Block
ACO - Automatic Changeover
MCO - Manual Changeover
BR - Boilerless Relay
HR - Heater Relay

Component Layout
1. Rotary Switch
2. Thermostat
3. Terminal Block
4. PC Board
5. Transformer
6. Boilerless Relay
7. Shutdown Relay
8. Auxiliary Relay
9. Heater Relay
10. Water Reg Valve Relay
11. Low Limit Thermostat
12. Night Setback Thermostat
14. Terminal Board 1
15. Terminal Board 2
17. Standby Electric Heat Switch

Notes:
1. Terminal block on PC board provides 24 VAC at terminals C and R. All other terminals are 24 VDC output.
2. All temperature and pressure switches are normally closed.
3. Component layout is typical, some components shown may not be used.



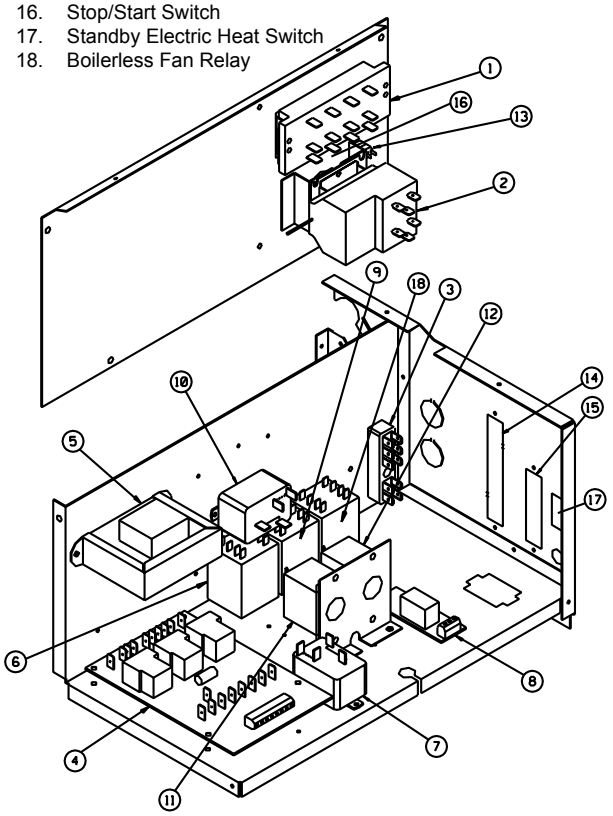


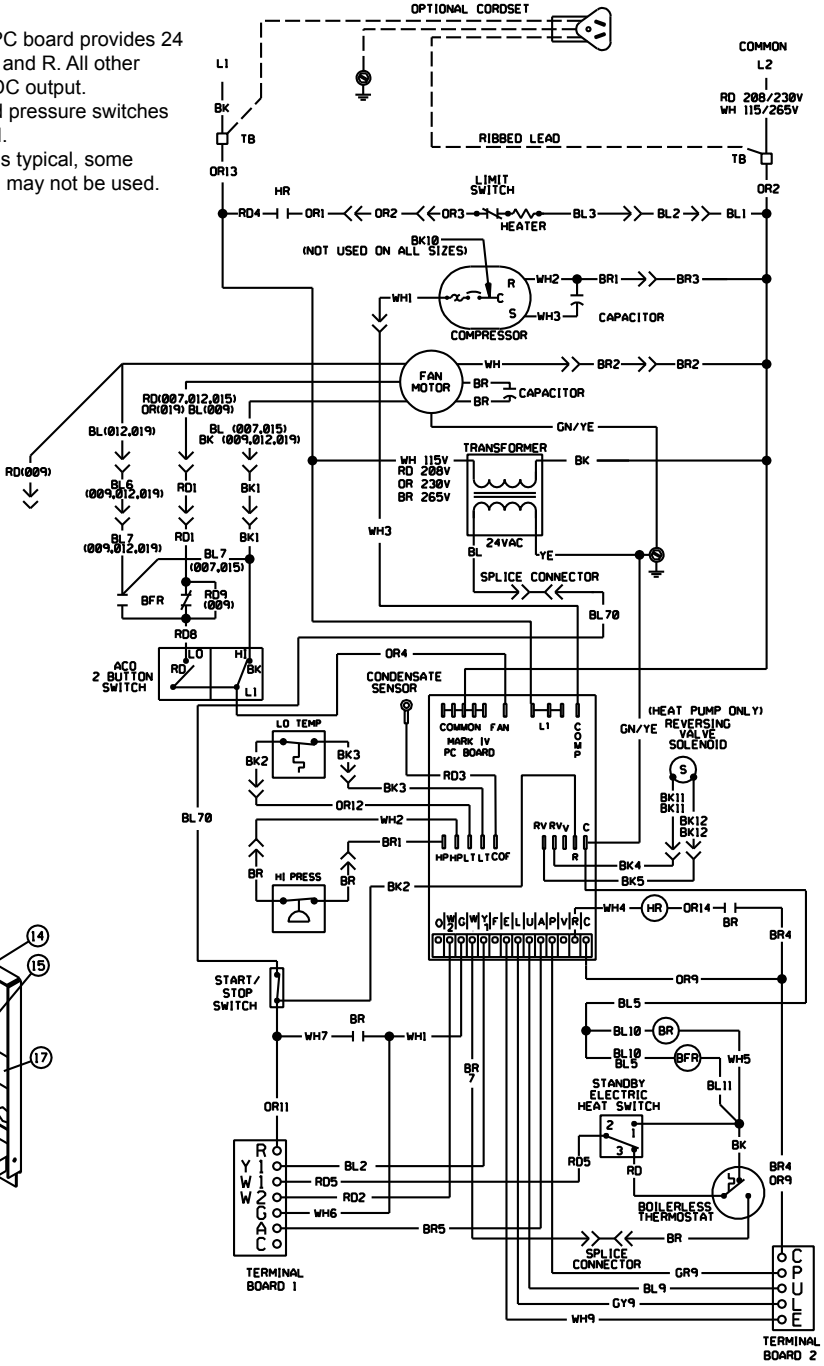
Console WSHP Size 009–019, All Voltages, 60Hz / Single Phase, Mark IV Board with Auto Changeover (ACO) Boilerless with Remote Thermostat

» - Plug Connection
TB - Terminal Block
ACO - Automatic Changeover
MCO - Manual Changeover
BR - Boilerless Relay
HR - Heater Relay

Component Layout
1. Tap-Touch Switch
2. Thermostat
3. Terminal Block
4. PC Board
5. Transformer
6. Boilerless Relay
7. Shutdown Relay
8. Auxiliary Relay
9. Heater Relay
10. Water Reg Valve Relay
11. Low Limit Thermostat
12. Night Setback Thermostat
13. Override Switch
14. Terminal Board 1
15. Terminal Board 2
16. Stop/Start Switch
17. Standby Electric Heat Switch
18. Boilerless Fan Relay

Notes:
1. Terminal block on PC board provides 24 VAC at terminals C and R. All other terminals are 24 VDC output.
2. All temperature and pressure switches are normally closed.
3. Component layout is typical, some components shown may not be used.





DAIKIN

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

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 locatons 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 specificaton 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.

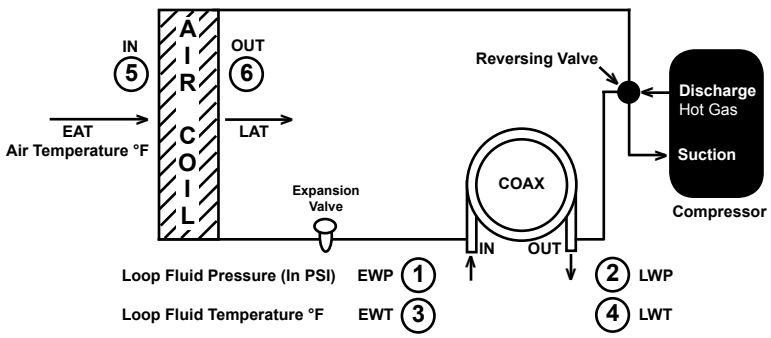
Air Temperature Rise / Drop through the air coil **ΔT x CFM x 1.08 = BTUH Sensible**

(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
EWP - Entering Water Pressure
EAT - Entering Air Temperature
Δ- Delta (Differential)
LWT - Leaving Water Temperature
LWP - Leaving Water Pressure
LAT - Leaving Air Temperature
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 page 2)

	Model	Serial #	H.P. #	EWT ③	LWT ④	EWP ①	LWP ②	EAT ⑤	LAT ⑥	Volts	Amps Cooling	Check Air Filter and Coil	Comments (more comments on back)
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													
14.													
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16.													
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34.													
35.													
36.													
37.													
38.													
39.													
40.													
41.													
42.													

Part No._____

Notes / Comments

Daikin Applied Training and Development

Now that you have made an investment in modern, efficient Daikin equipment, its care should be a high priority. For training information on all Daikin 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 equipment is sold pursuant to its standard terms and conditions of sale, including 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.