

# SMARTSOURCE®

## CONSOLE WATER SOURCE HEAT PUMP



- MODEL WSRC
- 1/2 TO 1-1/2 TONS
- R-32 REFRIGERANT

<b>Safety Information</b> .....	<b>3</b>	<b>Electrical</b> .....	<b>24</b>
Hazard Identification .....	3	Standard Electrical Connection .....	24
Safety Considerations .....	3	Low Voltage Wire Connections .....	25
UL Compliance Statements for Unit Work .....	4	Typical Wiring Diagrams .....	26
Unit Labels .....	4	Typical Connections for Thermostats & Temperature Sensors Applications .....	33
<b>Introduction</b> .....	<b>5</b>	<b>Operation</b> .....	<b>34</b>
Model Nomenclature .....	5	Start-Up .....	34
<b>Installation</b> .....	<b>8</b>	Controls .....	35
Receiving and Handling .....	8	Configuration DIP Switches .....	37
Operating Limits .....	8	MicroTech SmartSource Unit Controller .....	38
Pre-Installation .....	9	MT2300 Controller with an Optional BACnet Communication Module .....	40
Unit Location .....	10	<b>Maintenance</b> .....	<b>41</b>
Unit Installation (Recommended) .....	10	Charging .....	41
Alternate Unit Installation .....	12	General Maintenance .....	41
Installation with Optional Cabinet Rear Extension ..	13	Troubleshooting .....	42
Water Piping .....	15	<b>Refrigerant Information</b> .....	<b>43</b>
Water Connections .....	16	Refrigerant Guidelines .....	43
Water System Quality .....	18	Typical Refrigeration Cycles .....	46
Cleaning & Flushing System .....	19	<b>Appendix</b> .....	<b>48</b>
<b>Field Installed Accessories</b> .....	<b>20</b>	Warranty Registration Form .....	48
Wireless Temperature Control .....	20	Limited Product Warranty .....	51
Multiple Unit Control Panel (MUCP) for Use with MicroTech Unit Controller .....	20		
Outside Air Damper .....	21		
Motorized Isolation Valve & Relay .....	22		



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# Safety Information

## Hazard Identification

### DANGER

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

### WARNING

Warning indicates a potentially hazardous situations, which can result in property damage, personal injury, or death if not avoided.

### CAUTION

Caution indicates a potentially hazardous situations, which can result in minor injury or equipment damage if not avoided.

### NOTICE

Notice indicates practices not related to physical injury.

**NOTE:** Indicates important details or clarifying statements for information presented in Figures or Tables.

## Safety Considerations

This manual provides installation and maintenance information for Daikin Applied SMARTSOURCE CONSOLE WATER SOURCE HEAT PUMP with a MicroTech® controller.

A means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules for stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III.

### DANGER

**LOCKOUT/TAGOUT** all power sources prior to service, pressurizing, depressurizing, or powering down the unit. Failure to follow this warning exactly can result in serious injury or death. Disconnect electrical power before servicing the equipment. More than one disconnect may be required to de-energize the unit. Be sure to read and understand the installation, operation, and service instructions within this manual.

### WARNING

Electric shock hazard. Improper handling of this equipment can cause personal injury or equipment damage. This equipment must be properly grounded. Connections to and service of the MicroTech control panel must be performed only by personnel that are knowledgeable in the operation of the equipment being controlled.

### WARNING

When moving flammable A2L refrigerant to/from the unit from an auxiliary tank, a grounding strap must be used. An electrical charge builds when halo-carbon refrigerant travels in a rubber hose. A grounding strap must be used between the auxiliary refrigerant tank and the unit's end sheet (earth ground), which will safely take the charge to the ground. A fire risk could occur if this procedure is not followed.

### WARNING



This unit contains R-32, a class A2L refrigerant that is flammable. This unit should only be installed, serviced, repaired, and disposed of by qualified personnel licensed or certified in their jurisdiction to work with R-32 refrigerant. Installation and maintenance must be done in accordance with this manual. Improper handling of this equipment can cause equipment damage or personal injury.

For installation only in locations not accessible to the general public.

Be aware that R-32 refrigerant may not contain an odor. Place in a well ventilated area to prevent accumulation of refrigerant. When installing the unit in a small room, take measures to keep the refrigerant concentration from exceeding allowable safety limits. Excessive refrigerant leaks, in the event of an accident in a closed ambient space, can lead to oxygen deficiency.

Do not pierce or burn this unit.

Never use an open flame during service or repair. Never store in a room with continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater.), where there is ignitable dust suspension in the air, or where volatile flammables such as thinner or gasoline are handled.

Only use pipes, nuts, and tools intended for exclusive use with R-32 refrigerant in compliance with national codes (ASHRAE15 or IRC).

Do not mix air or gas other than R-32 in the refrigerant system. If air enters the refrigerant system, an excessively high pressure results, which may cause equipment damage or injury.

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

For more information, consult "Refrigerant Guidelines" on page 43.

### WARNING

Polyester Oil, commonly known as POE oil is a synthetic oil used in many refrigeration systems, and may be present in this Daikin Applied 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. Refer to the pipe manufacturer's recommendations to determine suitable applications of the pipe.

### WARNING

This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with this instruction manual, it may cause interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the owner will be required to correct the interference at the owner's own expense.

Daikin Applied disclaims any liability resulting from any interference or for the correction thereof.

### CAUTION

Static sensitive components. A static discharge while handling electronic circuit boards can cause damage to the components. Discharge any static electrical charge by touching the bare metal inside the control panel before performing any service work. Never unplug any cables, circuit board terminal blocks, or power plugs while power is applied to the panel.

**NOTICE**

**QUEBEC DISCLOSURE REGARDING AVAILABILITY OF REPLACEMENT PARTS, REPAIR SERVICES AND INFORMATION FOR MAINTENANCE AND REPAIR:** Daikin Applied Americas Inc. (Daikin Applied) does not guarantee the availability of (1) replacement parts; (2) repair services; and (3) information necessary to maintain or repair products, within the meaning of section 39.1 of the Consumer Protection Act, CQLR, c P-40.1 and section 79.18 of the Regulation respecting the application of the Consumer Protection Act, CQLR, c P-40.1, r. 3.

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**NOTICE**

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

- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.
- Equipment not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children shall not be allowed to play on or with equipment.
- If unit is permanently connected to water main; hose sets are not to be used.

## Unit Labels

Pictogram warning and informational labels may be present on the unit. Consult the table below for reference.

Label	Description
 Refrigerant class per ISO 817	WARNING - flammable refrigerant present
	Read the technical manual for service instructions
	WARNING - A2L low-burning velocity refrigerant present
	Pressurized medium present
	Ultraviolet (UV) radiation present
	Read the technical manual for instructions
	WARNING - flammable refrigerant present

## UL Compliance Statements for Unit Work

- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.
- Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i. e. non-sparking, adequately sealed or intrinsically safe.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available at hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- No person carrying out work in relation to a refrigeration system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space.
- Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards. Safety checks are necessary to ensure that the risk of ignition is minimized and "No Smoking" signs shall be displayed.



# Introduction

## Model Nomenclature

1	2-4	5	6-8	9	10	11	12	13	14-15	16-17	18	19	20	21-22	23	24-26	27-29	30-32	33	34	35-37	38	39	40	41	42	43	44
W	SRC	1	007	M	E	H	B	T	01	S2	A	C	Y	YY	L	UPY	YYY	YYY	A	Y	50V	Y	S	Y	D	1	L	1

Category	Code Option	Code	=	Description
Product Category	1	W	=	Water Source Heat Pump
Model Type	2-4	SRC	=	SmartSource Console
Design Series (Vintage)	5	1	=	Design Series 1
Nominal Capacity	6-8	007	=	7,000 Btu/h Nominal Cooling
		009	=	9,000 Btu/h Nominal Cooling
		012	=	12,000 Btu/h Nominal Cooling
		015	=	15,000 Btu/h Nominal Cooling
		018	=	18,000 Btu/h Nominal Cooling
Controls	9	M	=	MicroTech Unit Controller
		B	=	MicroTech Unit Controller + BACnet
Voltage	10	A	=	115/60/1 (Sizes 007-012)
		E	=	208-230/60/1
		J	=	265/60/1
Cabinet Height	11	H	=	High Sill (25")
		L	=	Low Sill (22.5")
Return Air/Corrosion Protection	12	B	=	Bottom Return Air (High Sill)
		F	=	Front Return Air (Low Sill)
		N	=	Bottom Return Air with Corrosion Protection (High Sill)
		M	=	Front Return Air with Corrosion Protection (Low Sill)
Discharge Air	13	T	=	Top Discharge
Fan Motor Options	14-15	01	=	PSC
Cabinet Type	16	A	=	Flat Top with 12" Extended End Pocket (High Sill)
		B	=	Slope Top with 12" Extended End Pocket (High Sill)
		F	=	Flat Top
		S	=	Slope Top
Discharge Grille	17	C	=	Chassis Only (N/A with 12" Extended End Pocket Option)
		2	=	Standard Stamped Louver - Painted Steel
		3	=	Multi-Directional Grille - Plastic (N/A with Electric Heat Option)
Construction Type	18	A	=	1/2" Fiberglass Insulation
		E	=	3/8" Closed Cell Foam (IAQ)
Water to Refrigerant Heat Exchanger Construction	19	C	=	Copper Inner Tube - Steel Outer Tube
		S	=	Cupronickel Inner Tube - Steel Outer Tube
		G	=	Copper Inner Tube - Steel Outer Tube (Geothermal)
		J	=	Cupronickel Inner Tube - Steel Outer Tube (Geothermal)
Heating Options	20	2	=	2.5 kW Electric Heat (Sizes 007-012, with 208-230/60/1 or 265/60/1 Electrical)
		3	=	3.5 kW Electric Heat (Sizes 015-018)
		Y	=	None
Future Use	21-22	YY	=	None

1	2-4	5	6-8	9	10	11	12	13	14-15	16-17	18	19	20	21-22	23	24-26	27-29	30-32	33	34	35-37	38	39	40	41	42	43	44
W	SRC	1	007	M	E	H	B	T	01	S2	A	C	Y	YY	L	UPY	YYY	YYY	A	Y	50V	Y	S	Y	D	1	L	1

Category	Code Option	Code	=	Description
Piping Hand	23	L	=	Left
		R	=	Right
Thermostat Control	24	R	=	Wireless
		S	=	Remote Wall Mounted Space Sensor with NSB Override
		U	=	Unit Mounted Thermostat
		W	=	Remote Wall Mounted Thermostat with Unit Mounted Fan Speed Switch
Thermostat Programmability	25	N	=	Non-Programmable
		P	=	Programmable
		Y	=	None
Thermostat Option	26	L	=	Low Limit Control
		M	=	Low Limit Control and Unit Mounted NSB Override Switch
		P	=	NSB Override Switch
		Y	=	None
Specials	27-29	YYY	=	None
		XXX	=	Special
Options	30-32	YYY	=	None
		B02	=	2" Rear Extension
		B04	=	4" Rear Extension
		B06	=	6" Rear Extension
Refrigerant	33	A	=	R-32
Power Connection	34	Y	=	None
		C	=	Unit Mounted 20A Plug and Cord
		D	=	Unit Mounted 20A Plug and Cord with Fused Disconnect Switch (High Sill Only)
		E	=	Unit Mounted 20A Plug and Cord with Non-Fused Disconnect Switch (High Sill Only)
Cabinet Electrical	35-37	50V	=	50VA
		75V	=	75VA
Water Flow Control	38	H	=	2-Way Motorized Isolation Valve, High Close-Off Pressure N.C. (Normally Closed)
		P	=	2-Way Motorized Isolation Valve, High Close-Off Pressure N.C. (Normally Closed); Supply, Return, and Bypass Hand Valves; Air Vent; Auto Flow Valve
		R	=	Supply, Return and Bypass Valves; Air Vent
		W	=	2-Way Motorized Isolation Valve, High Close-Off Pressure N.C. (Normally Closed); Supply, Return, and Bypass Hand Valves; Air Vent
		Y	=	None

1	2-4	5	6-8	9	10	11	12	13	14-15	16-17	18	19	20	21-22	23	24-26	27-29	30-32	33	34	35-37	38	39	40	41	42	43	44
W	SRC	1	007	M	E	H	B	T	01	S2	A	C	Y	YY	L	UPY	YYY	YYY	A	Y	50V	Y	S	Y	D	1	L	1

Category	Code Option	Code	=	Description	
Color	39	S	=	Antique Ivory Cabinet with Oxford Brown Grille and Subbase	Available with Stamped Louver or Multi-Directional Grille Options
		T	=	Antique Ivory Cabinet and Grille with Oxford Brown Subbase	
		B	=	Antique Ivory Cabinet, Grille and Subbase	
		D	=	Cupola White Cabinet with Oxford Brown Grille and Subbase	
		P	=	Cupola White Cabinet and Grille with Oxford Brown Subbase	
		E	=	Cupola White Cabinet, Grille and Subbase	
		G	=	Off White Cabinet with Oxford Brown Grille and Subbase	
		K	=	Putty Beige Cabinet with Oxford Brown Grille and Subbase	
		V	=	Soft Grey Cabinet with Oxford Brown Grille and Subbase	
		F	=	Off White Cabinet and Grille with Oxford Brown Subbase	Available with Stamped Louver Grille Option Only
	40	H	=	Off White Cabinet, Grille and Subbase	
		R	=	Putty Beige Cabinet and Grille with Oxford Brown Subbase	
		L	=	Putty Beige Cabinet, Grille and Subbase	
		J	=	Soft Grey Cabinet and Grille with Oxford Brown Subbase	
		N	=	Soft Grey Cabinet, Grille and Subbase	
		Y	=	None (Chassis Only Option)	
Outside Air	40	Y	=	None	
Agency Type	41	D	=	ETL, CETL, AHRI	
Packaging	42	1	=	Standard	
Extended Warranty	43	L	=	First Year Labor Allowance	
		M	=	1 Year Extended Compressor Only Parts Warranty with 1st Year Labor Allowance	
		N	=	1 Year Extended Refrigerant Circuit Parts Warranty with 1st Year Labor Allowance	
		S	=	1 Year Extended Complete Unit Parts Warranty with 1st Year Labor Allowance	
		F	=	4 Year Extended Compressor Only Parts Warranty with 1st Year Labor Allowance	
		H	=	4 Year Extended Refrigerant Circuit Parts Warranty with 1st Year Labor Allowance	
		J	=	4 Year Extended Complete Unit Parts Warranty with 1st Year Labor Allowance	
		T	=	4 Year Extended Complete Unit Parts Warranty with 5 Year Labor Allowance	
Product Style	44	1	=	Style 1	

# Installation



## WARNING

The installer must determine and follow all applicable local and national 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, personal injury or death. This equipment must be installed by experienced, trained personnel only.



## WARNING

This appliance shall be installed in accordance with national wiring regulations (national electric code, Canadian electric code).

# Receiving and Handling



## CAUTION

Use care and wear protective clothing, safety glasses, and gloves when handling parts and servicing heat pumps. Sharp edges can cause minor injury. Avoid contact with them.

Carefully check equipment against the bill of lading to ensure all items have been received. Before unloading any unit, check the nameplate to make sure the voltage complies with the power supply available.

Inspect all units for damage upon arrival. If a unit has become dirty during shipment, carefully clean it prior to completing the inspection. Daikin Applied is not responsible for physical damage after the unit leaves the factory unless the contract with Daikin Applied states otherwise.

## NOTICE

All units should be carefully inspected for damage when received. Report all loss or shipping damage using a claim form supplied by Daikin Applied.

**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.

**CONCEALED LOSS OR DAMAGE:** Concealed loss or damage means loss or damage which does not become apparent until the unit has been unpacked or unwrapped. The contents may be damaged in transit due to rough handling even though the exterior may not show damages. When the damage is discovered, make a written request for inspection by the carrier's agent within **five (5) days** of the delivery date and file a claim with the form provided by Daikin Applied. Refer to the Daikin Applied Freight Policy for further information.

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 up-ended positioning unavoidable, do not operate the machine until it has been in the normal upright position for at least 24 hours.

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.

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. If plastic film is not available, the shipping carton may be modified to cover the units during construction. Damage

DAIKIN APPLIED

to the unit due to a failure to protect it during finishing of the building is not covered by the warranty.

# Operating Limits

## Environmental Limits

**This equipment is designed for indoor installation only.**

Sheltered locations such as attics, garages, etc., will not provide sufficient protection against extremes in temperature and/or humidity, and equipment performance, reliability, and service life may be adversely affected.

## NOTICE

Altitude Limits: Maximum applied altitude not to exceed 3,000 m/9,843 ft.

## NOTICE

The maximum water temperature is 120°F (49°C) and the minimum brine temperature is 25°F (-4°C). The maximum water pressure is 500 psi (3,447 kPa) through the coaxial coil and the minimum water pressure is 0 psi (0 kPa).

# Initial Unit Start-Up Temperature Range

## NOTICE

This is not for continuous operation. It is assumed that such a start-up is for the purpose of bringing the building space up to occupancy temperature.

## Standard range units

Units are designed to start in an ambient of 50°F (10°C), with entering air at 50°F (10°C), with entering water at 70°F (21°C), with both air and water at the flow rates used in the ISO 13256-1 rating test, for initial start-up in winter.

## Extended range units

Extended range heat pump conditioners are designed to start in an ambient of 40°F (4°C), with entering air at 40°F (4°C), with entering water at 40°F (4°C), with both air and water at the flow rates used in the ISO 13256-1 rating test, for initial start-up in winter.

**Table 1: Air Limits in °F (°C)**

Air Limits	Standard Range Units		Extended Range (Geothermal) Units	
	Cooling (DB/WB)	Heat-ing	Cooling (DB/WB)	Heat-ing
<b>Minimum Ambient Air<sup>1</sup></b>	50°F (10°C)	50°F (10°C)	40°F (4°C)	40°F (4°C)
<b>Maximum Ambient Air<sup>2</sup></b>	100°F/77°F (38°C/25°C)	85°F (29°C)	100°F/77°F (38°C/25°C)	85°F (29°C)
<b>Minimum Entering Air<sup>1</sup></b>	65°F/55°F (18°C/13°C)	50°F (10°C)	65°F/55°F (18°C/13°C)	50°F (10°C)
<b>Common Design Entering Air</b>	75°F/63°F (24°C/17°C)	70°F (21°C)	75°F/63°F (24°C/17°C)	70°F (21°C)
<b>Maximum Entering Air<sup>2</sup></b>	85°F/71°F (29°C/22°C)	80°F (27°C)	85°F/71°F (29°C/22°C)	80°F (27°C)

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

<sup>2</sup> This is not for continuous operation. It is assumed that such a start-up is for the purpose of bringing the building space up to occupancy temperature.



**Table 2: Fluid Limits**

Fluid Limits	Standard Range Units		Extended Range (Geothermal) Units	
	Cooling	Heating	Cooling	Heating
<b>Minimum Entering Fluid</b>	55°F (13°C)	55°F (13°C)	30°F (-1°C)	25°F (-4°C)
<b>Common Design Entering Fluid</b>	85-90°F (29-32°C)	70°F (21°C)	90°F (32°C)	35-60°F (1.5-16°C)
<b>Maximum Entering Fluid</b>	120°F (49°C)	90°F (32°C)	120°F (49°C)	90°F (32°C)
<b>Minimum GPM/Ton</b>	1.5			
<b>Nominal GPM/Ton</b>	3.0			
<b>Maximum GPM/Ton</b>	4.0			

## Antifreeze



### CAUTION

Do not use an automotive-grade antifreeze. Industrial grade glycols must be used. Automotive antifreeze contains inhibitors which will cause plating on the copper components used with the unit. The type and handling of glycol used must be consistent with local codes.

Glycols and other alcohols are commonly used as antifreeze; however higher percentage mixtures of alcohols such as ethanol and methanol are not recommended due to increased flammability. Your local sales office should be consulted to determine the antifreeze best suited to your area. The use of antifreeze may impact system performance depending on its concentration and should be considered during initial system design. When antifreeze is added to the water system for freeze protection, recognize that the refrigerant suction pressure will be lower, capacity will be less, and water side pressure drop will be higher. The reduction in performance depends upon the antifreeze concentration and temperature.

In areas where minimum entering loop temperatures drop below 50°F (10°C) or where piping will be routed through areas subject to freezing, antifreeze is required. If 3 GPM/ton is maintained, this limit can be lowered to 42°F (6°C). Care must be given to maintain proper water flow.

Freeze protection should be maintained to 15°F (9°C) below the lowest expected entering loop temperature. For example, if 30°F (-1°C) is the minimum expected entering loop temperature, the leaving loop temperature would be 22 to 25°F (-6 to -4°C) and freeze protection should be at 15°F (-10°C). Calculation is as follows: 30°F - 15°F = 15°F (-1°C - 9°C = -10°C).

All alcohols should be premixed and pumped from a reservoir outside of the building when possible or introduced under the water level to prevent fumes. Calculate the total volume of fluid in the piping system. Then use the percentage by volume shown in Table 3 for the amount of antifreeze needed. Antifreeze concentration should be checked from a well mixed sample using a hydrometer to measure specific gravity.

**Table 3: Antifreeze Percentage by Volume**

Type	Minimum Temperature for Low Temperature Protection			
	10°F (-12.2°C)	15°F (-9.4°C)	20°F (-6.7°C)	25°F (-3.9°C)
<b>Propylene Glycol</b>	38%	25%	22%	15%
<b>Ethanol<sup>1</sup></b>	29%	25%	20%	14%
<b>Methanol</b>	25%	21%	16%	10%

<sup>1</sup> Must not be denatured with any petroleum product.

**Table 4: Antifreeze Correction Factors**

Ethylene Glycol					
	10%	20%	30%	40%	50%
<b>Cooling Capacity</b>	0.995	0.992	0.987	0.983	0.979
<b>Heating Capacity</b>	0.991	0.982	0.977	0.969	0.961
<b>Pressure Drop</b>	1.07	1.13	1.18	1.26	1.28
Propylene Glycol					
	10%	20%	30%	40%	50%
<b>Cooling Capacity</b>	0.99	0.98	0.97	0.96	0.95
<b>Heating Capacity</b>	0.987	0.975	0.962	0.942	0.93
<b>Pressure Drop</b>	1.07	1.15	1.25	1.37	1.42
Ethanol					
	10%	20%	30%	40%	50%
<b>Cooling Capacity</b>	0.991	0.951	—	—	—
<b>Heating Capacity</b>	0.995	0.96	—	—	—
<b>Pressure Drop</b>	1.035	0.96	—	—	—
Methanol					
	10%	20%	30%	40%	50%
<b>Cooling Capacity</b>	0.998	0.972	—	—	—
<b>Heating Capacity</b>	0.995	0.97	—	—	—
<b>Pressure Drop</b>	1.023	1.057	—	—	—

**NOTE:** Higher percentage mixtures of ethanol and methanol are not recommended due to increased flammability.

## Pre-Installation



### WARNING

The installer must determine and follow all applicable local and national 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, personal injury or death. This equipment must be installed by experienced, trained personnel only.

1. To prevent damage, do not operate this equipment for supplementary heating and cooling during the construction period. Doing so will void the warranty.
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.

- Before installation, check the available dimensions where the unit will be installed versus the dimensions of the unit.
- 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.
- The installing contractor should discuss installation with piping, sheet metal, and electrical foremen before installing any unit.

**NOTICE**

Check the unit data plate for correct voltage with the plans before installing the equipment. Also, make sure all electrical ground connections are made in accordance with local code.

**NOTICE**

No minimum clearance dimension is required between the unit and combustible surfaces.

## Unit Location

The console water source heat pump is typically installed on an exterior wall in the conditioned space. Locate the console unit to allow for easy removal of the filter and access panels. Allow a minimum of 18 in (46 cm) clearance on each side of the unit for service and maintenance access. The unit should be positioned to allow a minimum distance of 15 in (38 cm) from the front panel to objects in the room.

To reduce noise emissions, install a field-provided 0.25 in (6 mm) thick, rubber isolator pad below the entire base of the unit. The pad should be equal to the overall foot-print size of the unit to provide sound dampening of the unit while in operation. The unit must sit flat on the floor to prevent unwanted noise and vibration.

## Unit Installation (Recommended)

**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.

**NOTICE**

After removing unit panels, set aside in a safe area where they will not be damaged.

**NOTICE**

Use the appropriate fasteners in accordance with local building codes.

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.

- Consult job blueprints for unit location. Unit should be positioned to allow 15 in (38.1 cm) from front panel to objects in room. Clean area where unit is to be installed, removing all construction dirt and debris.

- Remove the unit from the shipping carton and save the carton to be used as a protective cover after the installation is complete.
- Remove the screws (numbered 1) shown in [Figure 1](#), securing the right and left side/corner panels to the subbase. Lift the panels up and out until the bottom tab clears the slot in the subbase.
- Remove the two screws (numbered 2) in [Figure 1](#) securing the front panel to the subbase and remove the panel by lifting up and tilting out until the panel tabs clear the slots in the subbase.

**NOTICE**

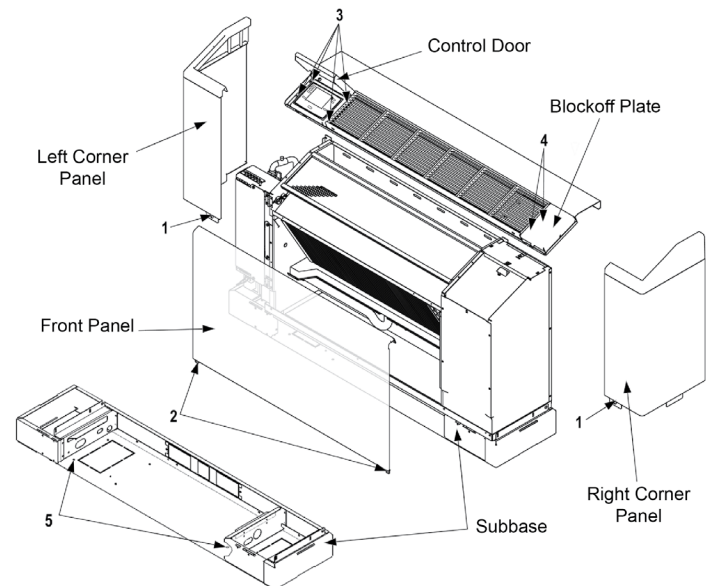
If using the Alternate Unit Installation procedure on [page 12](#), it is not necessary to remove the top section. Continue with step 5 if using the recommended method of installation.

- Open the control door and remove the four screws that hold the top panel and control pad in place (numbered 3) in [Figure 1](#). On the opposite end of the cabinet top lift off the blank-off plate to the right and remove the last two mounting screws (numbered 4) in [Figure 1](#). Lift the top panel off, turning the control pad so that it fits down through the opening in the top panel.

**NOTICE**

**STOP!** If an outside air damper kit is to be installed, refer to IM 974 for the manual damper and the motorized damper kit and install it now.

**Figure 1: Cabinet Panel Screw Locations and Panel Removal**



6. Position the chassis/subbase against the wall where the unit is to be installed. Remove any mouldings at the floor or wall (see letter A in Figure 2). Allow adequate room for piping and electrical connections in the subbase by checking the electrical connection end of the subbase and chassis.
7. Make sure electrical and piping connections are in the proper location within the subbase end piping compartment.
8. Remove the filter and locate the existing 1/4 in (6.35 mm) mounting holes in the bottom of the subbase labeled (5) in Figure 2 subbase detail.
9. Be sure the subbase is tight to the wall. With a marker or pencil, mark the floor at mounting hole locations labeled (5).
10. Move unit away to pre-drill 1/4 in (6.35 mm) mounting holes in the floor at marked locations.

#### NOTICE

Clean unit mounting area of all construction debris. Check that the floor is level and at 90 degrees to the wall as shown in Figure 2.

Daikin Applied recommends the placement of a sound absorbing mat beneath the unit footprint before continuing to the next installation step.

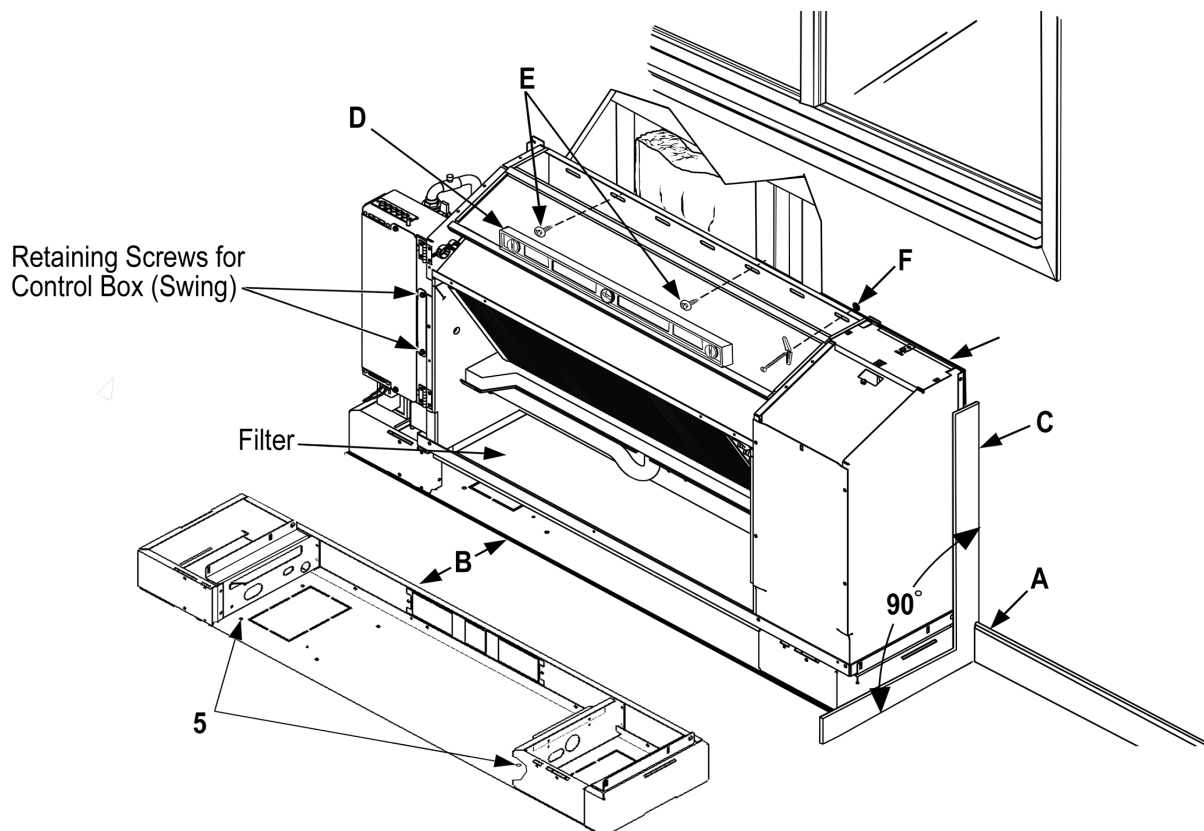
11. Insert fasteners through the mounting holes in the subbase and secure the subbase to the floor, tightening the fasteners. Do not over-tighten fasteners and distort or warp the subbase plate.
12. Use a carpenters square and level to check that the unit is level and 90 degrees to the wall and floor (see letters C & D in Figure 2).
13. The chassis back panel has a series of slots on the back flange to mount the assembly to the wall. It is the installing contractor's responsibility to select the correct fasteners for each unit to meet local codes (see letter E in Figure 2).

#### NOTICE

Use a minimum of three fasteners to secure the unit [field supplied]. Secure two fasteners into wall studs. At location(s) where no stud is present, secure with a Toggle bolt or equivalent [by others] (see letter F in Figure 2).

14. Reinstall the panels in reverse order as performed in prior steps 3 through 5.
15. Cut out one side and the bottom of the shipping carton, leaving the top and three sides to place over the unit for protection during construction.

Figure 2: Unit Mounting Details



## Alternate Unit Installation (Using Provided Brackets)

### NOTICE

It is preferred that the brackets are screwed directly into a stud where available. However, drywall anchors can be utilized when studs are absent at bracket locations. It is the responsibility of the installing contractor to provide the appropriate fasteners and anchors to ensure that the unit is secured properly.

### NOTICE

Use the appropriate fasteners in accordance with local building codes.

1. With the front, left and right cabinet panels removed, set the entire unit in its final mounting position.
2. With the chassis still mounted on the subbase, remove filter to allow access to the subbase bottom plate.
3. Make sure electrical and piping connections are in the proper location within the subbase end piping compartment.
4. Locate the existing 1/4 in (6.35 mm) mounting holes in the bottom of the subbase labeled (5) in [Figure 3](#), and mark the floor at the mounting hole locations with a marker or pencil.
5. Move unit away to pre-drill 1/4 in (6.35 mm) mounting holes in the floor at the marked locations.

### NOTICE

Clean unit mounting area of all construction debris. Check that the floor is level and at 90 degrees to the wall as shown in [Figure 2](#) on page 11.

Daikin Applied recommends the placement of a sound absorbing mat beneath the unit footprint before continuing to the next installation step.

### NOTICE

**STOP!** If an outside air damper kit is to be installed, refer to IM 974 for the manual damper and the motorized damper kit and install it now.

6. Insert fasteners through the mounting holes in the subbase and finish securing the unit to the floor, tightening the fasteners. Do not over-tighten fasteners and distort or warp the subbase plate.
7. Locate mounting brackets at locations at the wall as shown in [Figure 3](#). Brackets should be located approximately 3 in (76.2 mm) from the top of the chassis. A slot is provided in the sheet metal end partition for the bracket to fit into.

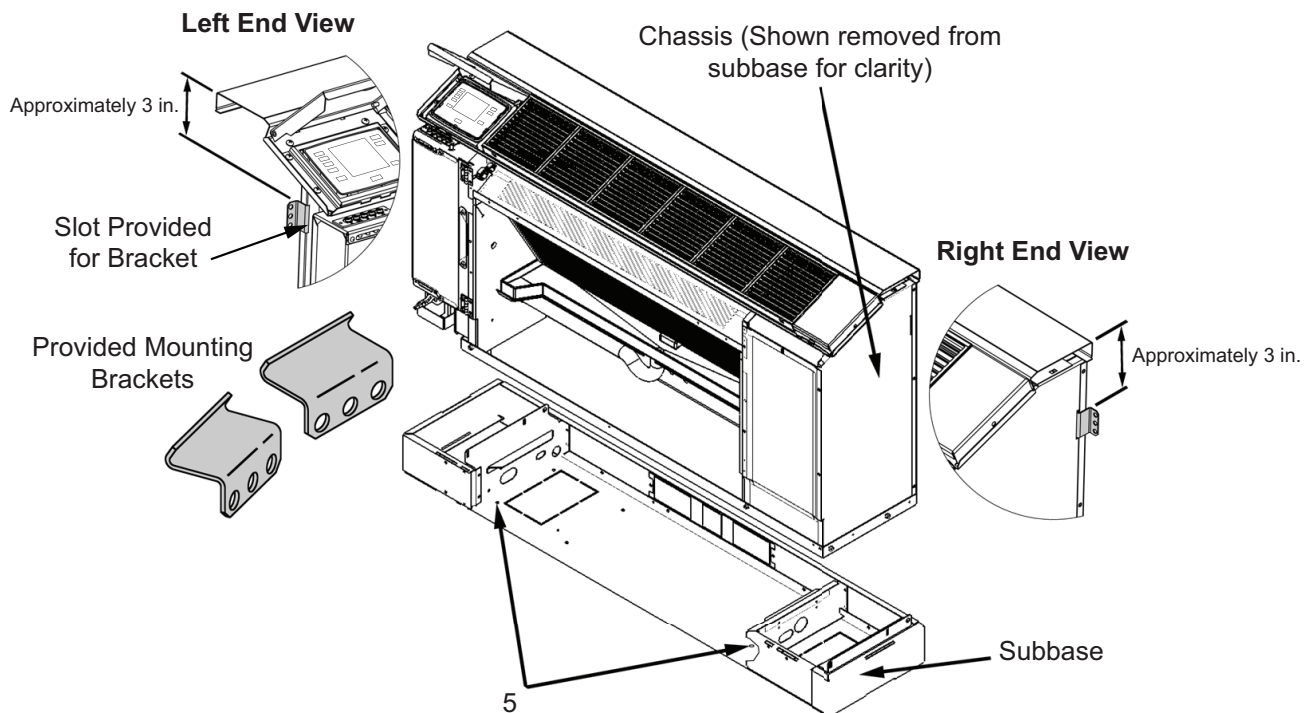


### WARNING

Failure to use a pre-set depth drill could result in serious injury or death.

8. Mark the position of the bracket mounting holes onto the wall. Remove the brackets and using a pre-set depth drill, pre-drill holes to accept a wall anchor (by others).

**Figure 3: Mounting Bracket Installation**





# Installation with Optional Cabinet Rear Extension (2", 4" or 6" Deep Extension)

Refer to [Figure 4](#), and labels 1a through 6a.

## **NOTICE**

It is preferred that mounting screws are secured to wall studs. However, drywall anchors, toggle bolts or equivalents should be used when a wall stud is not present. It is the responsibility of the installing contractor to provide the appropriate fasteners and anchors to ensure that the unit is properly secured.

## **NOTICE**

Use the appropriate fasteners in accordance with local building codes.

## **NOTICE**

Retain all screws for reassembly. Set components aside in a safe place where they will not be damaged.

1. Remove screw (1a) and remove left end panel (1b).
2. Remove screw (2a) and remove right end panel (2b).
3. Remove screw (3a) and (3b) and remove center-front panel (3c).

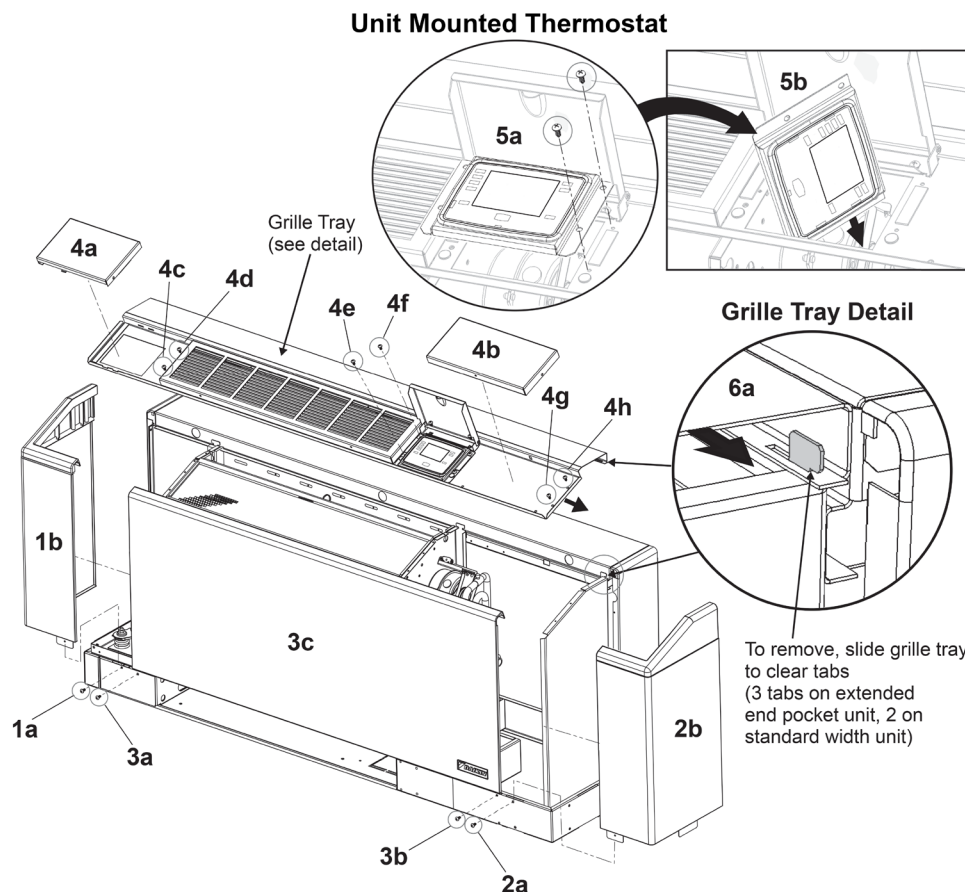
4. Remove blockoff panels (4a) and (4b) by carefully prying them up.
5. Remove two (2) screws (5a) which hold the touchpad control in place. Carefully pass the touchpad controller through its mount opening on the grille tray as shown in detail (5b). Take care to secure the touch pad controller so the attached wiring is not damaged.
6. Remove six (6) screws (4c-4h) which hold the grille tray in place.
7. Refer to grille tray detail (6a) and slide the grille tray assembly to the side to clear the tabs from the slots holding the grille tray in place. Note the number of tabs based on the unit type. Remove the grille tray.
8. Make sure electrical and piping connections are in the proper location within the subbase end piping compartment.

## **NOTICE**

Clean unit mounting area of all construction debris. Check that the floor is level and at 90 degrees to the wall as shown in [Figure 2 on page 11](#).

Daikin Applied recommends the placement of a sound absorbing mat beneath the unit footprint before continuing to the next installation step.

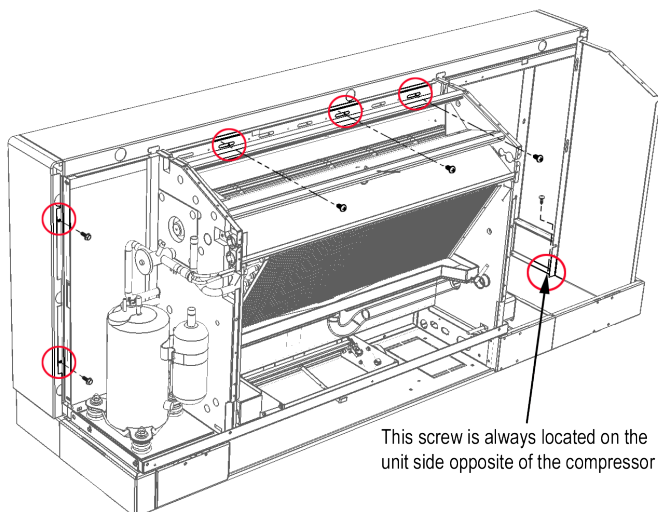
**Figure 4: Prepare for Installation**



### NOTICE

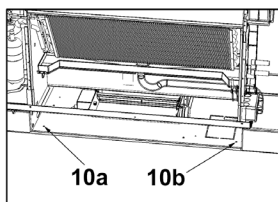
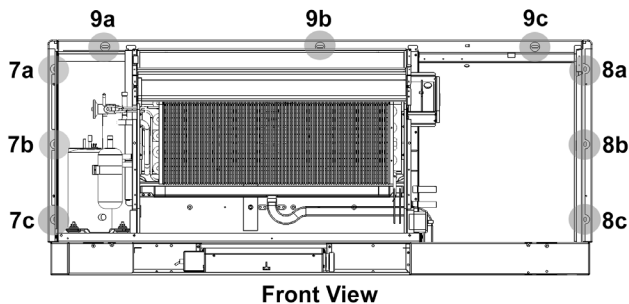
The rear extension may be detached from the chassis by removing screws shown in Figure 5.

**Figure 5: Detach Points on the Rear Extension**



9. Position the unit in the desired location against the wall and transfer a mark to the wall at each of the mounting hole locations as shown in Figure 6.

**Figure 6: Extension Mounting Hole Locations**



**Sub base Mounting Holes**

- Three locations along the left-hand side of the rear extension (cut outs) labeled, (7a-7c).
- Three locations along the right-hand side of the rear extension (cut outs) labeled, (8a-8c).
- Three locations along the top-front edge of the rear extension (cut outs) labeled (9a-9c).
- Two locations in the bottom of the subbase labeled (10a) and (10b).

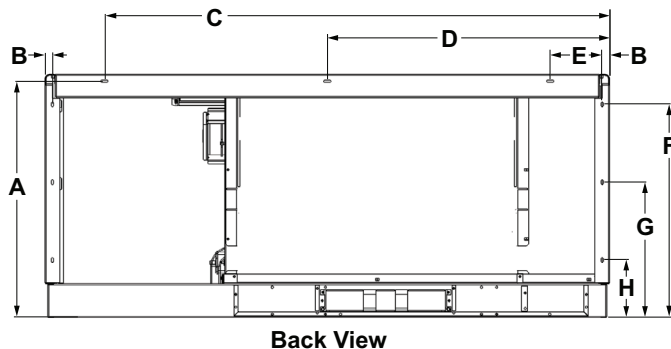


### WARNING

Failure to use a pre-set depth drill could result in serious injury.

10. Move unit away and using a pre-set depth drill, pre-drill 1/4" holes in the floor at the marked locations (10a) and (10b) for the subbase.
11. Drill holes at marked locations for the rear extension. Where there is no wall stud present, install a wall anchor, toggle bolt or equivalent.
12. Reposition the unit and install fasteners (by others) at each mounting point in the rear extension.
13. Insert fasteners through the mounting holes in the subbase and finish securing the unit to the floor at labeled locations (10a) and (10b) as shown in Figure 6. Do not over-tighten fasteners and distort or warp the subbase plate.

**Figure 7: Extension Mounting Hole Location Dimensions**



**NOTE:** Right-hand (slope-top) unit shown, dimensions are mirrored for left-hand units and flat-top units.

**Table 5: Extension Mounting Hole Location Dimensions, in (cm)**

Unit Size	Unit Type	A	B	C	D	E	F	G	H
007, 009, 012	Standard Unit	24.3 (61.72)	0.75 (1.91)	39.9 (101.35)	23 (58.42)	6.1 (15.49)	21.94 (55.73)	13.91 (35.33)	5.91 (15.01)
	With Extd. End Pocket			51.9 (131.83)	29 (73.66)				
015, 018	Standard Unit			47.9 (121.67)	27 (68.58)				
	With Extd. End Pocket			59.9 (152.15)	33 (83.82)				

**NOTE:** Right-hand (slope-top) unit shown, dimensions are mirrored for left-hand units and flat-top units.

# Water Piping

1. Connect units to supply and return piping in a two-pipe reverse return configuration (Figure 8).

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 achieve proper water flow, the differential should be 10°F to 14°F (-5°C to -8°C).

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

2. The piping must comply with local codes.



## WARNING

Polyester Oil, commonly known as POE oil is a synthetic oil used in many refrigeration systems, and may be present in this Daikin Applied 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. Refer to the pipe manufacturer's recommendations to determine suitable applications of the pipe.

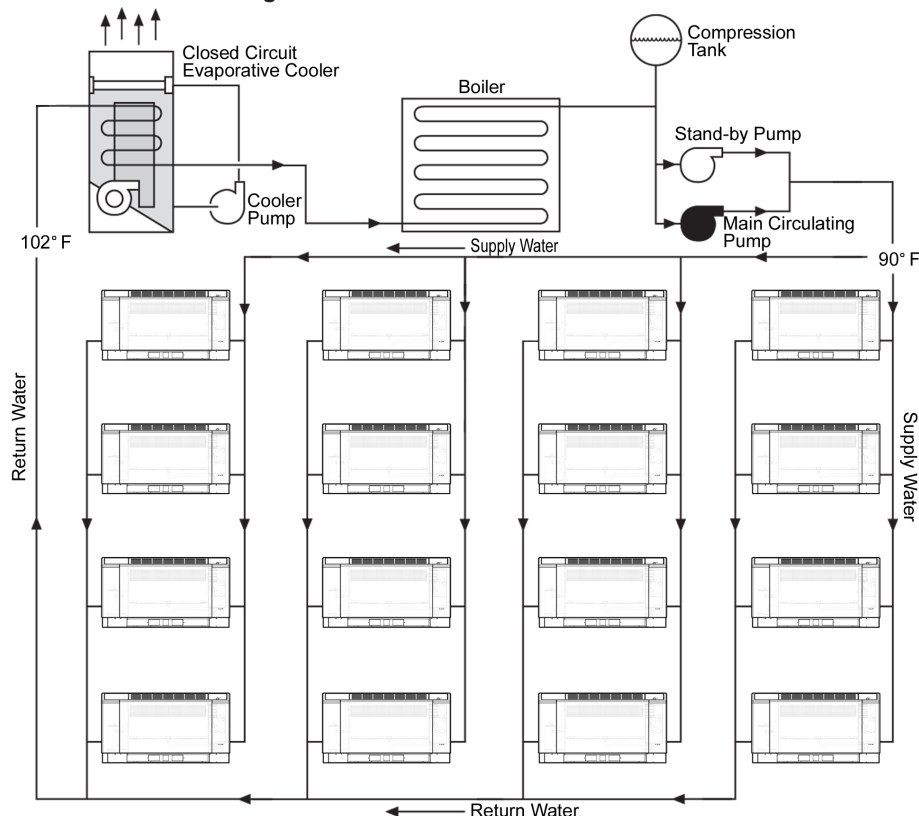
3. Supply and return run outs are typically connected to the unit by short lengths of high pressure flexible hose which are sound attenuators for both unit operating noise and hydraulic pumping noise.

## NOTICE

Be sure that one end of the hose has a swivel fitting to facilitate removal for service. Hard piping to the unit can result in added operating noise.

4. If sealant compound is not provided for flexible hose fittings, apply Teflon tape to the connections to help prevent leaks.
5. Supply and return shutoff valves are required at each unit. 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, unless an auto-flow control device is used.
6. Do not connect a unit to the supply and return piping until the water system has been cleaned and flushed completely. After this is done, the initial connection should have all valves wide open in preparation for water system flushing.
7. Condensate piping should be installed per local codes. Each unit is supplied with an internal clear vinyl condensate hose.
8. Units are internally trapped. 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 any requirement for electric fittings.

Figure 8: Typical 2-Pipe Reverse Return Configuration



## Water Connections

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

### NOTICE

On left-hand piping units the water supply connection is on the top. Right hand piping units the water supply is at the bottom location.

## Unit Piping Connection

Each heat pump is supplied with extended copper tubing on the water-to-refrigerant coil and 5/8" (16 mm) O.D. tubing. The connections are for both the supply and return water connections. See Figure 9 for left and right hand connections locations.

## Shutoff/Balancing Valve Piping

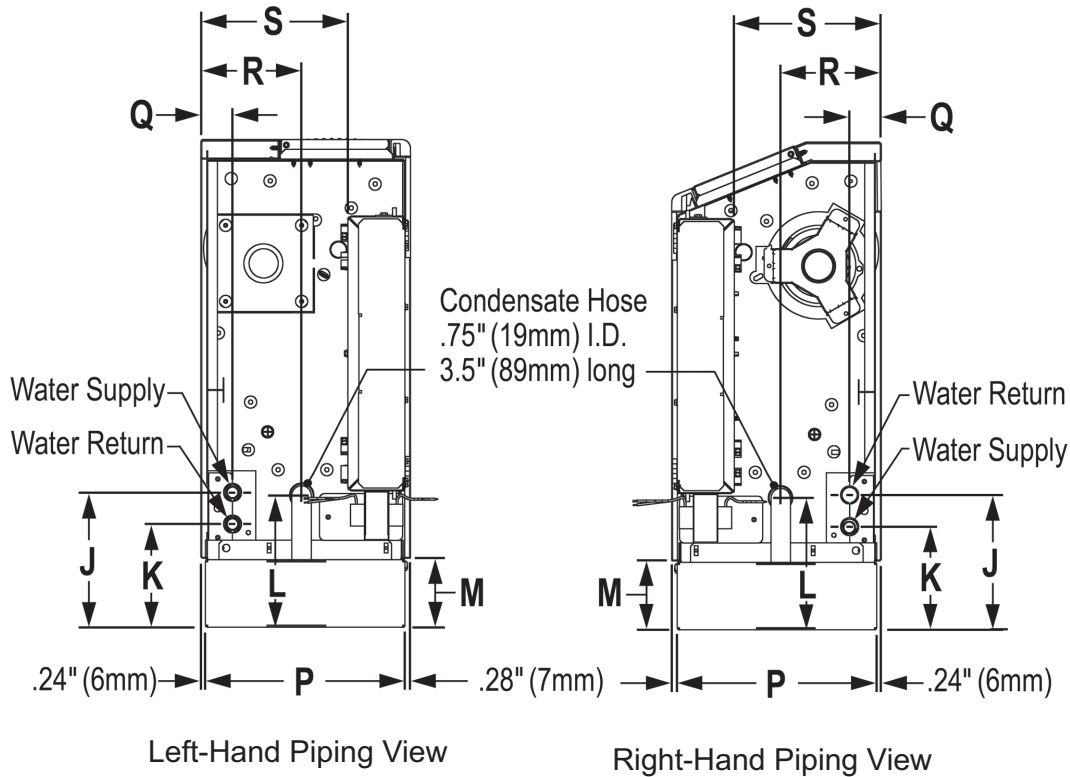
Each heat pump requires a shutoff valve on both the supply and return lines for easy serviceability and removal if it becomes necessary.

We suggest using our combination shutoff/balancing valves installed in the field between the contractor's piping and the heat pump unit. The valve installed on the return line acts as a balancing valve to adjust the proper water flow. An automatic flow limiting device is also available as a factory installed option.

Add the female pipe adapter connection to unit supply and return coil connection by sweating them in place using silver solder.

Using the specified hoses, screw the fixed end into the shut-off/balancing valve. 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.

Figure 9: Supply and Return Connections Locations for Left-Hand and Right-Hand Units (Flat Top and Slope Top)



**NOTE:** On left-hand piping units, the water supply connection is on the top. On right-hand piping units, the water supply is located at the bottom.

Table 6: Dimensions (High Sill Units)

Unit Size	J	K	L	M	P	Q	R	S
007-018	6 <sup>5</sup> / <sub>8</sub> " (175 mm)	5 <sup>1</sup> / <sub>8</sub> " (132 mm)	6 <sup>3</sup> / <sub>4</sub> " (172 mm)	3 <sup>1</sup> / <sub>2</sub> " (90 mm)	10 <sup>1</sup> / <sub>4</sub> " (260 mm)	1 <sup>1</sup> / <sub>8</sub> " (41 mm)	5 <sup>1</sup> / <sub>4</sub> " (134 mm)	7 <sup>1</sup> / <sub>2</sub> " (192 mm)



## Optional Factory-Installed Motorized & Hand Valve Assemblies

Console water source heat pumps can be configured with factory-installed motorized valves. Valves should be mounted on the return water line. All valve assemblies terminate with 5/8" O.D. copper tubing.

### NOTICE

Make sure the pipes fit the confines of the piping compartment of the heat pump unit (Figure 10).

Figure 10: Typical Motorized Valve Piping

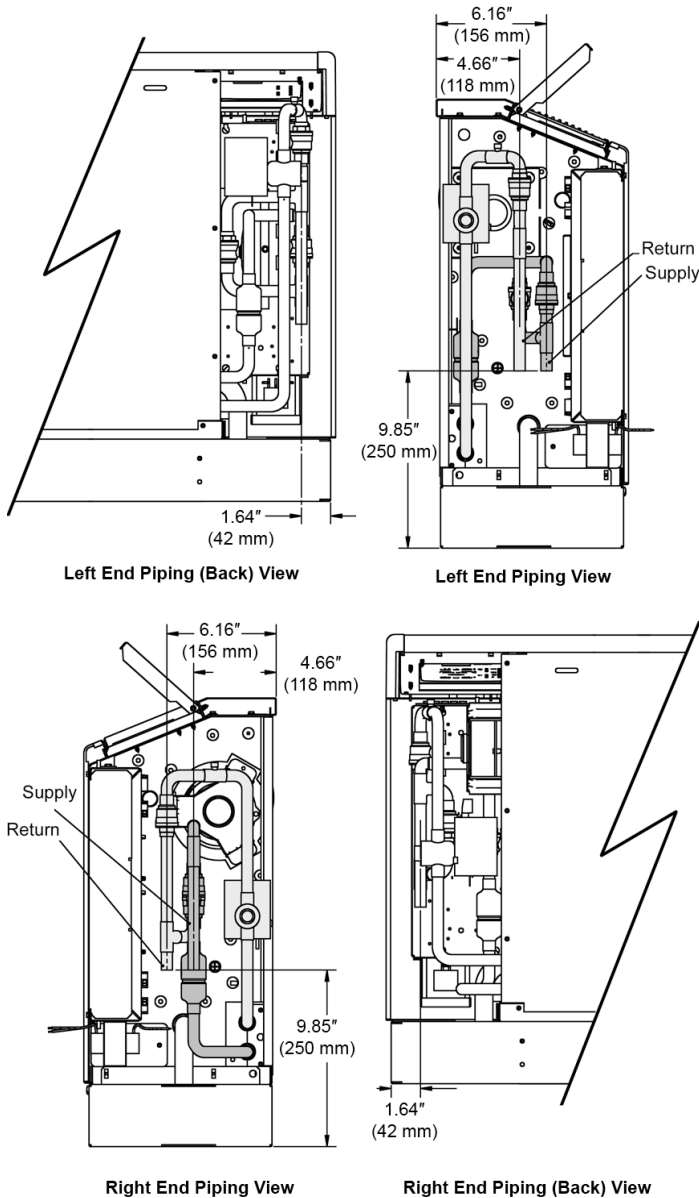
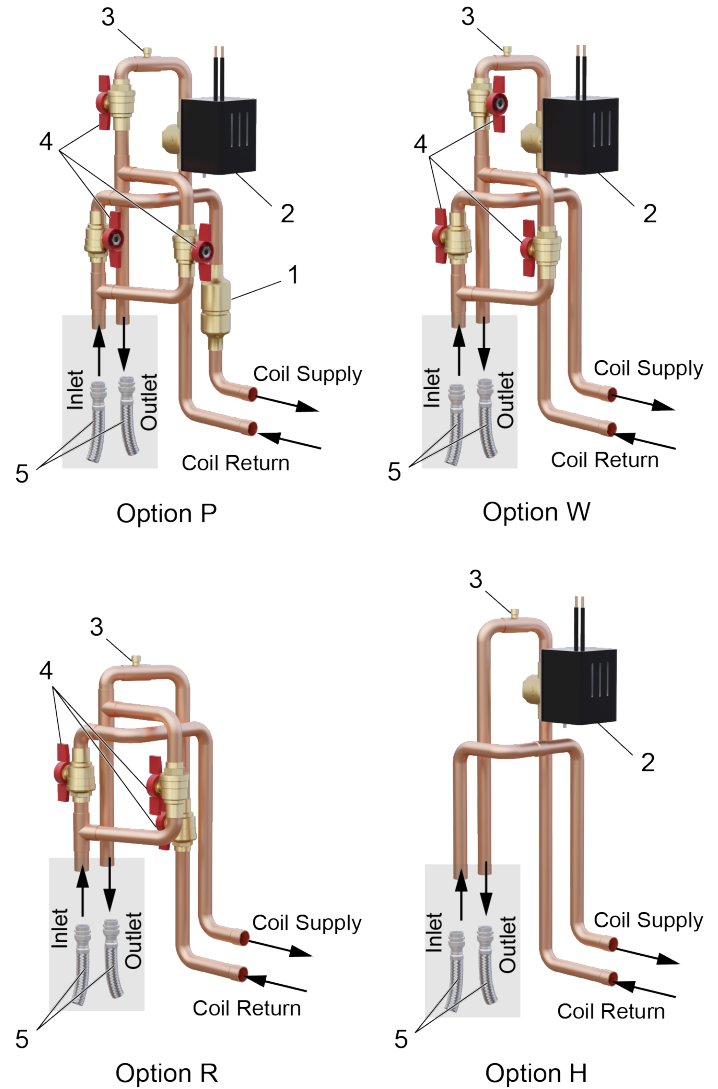


Figure 11: Typical Piping Package Configurations (Left-Hand Unit Piping Connections Shown)



No.	Description
1	Measureflow device
2	2-way, normally closed motorized isolation valve
3	Air bleed vent
4	Supply, return, and bypass hand valve
5	Inlet-outlet flexible hoses (field-installed - not included)

**NOTE 1:** Optional flexible hose kits are provided with a 5/8" JIC FPT sweat adapter for field-installation to supply and return pipe stubs.

**NOTE 2:** On left-hand piping units, the water supply connection is on the top. On right hand piping units, the water supply is located at the bottom.

**NOTE 3:** Gray tinted areas are field-installed (not included).

When installing the hoses on valve assemblies, use the method as outlined in "Shutoff/Balancing Valve Piping" on page 16.

## Motorized Isolation Valve

The 2-way motorized valve kit is available as a factory-installed and wired option or may be ordered as a field-installed accessory. Refer to “Motorized Isolation Valve & Relay” on page 22 for more details.

## Condensate Hose Connection

Each unit is supplied with a 3/4" (19 mm) I.D. clear vinyl condensate hose internally trapped within the chassis. The hose extends 3 1/2" (89 mm) 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 securely to prevent leakage.

## 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:

1. 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.
2. Corrosion – Decomposition of the metal caused by absorption of gases from the air. Corrosion may occur in any metal component of the system.
3. 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. Refer to Table 7.

**Table 7: Water Quality Conditions and Applications for Units with a Coaxial Heat Exchanger**

Potential Problem	Chemical(s) or Condition	Range for Copper Heat Exchangers	Range for 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 <sup>[4]</sup>
	Chlorine	Less than 0.5 ppm	Less than 0.5 ppm
	Hydrogen Sulfide	None Allowed	None Allowed
Biological Growth	Iron Oxide	Less than 1 ppm	Less than 1 ppm
	Iron Bacteria	None Allowed	None Allowed
Erosion	Suspended Solids	Less than 10 ppm	Less than 10 ppm
	Water Velocity	Less than 8 ft/s	Less than 12 ft/s

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

**NOTE 2:** Grains/gallon = ppm divided by 17.1.

**NOTE 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.

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

## Cleaning & 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. See [Figure 12](#).

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 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.

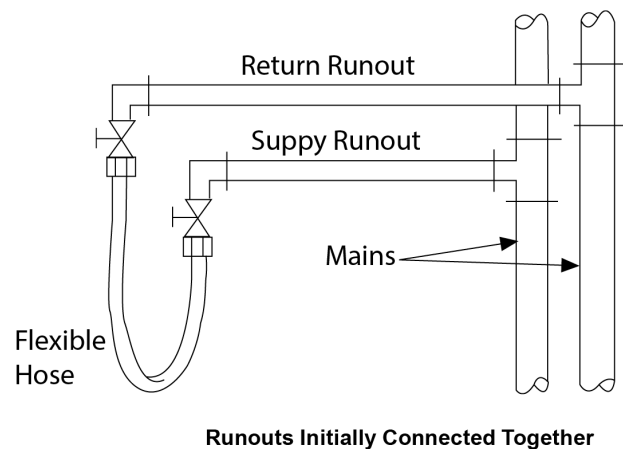
3. Shut off supplemental heater and circulator pump and open all drains and vents to completely drain down the system. Short circuited supply and return runouts should now be connected to the conditioner supply and return connections. Do not use sealers at the swivel flare connections of hoses. Trisodium 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 warm 80°F (27°C) water.

4. 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.

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. Dirty water will result in system wide degradation of performance and solids may clog valves, strainers, flow regulators, etc. Additionally, the heat exchanger may become clogged which reduces compressor service life or causes premature failure.

5. 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 air vented and loop temperatures stabilized, each of the conditioners will be ready for check, test and start-up, air balancing, and water balancing.

**Figure 12: Supply and Return Runouts Connected Together**



## Field Installed Accessories

### Wireless Temperature Control

The wireless thermostat option is designed to provide precision temperature control without the installation labor and expense of wiring.

- Powered by AA batteries
- Mounts in any suitable location that will provide good temperature control.
- Large LCD display provides the user with current room temperature, set point temperature, time, program interval, and other system status information.

For detailed installation and operation information, refer to the manual provided with the thermostat.

**Figure 13: Wireless Thermostat**



The second part of the wireless system is called a Remote Control Node or "RCN." An RCN interfaces with specific desired HVAC equipment, and communicates with its thermostat wirelessly. At the time of installation, the wireless thermostat is linked to the RCN. The thermostat and RCN that have been linked will not interfere with, or be affected by, any other thermostat or RCN in adjacent rooms, apartments, or neighboring homes.

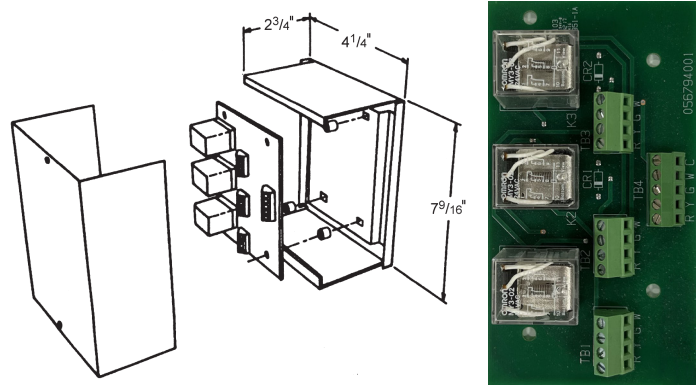
**Figure 14: Remote Control Node (RCN)**



### Multiple Unit Control Panel (MUCP) for Use with MicroTech Unit Controller

For detailed installation instructions refer to IM 952

**Figure 15: Multiple Unit Control Panel and Board**



The Multiple Unit Control Panel (MUCP) is an accessory used when up to 3-units are controlled from a single thermostat. Console units must have the MUCP field-installed in a remote location, typically close to the units and convenient for service access.

A multiple unit control panel allows a single wall-mounted thermostat to control up to three units in a common space.

An auxiliary relay controls optional devices when the fan is operating. The relay has SPDT contacts.

A maximum of 2 boards may be used together if up to 6-units must be connected and controlled from a single thermostat.

#### NOTICE

The MUCP control board does not fit inside the console unit control box.

#### NOTICE

Multi-speed operation is only available with the optional unit-mounted fan speed switch.

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

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.



## Outside Air Damper

### Field-Installed Option

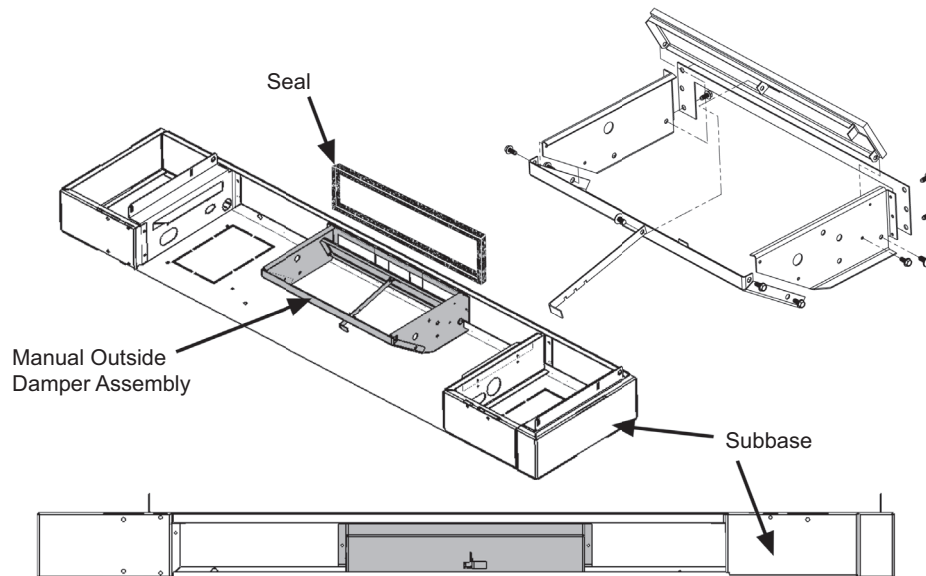
#### CAUTION

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.

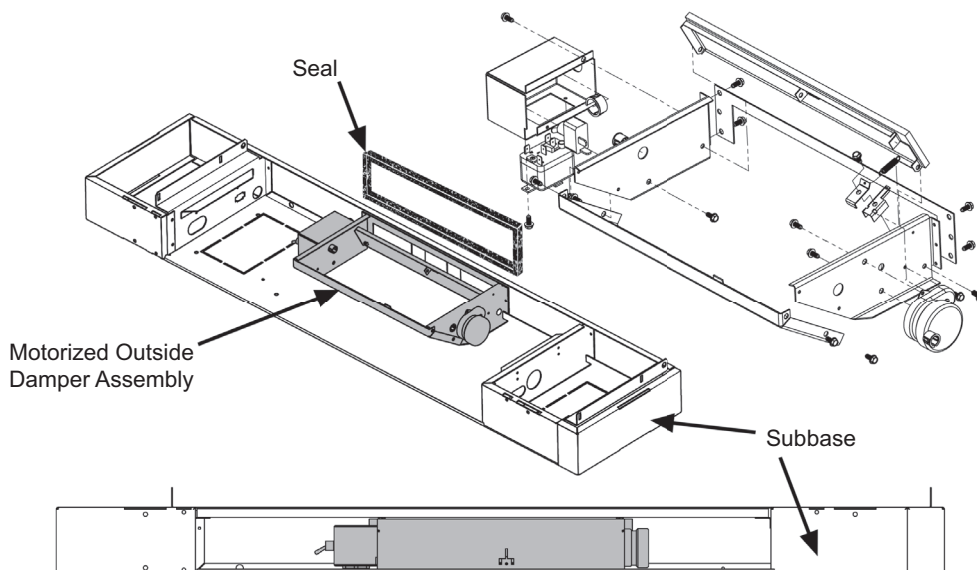
### Cold Weather Operation

Console water source heat pumps may experience erratic operation during cold ambient conditions with the outside air damper in the open position. See "Operating Limits" on page 8, for guidelines.

**Figure 16: Manual Outside Air Damper Assembly (See IM 974 for Detailed Installation Instructions.)**



**Figure 17: Motorized Outside Air Damper Assembly (See IM 974 for Detailed Installation Instructions)**



## Motorized Isolation Valve & Relay

### Motorized Isolation Valve

The motorized valve kit is available as a factory-installed or a field-installed option. Wired as shown in [Figure 19](#), the motorized valve will open on a call for compressor operation. The motorized isolation valve actuator (ISO) includes a 24 V power connection. Valves are 1/2".

1. Install the supplied wire harness into plug H6 on the main control board.
2. Run wires between the ISO actuator and the supplied wire harness ends.
3. Connect N.O. & N.C. actuators as shown on the schematic.

### Pump Request Relay

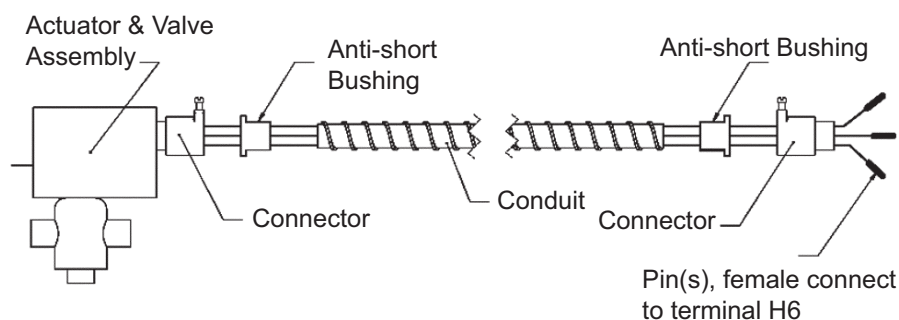
The MicroTech unit controller includes an internal Pump Request Relay connected to terminal H6 with three output connections. See [Table 8](#) for control operation:

The output of the internal pump request relay is 24 VAC. The output is not available when the H6 connection is used to control a motorized valve.

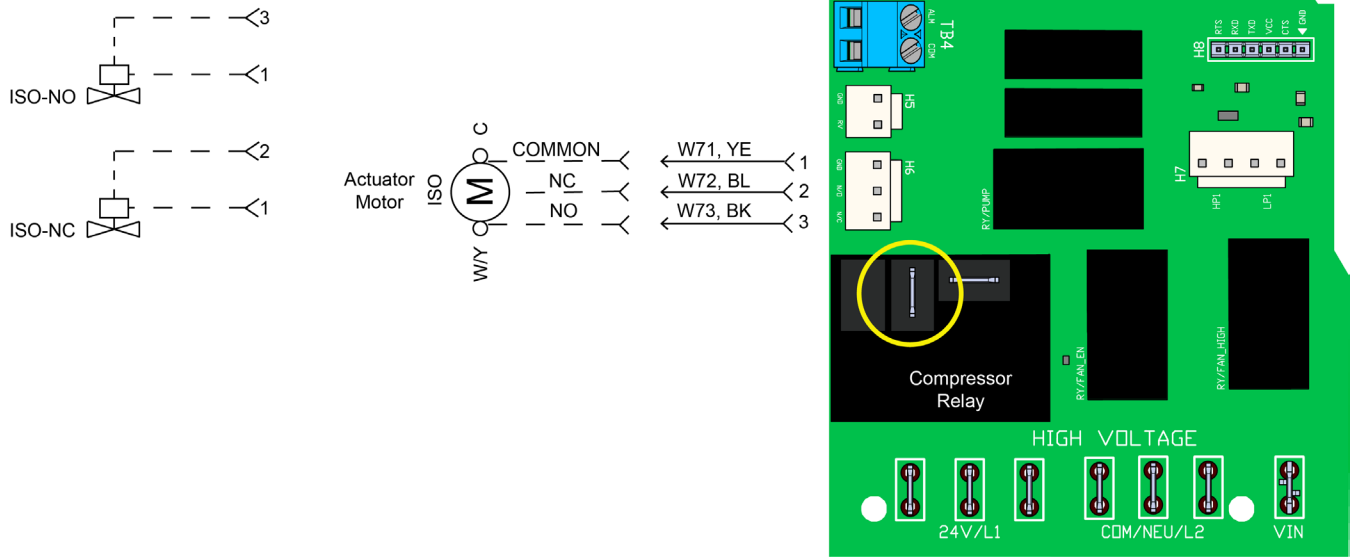
**Table 8: Pump Request Relay**

Terminal Connection	Signal	Output	Description
H6-1	Common	Ground	Pump Request - Common (Ground) Terminal
H6-2	24 VAC	N.O.	Pump Request - Normally Open (N.O.) Terminal. Energized when cooling or heating demand is required.
H6-3	24 VAC	N.C.	Pump Request - Normally Closed (N.C.) Terminal. Energized when cooling or heating demand is no longer required.

**Figure 18: Normally Closed, Power Open Motorized Valve**



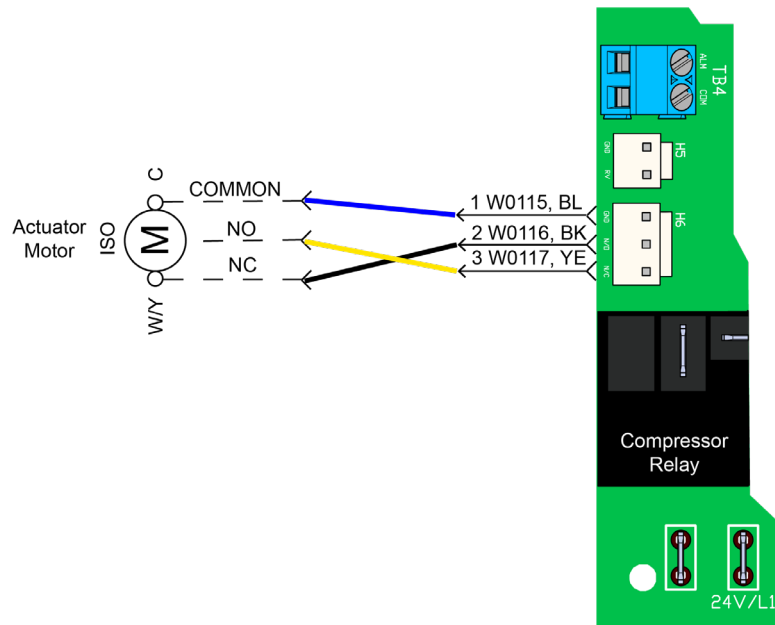
**Figure 19: Motorized Valve Wiring**



**NOTE 1:** Connectors on valve must be cut off and stripped back and the wires twisted to make connections to the H6 (IV/PR) terminals on the MT2300 controller.

**NOTE 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 20: MT2300 Wiring to an Existing Motorized Valve from a previously Installed Unit with MicroTech III Controller**



**NOTE:** If reusing a motorized valve on an existing Daikin Applied R-410A unit, the wiring harness for connections 1, 2, and 3 for the R32 product are different. Therefore, the wiring connections (Common, N.O., and N.C.) to the motorized valve must be rewired.

# Electrical

## **⚠ DANGER**

**Hazardous Voltage!** 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.

## **⚠ WARNING**

All field installed wiring must comply with local and national electrical codes. 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, personal injury, or death. This equipment must be installed by experienced, trained personnel only.

## **⚠ WARNING**

Use copper conductors only. Conductor insulation must be rated for a minimum temperature of 167°F (75°C).

## **⚠ CAUTION**

Fasteners should not be screwed into and penetrate the unit enclosure to avoid damage to internal electrical and mechanical components.

**Table 9: Operating Voltages**

Voltage	Minimum	Maximum
115/60/1	103	126
208-230/60/1	197	253
265/60/1	238	292

**NOTE 1:** Voltages listed are to show voltage range. However, units operating with over voltage and under voltage for extended periods of time will experience premature component failure.

**NOTE 2:** All 208-230 volt units are factory wired for 208 volt operation. When installing a 208-230 volt unit, ensure the correct wire is connected to the transformer.

## Standard Electrical Connection

Each chassis comes with a junction box mounted on the side of the chassis and contains the field electrical connection (Figure 21).

## 230 Volt Operation

All 208-230 volt units are factory wired for 208 volt operation. For 230 volt operation, the RED primary lead wire from the transformer must be disconnected from contactor, and replaced with the ORANGE wire from the transformer.

## Sealing Electrical Wiring

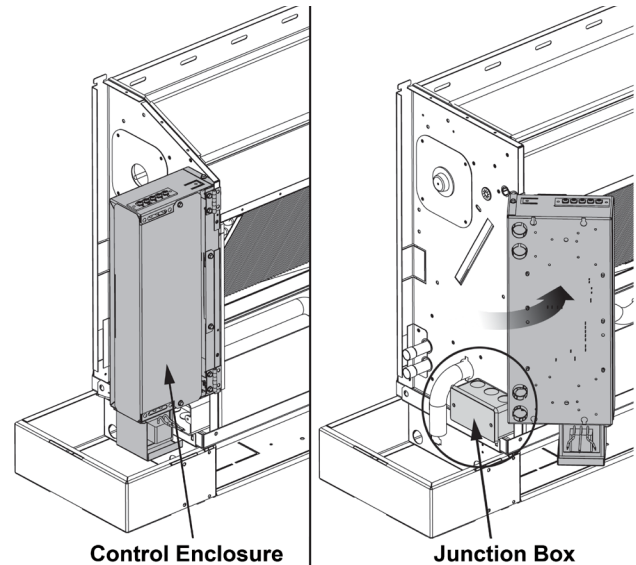
If electrical wiring or conduit comes through the floor, all wires or conduit should be sealed at this point. It will prevent any condensation or water leakage that may occur due to lack of preventive maintenance. Each unit has an internal condensate trap but will require cleaning.

Wiring coming through the wall should 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.

Check the local code concerning correct electrical connection.

**Figure 21: Junction Box Location**



**NOTE:** Both flat top and slope top units shown.

## 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 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.

### **NOTICE**

Refer to IM 975-X for additional information.

### **NOTICE**

Only factory authorized service personnel may replace the electrical power cord. Refer to Table 10 and "Typical Wiring Diagrams" for further information.

**Table 10: Electrical Power Cord**

Unit Electrical	Plug Size	Plug Type	Length
115/60/1	20 Amp - 115 VAC	NEMA 5-20P	27 in.
208-230/60/1	20 Amp - 250 VAC	NEMA 6-20P	27 in.
265/60/1	20 Amp - 277 VAC	NEMA 7-20P	27 in.

## Low Limit Switch (Optional)

The optional unit mounted Low Limit Switch will activate heating mode when return air temperatures below 54°F (12°C) are measured.

## Night Set Back Switch

During unoccupied mode, pressing the Night Set Back Switch for four to nine (4 to 9) seconds will cause the unit to operate as follows:

- occupied mode (for up to two hours)
- after-hours heating mode
- cooling mode

## Unit Mounted Fan Speed Switch

Toggleing the Fan Speed Switch will set either high or low speed while the fan is running.

### NOTICE

On units with electric heat, the fan will always run at high speed when the electric heat is energized.

## Mechanical (Compressor) Heating Override to Electric Heat Operation

### NOTICE

Only with units equipped with the electric heat option.

In the event of a compressor failure, or if electric heat is desired over mechanical (compressor) heating, the DIP switch configuration setting (SW7) may be reconfigured to disable compressor operation in heating mode to only allow electric heat. This will also allow emergency electric heat operation when mechanical heating is not available. The DIP switch setting (SW7) may be reconfigured for mechanical (compressor) heating operation when desired.

### NOTICE

When mechanical heating is disabled, the unit will not run the compressor on a call for heating. The electric heater will be utilized instead.

### NOTICE

Always disconnect power to the unit prior to making changes to the DIP switch settings on the interface board. The new settings will take effect once power is restored to the unit.

## Disabling Mechanical (Compressor) Heating Operation

To disable mechanical (compressor) heating and only allow electric heating, set MT2300 baseboard configuration switch SW7 to ON and cycle power to the controller.

To enable mechanical (compressor) heating, set MT2300 baseboard configuration switch SW7 to OFF and cycle power to the controller.

Table 11: Electric Heater Current and Power

Nominal Voltage	2.5 kW Heater Sizes 007, 009, 012		3.5 kW Heater Sizes 015, 018	
	Electric Heater		Electric Heater	
	kW	FLA	kW	FLA
208	2.01	9.7	2.74	13.2
230	2.46	10.7	3.35	14.6
265	3.27	12.3	4.45	16.8

## Electrical Data

1. Be sure the available power is the same voltage and 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 208-230 VAC single phase units are factory wired for 208 volt operation unless specified for 230 volts.

## Low Voltage Wire Connections

### NOTICE

Never install relay coils in series or parallel with the thermostat inputs.

1. Route the field-supplied low voltage wiring through the upper knockout in the left corner post as shown in [Figure 22](#).
2. Secure the low voltage wire connections to the terminals shown in [Figure 22](#), [Figure 23](#). Refer to "Typical Connections for Thermostats & Temperature Sensors Applications" on page 33 for I/O Expansion Module terminal TB1-1 connection.

Figure 22: Terminal Connection Locations on the MicroTech Board

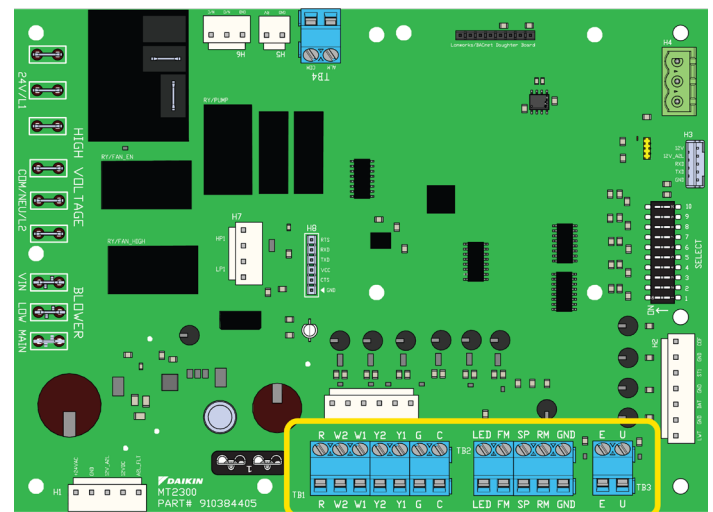
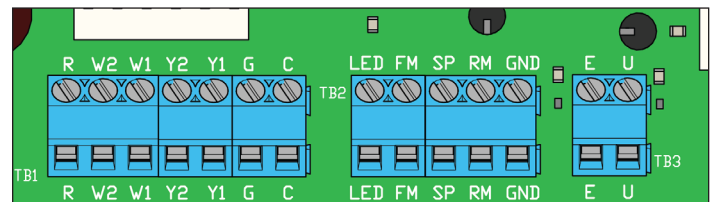


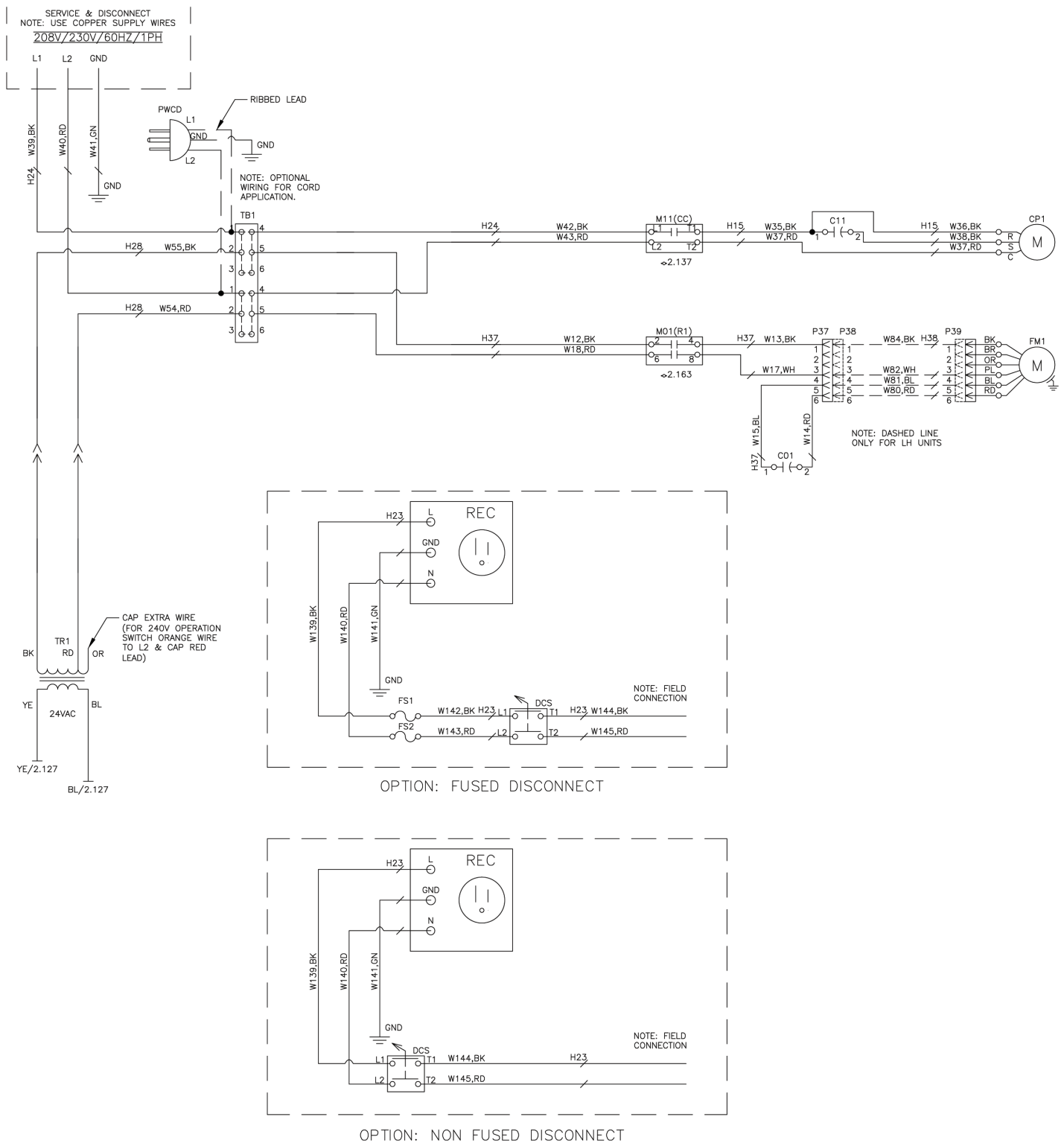
Figure 23: Terminal Connections TB1 (Thermostat Control) and TB2 (Sensor Control) on the MicroTech Board

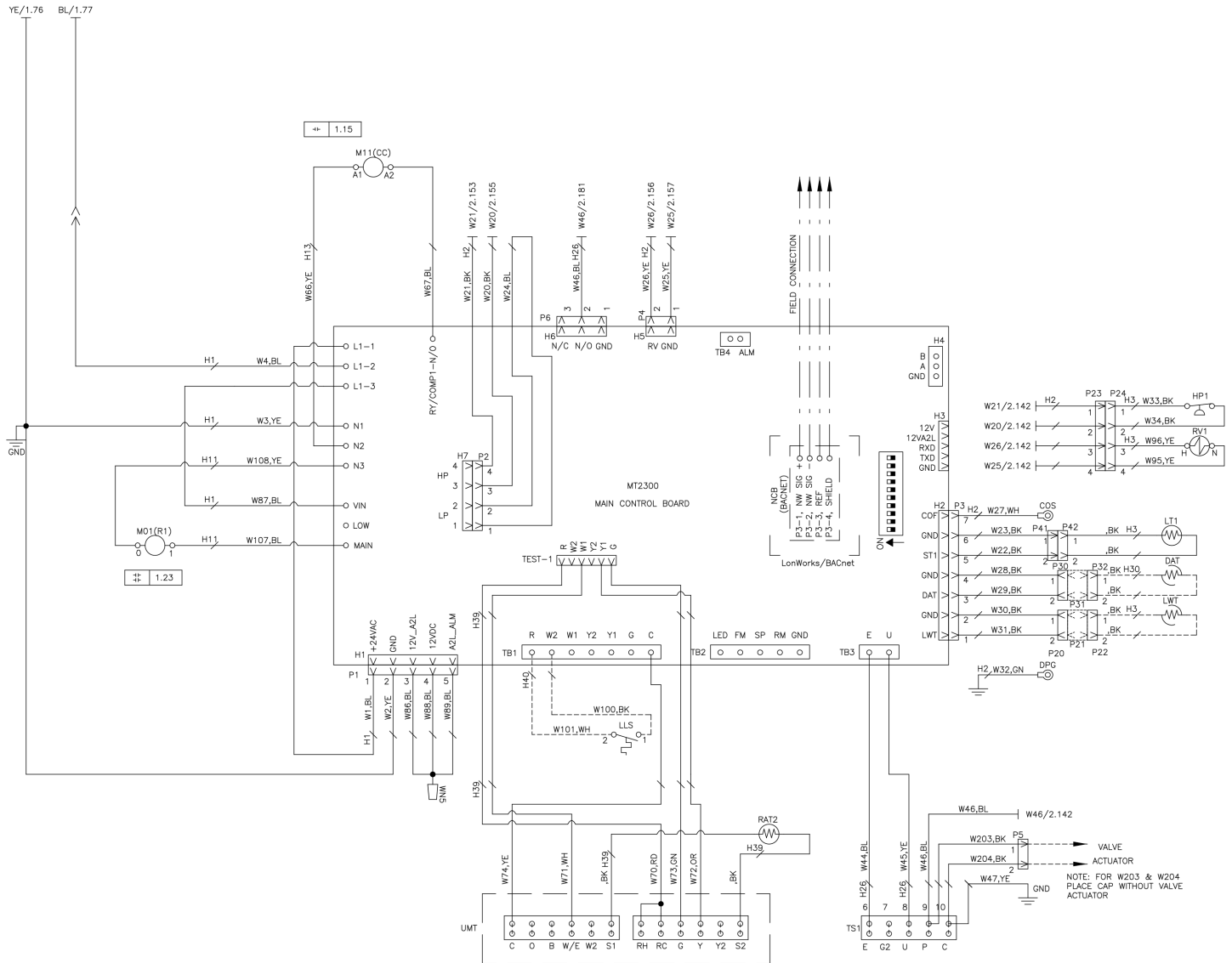




# Typical Wiring Diagrams

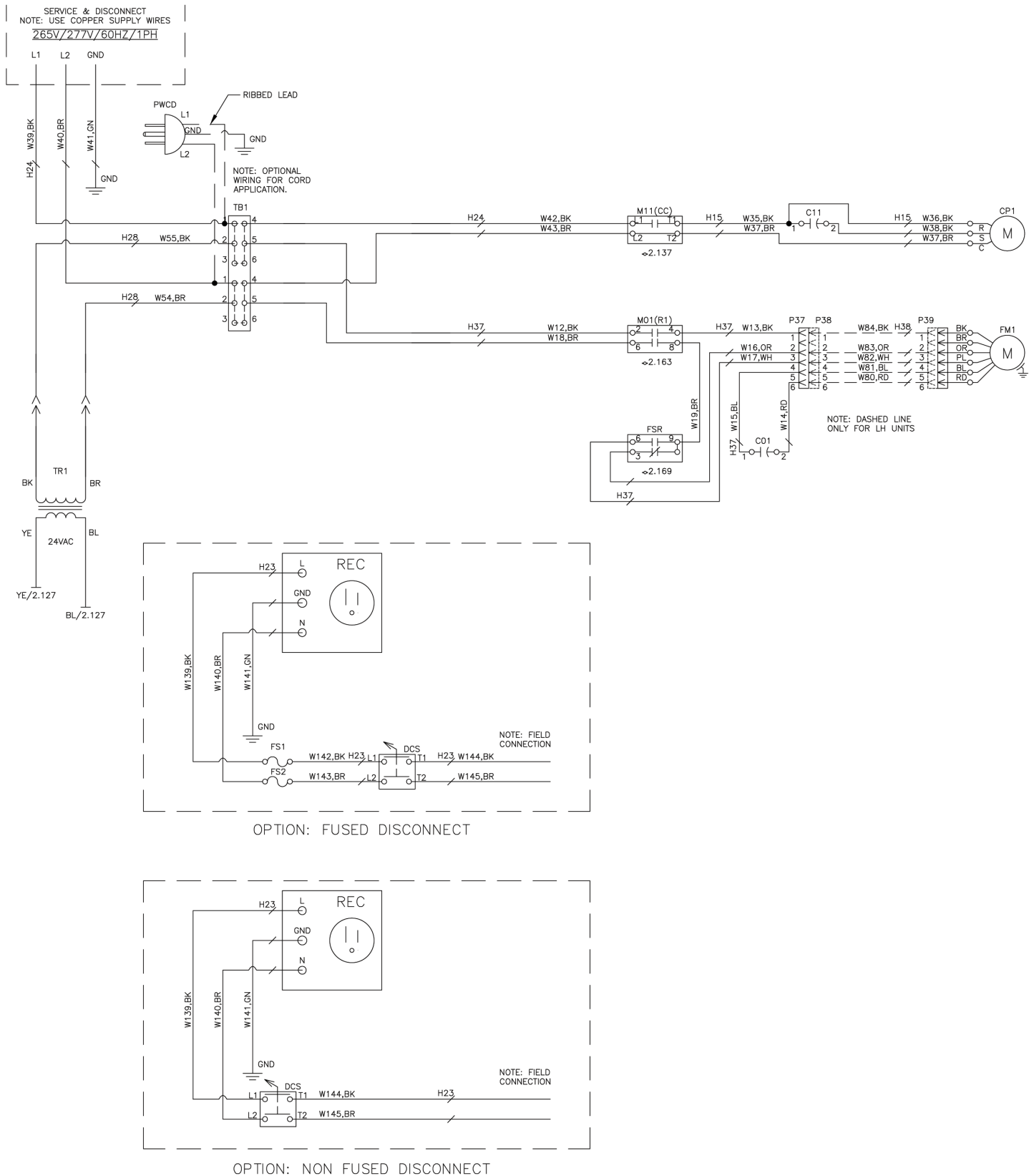
Figure 24: 208-230/60/1 Without Electric Heat



**Figure 25: MicroTech Unit Control Without Electric Heat - 208-230/60/1**





**Figure 28: 265/60/1 with Wall Mounted Room Temperature Sensor**





## Wiring Schematics Legend for “Typical Wiring Diagrams”

LEGEND			
<b>C01</b>	Fan Motor Capacitor	<b>LWT</b>	Leaving Water Temperature Sensor
<b>C11</b>	Compressor Capacitor	<b>M01</b>	Fan Motor Contactor
<b>CP1</b>	Compressor	<b>M11</b>	Compressor Contactor
<b>COS</b>	Condensate Overflow Protection Sensor	<b>MCB</b>	Main Control Board
<b>DAT</b>	Discharge Air Temperature Sensor	<b>NCB</b>	Network Control Board
<b>DCS</b>	Disconnect Switch	<b>NSB</b>	Night Set Back Switch
<b>DPG</b>	Drain Pan Ground	<b>OLP</b>	Overload Protector - Compressor Motor
<b>EB1</b>	Expansion Control Board 1	<b>P1-^</b>	Wire Plug
<b>EWT</b>	Entering Water Temperature Sensor	<b>PWCD</b>	Power Cord
<b>FHS</b>	Fan High Speed Relay	<b>RAT</b>	Return Air Temperature Sensor
<b>FM1</b>	Fan Motor	<b>RAT2</b>	Return Air Temperature Sensor (Unit-MTD)
<b>FS1-2</b>	Fuse 1-2	<b>REC</b>	Receptacle
<b>FSR</b>	Fan Speed Relay	<b>REH</b>	Relay Electric Heat
<b>FSS</b>	Fan Speed Switch	<b>RV1</b>	Reversing Valve 1
<b>GND</b>	Ground	<b>TB1</b>	Terminal Block, Line Voltage
<b>H1-^</b>	Wire Harness	<b>TR1</b>	Transformer - Control
<b>HP1</b>	High Pressure Switch 1	<b>TS1</b>	Terminal Strip - EG2UPC
<b>LLS</b>	Low Limit Switch	<b>UMT</b>	Unit Mounted Thermostat
<b>LP1</b>	Low Pressure Switch 1	<b>W1-^</b>	Wire
<b>LT1</b>	Compressor Suction Line Temperature Sensor 1	<b>WN1-^</b>	Wire Nut

**NOTE:** Devices in legend may or may not be on unit.

## Typical Connections for Thermostats & Temperature Sensors Applications

Figure 30: Wiring Example of Typical Heat/Cool Thermostat Connections

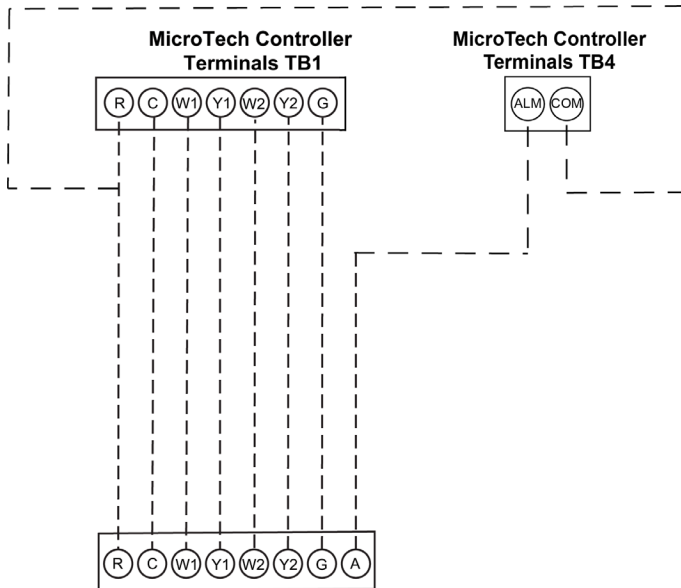
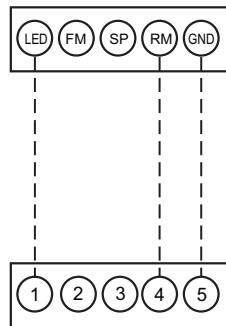


Figure 31: Basic Room Sensor Wiring

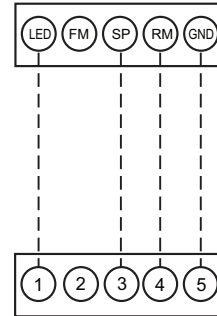
MicroTech Controller Terminals TB2



Basic Room Sensor

Figure 32: Example Wiring of SmartSource MicroTech Board to Basic Temperature Sensor Wiring

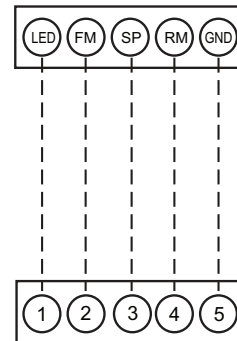
MicroTech Controller Terminals TB2



Basic Room Sensor with Cool to Warm Adjustment

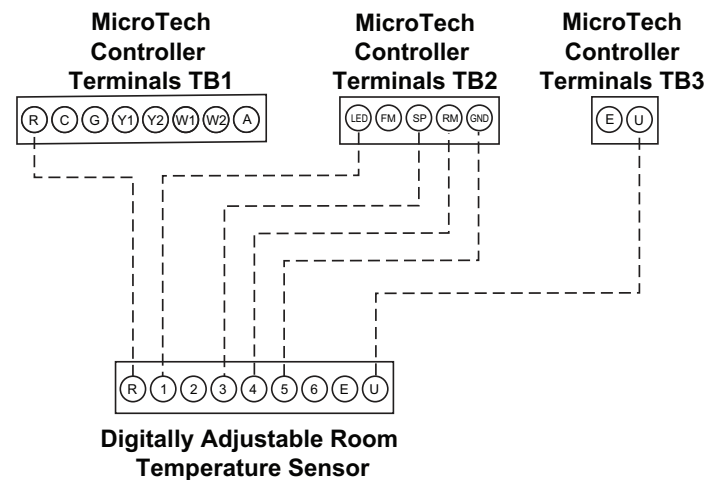
Figure 33: Room Sensor with Temperature Adjustment Wiring

MicroTech Controller Terminals TB2



Room Sensor with Temperature Adjustment

Figure 34: Digitally Adjustable Room Temperature Sensor Wiring



Digitally Adjustable Room Temperature Sensor

# Operation

## 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 48](#).

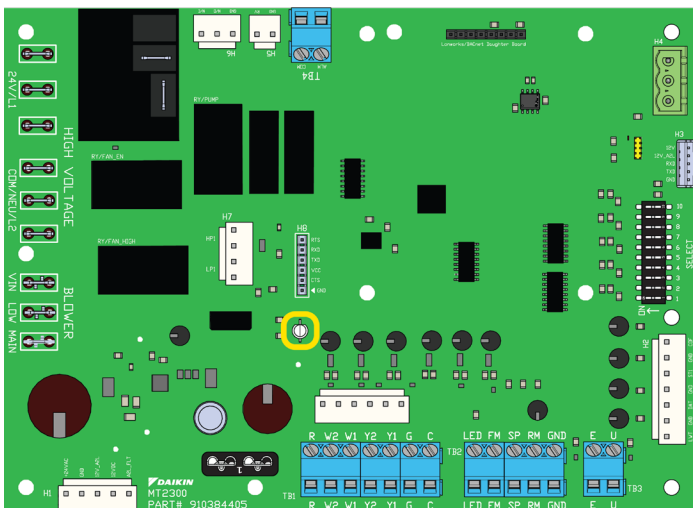
## MT2300 Board LED Indicator

When the unit controller is communicating a certain fault or mode, the LED indicator will flash a designated pattern or sequence. See [Figure 35](#) for the location of the MT2300 board LED indicator. [Table 12](#) gives a description of the LED activity. Refer to OM 1364 for additional information.

**Table 12: MT2300 Board LED Indicator Sequence**

LED Activity	Type	Color	Description
1 Flash	Mode	Green	No Call for Heating/Cooling/Dehumidification
2 Flash	Mode	Green	Call for Cooling
3 Flash	Mode	Green	Call for Heating
4 Flash	Mode	Green	Call for Fan Only

**Figure 35: LED Indicator on MT2300 Board**



## Check as completed:

### NOTICE

To prevent compressor cycling and all compressors from starting up together after loss of power, the required minimum on/off time default is 300 seconds plus the random restart of 0 to 60 seconds.

- Open all valves to full open position and turn on power to the unit.
- 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.

Check the unit controller LED indicator for "Fan Only" mode operation.

- 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.

Check the unit controller LED indicator for "Cool" mode operation.

After a few minutes of operation, check the discharge grilles for cool air delivery. To insure proper water flow, measure the temperature difference between entering and leaving water. The temperature differential should be 10°F to 14°F (5°C to 8°C) for units in cooling mode. 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.

- 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. 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).

Check the unit controller LED indicator for "Heat" mode operation.

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 rise exceeds 35°F (19°C), then the air flow rate is inadequate.

- 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.

- If the unit does not operate, check the following points:
  - Is supply voltage to the machine compatible?
  - Is thermostat type appropriate?
  - Is thermostat wiring correct?
- If the unit operates but stops after a brief period:
  - Is there proper airflow? Check for dirty filter.
  - Is there proper water flow rate within temperature limits?  
Check water balancing; back flush unit if dirt-clogged.
- Check for refrigerant piping rubbing against cabinet or other piping causing vibration. Check fan wheels, set screws, shaft, etc.

## Controls

**Table 13: MicroTech 2300 Unit Controller Connector and Terminal Descriptions**

Connector	I/O	Type	Signal	Description
H1-1	+24VAC	Power	VAC	Control Power Voltage
H1-2	GND	Power	Ground	Control Power Common
H1-3	12V_A2L	Input	VDC	A2L Sense Voltage
H1-4	12 VDC	Output	VDC	A2L Mitigation Voltage
H1-5	A2L_ALM	Input	Digital	A2L Fault Alarm
H2-1	LWT	Input	Analog	Leaving Water Temperature
H2-2	GND	REF	Common	
H2-3	DAT	Input	Analog	Discharge Air Temperature
H2-4	GND	REF	Common	
H2-5	ST1	Input	Analog	Comp1 Suction Temperature
H2-6	GND	REF	Common	
H2-7	COF	Input	Analog	Condensate Overflow
H3-1	12V	Output	VDC	Base/Expansion Board Interface
H3-2	12V_A2L	Output	VDC	
H3-3	RXD	COM	UART	
H3-4	TXD	COM	UART	
H3-5	GND	COM	UART	
H4-1	B(+)	COM	N/A	Future Use
H4-2	A(-)	COM	N/A	
H4-3	GND	COM	N/A	
H5-1	GND	REF	Common	Comp1 Reversing Valve
H5-2	RV	Output	24 VAC	
H6-1	GND	REF	Common	Pump Request - Common (Ground) Terminal
H6-2	NO	Output	24 VAC	Pump Request - Normally Open Terminal for Normally Closed Valves
H6-3	NC	Output	24 VAC	Pump Request - Normally Closed Terminal for Normally Open Valves
H7-1,2	LP1	Input	Digital	Comp1 Low Pressure
H7-3,4	HP1	Input	Digital	Comp1 High Pressure
TB1-1	R	Output	24 VAC	Thermostat 24 VAC Power
TB1-2	W2	Input	24 VAC	Thermostat Heat Stage 2
TB1-3	W1	Input	24 VAC	Thermostat Heat Stage 1
TB1-4	Y2	Input	24 VAC	Thermostat Cool Stage 2
TB1-5	Y1	Input	24 VAC	Thermostat Cool Stage 1
TB1-6	G	Input	24 VAC	Thermostat Fan
TB1-7	C	REF	Common	Thermostat Common
TB2-1	LED	Output	5 VDC	Room Sensor LED
TB2-2	FM	Input	Analog	Room Sensor Fan/Mode

Connector	I/O	Type	Signal	Description
TB2-3	SP	Input	Analog	Room Sensor Setpoint Adjust
TB2-4	RM	Input	Analog	Room Sensor Air Temp / Tenant Override
TB2-5	GND	REF	Common	Room Sensor Common
TB3-1	E	Input	Digital	Emergency Shutdown
TB3-2	U	Input	Digital	Unoccupied Sensor
TB4-1,2	ALM	Output	Digital	Alarm Output - Contact Closure
BLOWER	VIN	Input	VAC	Blower Motor Voltage
BLOWER	LOW	Output	VIN	Blower Motor Low Speed
BLOWER	MAIN	Output	VIN	Blower Motor High Speed or ECM
LIVE (Relay)	Comp1	Output	L1/24V	Compressor Stage 1
LIVE x 3	24V/L1	Input	VAC	COMP1 Line1 Control Voltage
LIVE x 3	COM/NEU/L2	Input	VAC	COMP1 Line2 Control Voltage
Daughter Board	BACnet	COM	SPI	BACnet MS/TP Only

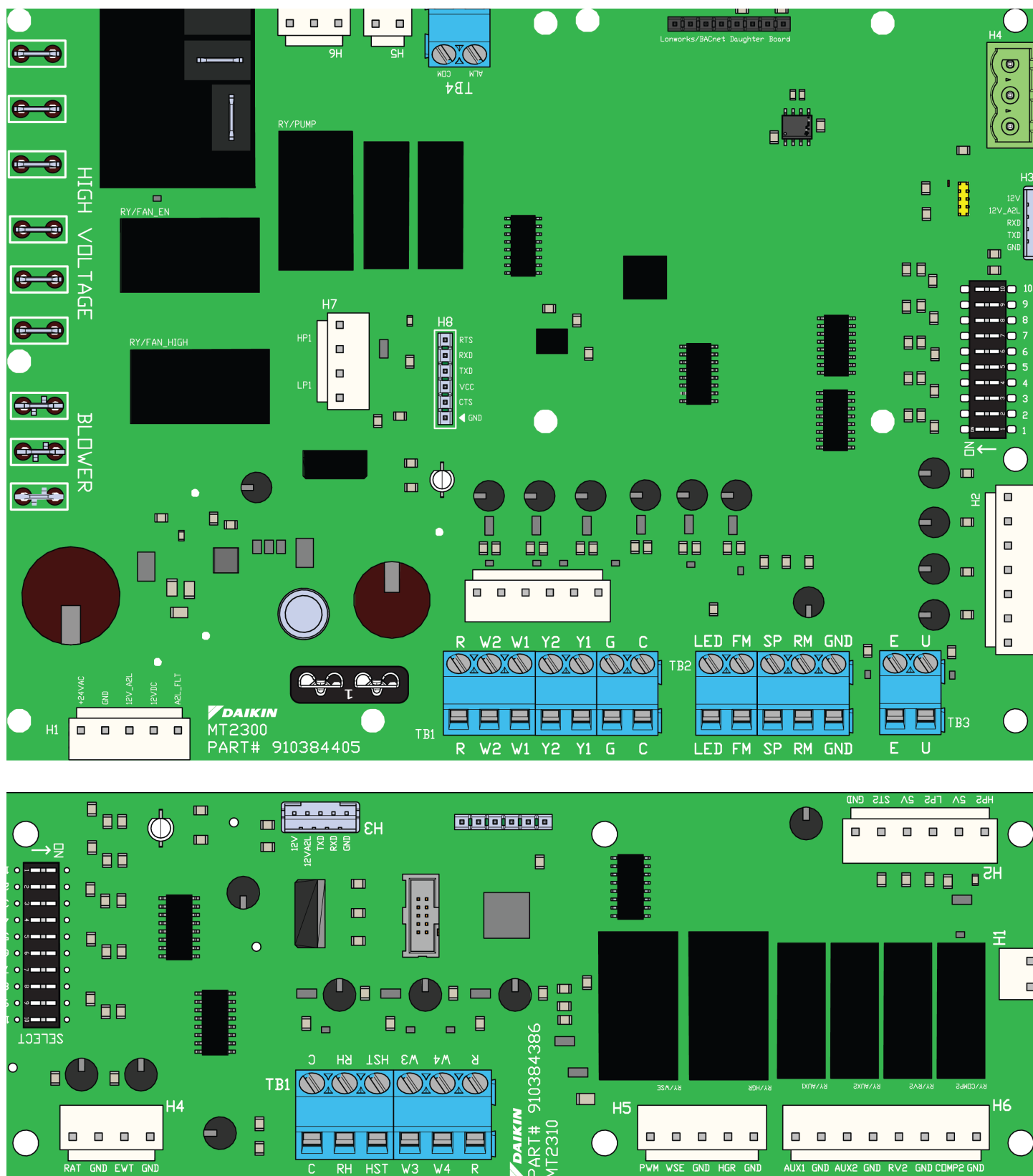
**Table 14: MT2310 I/O Board Connectors and Terminals**

Connector	I/O	Type	Signal	Description
H1-1	GND	Power	Ground	Control Power Common
H1-2	+24VAC	Power	VAC	Control Power Voltage
H2-1 <sup>1</sup>	GND	REF	Common	Comp2 Suction Temperature
H2-2 <sup>1</sup>	ST2	Input	Analog	
H2-3,4 <sup>1</sup>	LP2	Input	Digital	
H2-5,6 <sup>1</sup>	HP2	Input	Digital	Comp2 High Pressure
H3-1	12V	Input	VDC	Base/Expansion Interface
H3-2	12V_A2L	Input	VDC	
H3-3	TXD	COM	UART	
H3-4	RXD	COM	UART	
H3-5	GND	REF	Common	
H4-1	RAT	Input	Analog	Return Air Temperature
H4-2	GND	REF	Common	
H4-3	EWT	Input	Analog	Entering Water Temperature
H4-4	GND	REF	Common	
H5-1 <sup>1</sup>	GND	REF	Common	Hot Gas Reheat Valve
H5-2 <sup>1</sup>	HGR	Output	24 VAC	
H5-3 <sup>1</sup>	GND	REF	Common	Waterside Economizer Valve
H5-4 <sup>1</sup>	WSE	Output	24 VAC	
H5-5 <sup>1</sup>	PWM	Output	PWM	Variable Speed Blower Motor
H6-1 <sup>1</sup>	GND	REF	Common	Compressor Stage 2
H6-2 <sup>1</sup>	COMP2	Output	24 VAC	
H6-3 <sup>1</sup>	GND	REF	Common	Comp2 Reversing Valve
H6-4 <sup>1</sup>	RV2	Output	24 VAC	
H6-5	GND	REF	Common	Auxiliary Heat 2
H6-6	AUX2	Output	24 VAC	
H6-7	GND	REF	Common	Auxiliary Heat 1 / Hydronic Heat
H6-8	AUX1	Output	24 VAC	
TB1-1	C	REF	Common	Input Common
TB1-2	RH	Input	Analog	Space Relative Humidity
TB1-3	HST	Input	24VAC	Humidistat
TB1-4	W3	Input	24VAC	Thermostat - Stage 3 Heat
TB1-5	W4	Input	24VAC	Thermostat - Stage 4 Heat or Stage 3 Cool
TB1-6	R	Output	24 VAC	Thermostat - 24 VAC Power

<sup>1</sup> Not used on the Console WSHP unit.



Figure 36: MicroTech2300 Unit Controller and MicroTech 2310 I/O Expansion Board Terminal Location

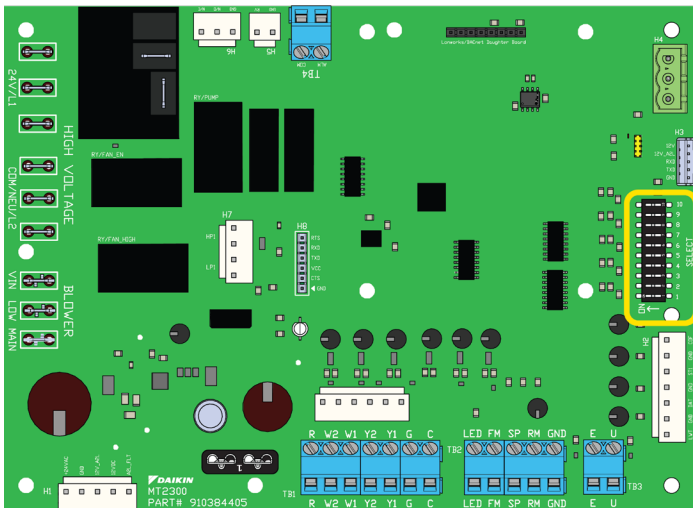


## Configuration DIP Switches

### WARNING

Proper antifreeze/water solution is required to minimize the potential of fluid freeze-up. Switch SW3 is factory set for water freeze protection with the switch closed. Operation at fluid temperatures below 32°F (0°C) with anti-freeze protection requires SW3 to be field configured for the switch on. If unit is employing a fresh water system (no anti-freeze protection), it is extremely important that SW3 switch setting remains in the off 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 or property damage and will void unit warranty.

**Figure 37: Location of Configuration DIP Switches on the MT2300 Unit Controller**



### CAUTION

The MT2300 unit controller incorporates static sensitive devices. A static charge from touching the device can damage the electronic components. To help prevent damage during service, use static discharge wrist straps. Static discharge wrist straps are grounded to the heat pump chassis through a 1M ohm resistor.

**Table 15: MT2300 Main Board DIP Switch Settings**

Switch	Description	Position	Model/Options
SW1	Normal/Test Mode	SW1 = OFF (0)	Normal Operation
		SW1 = ON (1)	Service/Test Mode
SW2	Fan Operation	SW2 = OFF (0)	Continuous Fan Operation (On)
		SW2 = ON (1)	Cycling Fan Operation (Auto)
SW3 <sup>1</sup>	Loop Fluid	SW3 = OFF (0)	Water Loop Fluid
		SW3 = ON (1)	Glycol Loop Fluid
SW4	Freeze Fault Detect (FFD)	SW4 = OFF (0)	Disabled FFD
		SW4 = ON (1)	Enabled FFD with LWT sensor installed
SW5	Room Sensor Setpoint Adjust Range	SW5 = OFF (0)	Short Range -5 to +5 F (-2.78 to +2.78 C)
		SW5 = ON (1)	Long Range 55 to 95 F (12.78 to 35 C)

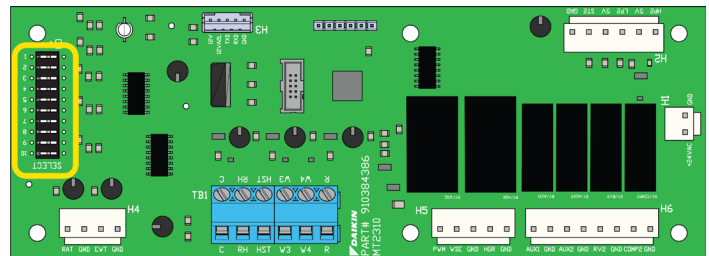
Switch	Description	Position	Model/Options
SW6	Thermostat/Room Sensor Control	SW6 = OFF (0)	Thermostat Control
		SW6 = ON (1)	Room Sensor Control
SW7/ SW8 <sup>2</sup>	Single Compressor Heating Source	SW7 = OFF (0)	Allow Compressor in Heating Mode
		SW7 = ON (1)	Disable Compressor in Heating Mode
	Single Compressor I/O Expansion Module	SW8 = OFF (0)	I/O Expansion Module Not Required
		SW8 = ON (1)	I/O Expansion Module is Required
	Two Compressor Availability <sup>3</sup>	SW7 = OFF (0) SW8 = OFF (0)	Both Compressors Available (Automatic Compressor Fail Replace)
		SW7 = ON (1) SW8 = OFF (0)	Lead Compressor Available (Lag Compressor is Off-Line)
		SW7 = OFF (0) SW8 = ON (1)	No Compressors Available
SW9	WSHP Base Board Application Select	SW9 = OFF (0)	Single Compressor WSHP Application
		SW9 = ON (1)	Two Compressor Application <sup>3</sup>
SW10	Discrete/Variable Speed Fan Select	SW10 = OFF (0)	Fan Single (Fan Main Output) or Variable (PWM) Speed <sup>3</sup>
		SW10 = ON (1)	Dual Speed Fan (Low & High Discrete Outputs)

<sup>1</sup> See Warning under "Configuration DIP Switches" for DIP switch 3 (SW3) setting information.

<sup>2</sup> The functionality of SW7 and SW8 depends on the setting of SW9. If SW9 is OFF, SW7 and SW8 will be for Heating Source and I/O Expansion Module functionality. If SW9 is ON, SW7 and SW8 will be for Compressor Availability functionality.

<sup>3</sup> Not used on the Console WSHP unit.

**Figure 38: MT2310 I/O Expansion DIP Switches**



**Table 16: MT2310 I/O Expansion Module DIP Switch Settings**

Switch	Description	Position	Model/Options
SW1-4 <sup>2</sup>	Variable Fan Speed Row Selection	0000 to 1111 Binary	Variable Speed Fan Row Selection (1 to 16), used when "nciVsNetCnfgEn" is set to "Disable" the network override.
SW5/ SW6	Secondary Heating Options	SW5 = OFF (0) SW6 = OFF (0)	None
		SW5 = ON (1) SW6 = OFF (0)	Supplemental Electric Heat
		SW5 = OFF (0) SW6 = ON (1)	Boilerless Electric Heat <sup>2</sup>
		SW5 = ON (1) SW6 = ON (1)	Hydronic Heating <sup>2</sup>

Switch	Description	Position	Model/Options
<b>SW7<sup>2</sup></b>	Hot Gas Reheat (HGRH)	SW7 = OFF (0)	HGRH Disabled
		SW7 = ON (1)	HGRH Enabled
<b>SW8<sup>2</sup></b>	Waterside Economizer (WSE)	SW8 = OFF (0)	Waterside Economizer Disabled
		SW8 = ON (1)	Waterside Economizer Enabled
<b>SW9</b>	WSHP I/O Expansion Application Select	SW9 = OFF (0)	Single Compressor Application
		SW9 = ON (1)	Two Compressor Application <sup>2</sup>
<b>SW10<sup>1</sup></b>	Single Compressor: Speed	SW10 = OFF (0)	Single Speed Compressor
		SW10 = ON (1)	Dual Speed Compressor <sup>2</sup>
	Two Compressor: Lead Compressor Select <sup>2</sup>	SW10 = OFF (0)	Compressor #1 is Lead
		SW10 = ON (1)	Compressor #2 is Lead

<sup>1</sup> The functionality of SW10 depends on the setting of SW9. If SW9 is OFF, SW10 will be for Single Compressor Speed. If SW9 is ON, SW10 will be for Lead Compressor Select.

<sup>2</sup> Not used on the Console WSHP unit.

## MicroTech SmartSource Unit Controller

The MicroTech SmartSource unit controller allows thermostat, Daikin Applied sensor and DDC standalone operation. The R (24VAC) terminal is used to operate thermostat inputs G, Y1, Y2, W1, W2, W3, W4 and TB2. The C (common) terminal is used to control inputs U and E. No external power sources may be used to operate the MicroTech controller. All units must be properly grounded per local code requirements.

### NOTICE

For information on sequence of operation and troubleshooting refer to OM 1364.

## Remote Reset of Automatic Lockouts

The Remote Reset feature provides the means to remotely reset automatic lockouts. There are (3) ways to accomplish a unit reset once the fault condition has been remedied:

- Using the thermostat, cycle from cool or heat to off and back to heat or cool two times within 30 seconds.
- Press the Room Sensor or Thermostat Timed Override/Reset Button for more than 10 seconds.
- Turn the unit power off and wait 10 seconds to turn back on.

When the cause of the fault condition has been remedied, and the unit is cycled from not requiring heating or cooling to needing heating or cooling 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.

### NOTICE

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 Room Temperature Sensor connection at TB2 pin 4, RS clearing the lockout alarm once the cause of the fault condition has been remedied.

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

**Table 17: MT2300 Unit Controller Status LEDs**

LED Activity	Type	Color	Description
Steady ON	Fault	Yellow	MCU Not Programmed
Steady ON	Fault	Red	MCU Hardware Failure
1 Flash	Fault	R–Y–G	Invalid Configuration
2 Flash	Fault	R–Y–G	Incompatible Software
1 Flash	Fault	R–Y	I/O Exp Board Communications Fail
1 Flash	Mode	G–Y	Service / Test Mode Active
Rapid Flash <sup>1</sup>	Fault	Red	A2L Mitigation – Refrigerant Leak
1 Flash	Fault	Red	Compressor #1 High Pressure
2 Flash	Fault	Red	Compressor #1 Low Pressure
3 Flash	Fault	Red	Compressor #1 Suction Temp Sensor Out of Range
4 Flash	Fault	Red	Compressor #1 Low Suction Temp
5 Flash <sup>1</sup>	Fault	Red	Compressor #2 High Pressure
6 Flash <sup>1</sup>	Fault	Red	Compressor #2 Low Pressure
7 Flash <sup>1</sup>	Fault	Red	Compressor #2 Suction Temp Sensor Out of Range
8 Flash <sup>1</sup>	Fault	Red	Compressor #2 Low Suction Temp
9 Flash <sup>1</sup>	Fault	Red	A2L Mitigation – Control Board Without Power
Rapid Flash <sup>1</sup>	Mode	Yellow	A2L Mitigation – Refrigerant Sensor Out of Range
1 Flash	Fault	Yellow	Compressor Low Voltage Brownout
2 Flash	Fault	Yellow	Freeze Fault Detect (FFD)
3 Flash	Fault	Yellow	Control Temp Sensor Out of Range
4 Flash	Fault	Yellow	Entering Water Temp Sensor Out of Range
5 Flash	Fault	Yellow	Leaving Water Temp Sensor Out of Range
6 Flash	Fault	Yellow	Relative Humidity Sensor Out of Range
7 Flash	Fault	Yellow	Condensate Overflow
8 Flash	Fault	Yellow	Space Temp Sensor Out of Range
9 Flash	Fault	Yellow	Return Air Temp Sensor Out of Range
Rapid Flash	Mode	Green	Emergency Shutdown
1 Flash	Mode	Green	No Call for Heating / Cooling / Dehumidification
2 Flash	Mode	Green	Call for Cooling
3 Flash	Mode	Green	Call for Heating
4 Flash	Mode	Green	Call for Fan Only

LED Activity	Type	Color	Description
5 Flash	Mode	Green	Unoccupied Mode Active
6 Flash <sup>1</sup>	Mode	Green	Call for Dehumidification
7 Flash	Mode	Green	Low Entering Water Temp
8 Flash <sup>1</sup>	Mode	Green	HGRH Low Return Air Temp Cutout
9 Flash <sup>1</sup>	Mode	Green	WSE Low Temp Cutout

<sup>1</sup> Not used on the Console WSHP unit.

**Table 18: MT2310 I/O Expansion Board Status LEDs**

LED Activity	Type	Color	Description
1 Flash <sup>2</sup>	Mode <sup>1</sup>	Green	Variable Speed Fan OFF
2 Flash <sup>2</sup>	Mode <sup>1</sup>	Green	Variable Speed Fan ON: 0 to 20%
3 Flash <sup>2</sup>	Mode <sup>1</sup>	Green	Variable Speed Fan ON: 21 to 30%
4 Flash <sup>2</sup>	Mode <sup>1</sup>	Green	Variable Speed Fan ON: 31 to 40%
5 Flash <sup>2</sup>	Mode <sup>1</sup>	Green	Variable Speed Fan ON: 41 to 50%
6 Flash <sup>2</sup>	Mode <sup>1</sup>	Green	Variable Speed Fan ON: 51 to 60%
7 Flash <sup>2</sup>	Mode <sup>1</sup>	Green	Variable Speed Fan ON: 61 to 70%
8 Flash <sup>2</sup>	Mode <sup>1</sup>	Green	Variable Speed Fan ON: 71 to 80%
9 Flash <sup>2</sup>	Mode <sup>1</sup>	Green	Variable Speed Fan ON: 81 to 90%
10 Flash <sup>2</sup>	Mode <sup>1</sup>	Green	Variable Speed Fan ON: 91 to 100%
Steady ON	Fault	Yellow	MCU Not Programmed
Steady ON	Fault	Red	MCU Hardware Failure
1 Flash	Fault	R-Y-G	Invalid Configuration
2 Flash	Fault	R-Y-G	Incompatible Software
1 Flash	Fault	R-Y	Base Board Communications Failure
Rapid Flash <sup>2</sup>	Fault	Red	A2L Mitigation - Alarm Condition

<sup>1</sup> When the BACnet network is overriding the fan speed DIP switch selection, the LED interval color will be yellow instead of OFF.

<sup>2</sup> Not used on the Console WSHP unit.

**Table 19: Priority Level of Faults and Modes with Resets**

Alarm Enumeration (BACnet)	Fault	Indication	Reset <sup>1</sup>
1	No Alarm	Normal operation	NA
2	MT2310 Communication Failure	Single compressor unit with SW #8 set to ON position	A
3	Incompatible Software	Incorrect Software Part or Version Numbers	P
4	Invalid Configuration	Base & I/O Exp Application Mismatch or MT2310 detected but not required (SW #8)	P
5 <sup>3</sup>	A2L Alarm	A2L refrigerant leak detected	A
6 <sup>3</sup>	A2L Error - Power	A2L mitigation control is not powered	A
7	Compressor Low Voltage	"Brownout" condition exists	A
8	Comp #1 High Pressure	Compressor #1 high pressure switch opened	T,N
9 <sup>3</sup>	Comp #2 High Pressure	Compressor #2 high pressure switch opened	T,N

Alarm Enumeration (BACnet)	Fault	Indication	Reset <sup>1</sup>
10	Comp #1 Low Pressure	Compressor #1 low pressure switch opened	T,N
11 <sup>3</sup>	Comp #2 Low Pressure	Compressor #2 low pressure switch opened	T,N
12	Comp #1 Suction Temp Sensor	Compressor #1 suction temp sensor reading "out of range"	N
13 <sup>3</sup>	Comp #2 Suction Temp Sensor	Compressor #2 suction temp sensor reading "out of range"	N
14	Leaving Water Temp (LWT) Sensor	LWT sensor not present (SW #4 = ON)	N
15	Freeze Fault Detect (FFD)	LWT sensor temp below freeze setpoint (SW #4 = ON)	T,N
16	Comp #1 Low Suction Temp (ST1)	ST1 sensor temp below minimum setpoint	A,T,N <sup>2</sup>
17 <sup>3</sup>	Comp #2 Low Suction Temp (ST2)	ST2 sensor temp below minimum setpoint	A,T,N <sup>2</sup>
18 <sup>3</sup>	A2L Error - Sensor	A2L sensor lost communication or reported failure	A
19	Control Temp Sensor Failure	Room Temp and Return Air Temp sensor reading "out of range"	N
20	Entering Water Temp (EWT) Sensor Failure	EWT sensor reading "out of range"	N
21	Room Temp Sensor Failure	Room temp sensor reading "out of range"	N
22	Return Air Temp Sensor Failure	RAT sensor reading "out of range"	N
23	Space RH Sensor Failure	Space RH sensor reading "out of range"	N
24	Low Entering Water Temp (EWT)	EWT sensor reading below minimum setpoint	A
25	Condensate Overflow	Condensate overflow sensor indicates water present	A,N
26 <sup>3</sup>	Waterside Economizer (WSE) Low Temp	WSE temp sensor reading below minimum setpoint	A

<sup>1</sup> "A" = Auto Reset, "T" = Tenant Override Button Reset, "N" = Network Reset, "P" = power cycle only

<sup>2</sup> Low suction temperature faults have "Intelligent Reset" logic - 3 faults in a 24 hour period disables the auto reset function.

<sup>3</sup> Not used on the Console WSHP unit.

## MT2300 Controller with an Optional BACnet Communication Module



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

- OM 1364 - MT2300 Unit Controller with MT2310 I/O Expansion Board MicroTech Controller
- IM 956 - Temperature Sensors for Units with MicroTechIII or MT2300 Unit Controller and LonWorks® or BACnet Communication Module
- IM 1363 - MicroTech MT2300 Water Source Heat Pump Unit Controller BACnet MS/TP Communication Module
- ED 19129 - MicroTech MT2300 Water Source Heat Pump Unit Controller BACnet Protocol Information

Daikin Applied water source heat pumps are available with an optional BACnet MS/TP communication module that is designed to communicate over a BACnet MS/TP communications network to a building automation system (BAS). It can be factory or field-installed.

The unit controller is programmed and tested with all the logic required to monitor and control the unit. An optional wall sensor may be used with the communication module to provide limited local control of the water source heat pump. The unit controller monitors water and air temperatures and passes information to the communication module. The module communicates with the BAS, to provide network control of the water source heat pump.

The module makes operational data and commands available on a communications network using BACnet objects and properties:

- The network cable is a shielded twisted-pair cable
- Network communications run up to 76.8 kbps
- DIP switches on the controller enable the MS/TP MAC address to be set in the range 0-127
- Four green status LEDs on the communication module indicate communication activity on the MS/TP communication network and with the unit controller

***MicroTech unit controller with BACnet MS/TP communication module orchestrates the following unit operations:***

- Enable heating and cooling to maintain setpoint based on a room sensor
- Enable fan and compressor operation
- Monitors all equipment protection controls
- Monitors room and discharge air temperatures
- Monitors leaving water temperature
- Relays status of all vital unit functions

***The MicroTech unit controller with an optional communication module includes:***

- Return Air Temperature sensor (RAT) (field-installed)
- Discharge Air Temperature sensor (DAT) (field-installed)
- Leaving Water Temperature sensor (LWT)

### NOTICE

Refer to IM 956 for details to install RAT & DAT sensors.

The communication module provides access to setpoints for operational control.

***Available wall sensors include:***

- Room sensor with LED status and tenant override button
- Room sensor with LED status, tenant override button, and  $\pm 5^{\circ}\text{F}$  setpoint adjustment
- Room sensor with LED status, tenant override button,  $55^{\circ}$  to  $95^{\circ}\text{F}$  ( $13^{\circ}$  to  $35^{\circ}\text{C}$ ) setpoint adjustment



# Maintenance

## Charging

It is recommended to charge the unit with liquid R-32. 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-32. 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-32 in a 300 psig rated cylinder.



### WARNING

Recycle/recovery equipment must be designated for R-32. Use of improper equipment to recycle/recover R-32 can cause severe injury or death.

### NOTICE

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 Applied 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	335-370 psig	10° to 14°

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

## General Maintenance

1. 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.
2. 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.
3. The condensate drain pan should be checked annually and cleaned and flushed as required.
4. 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.
5. 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.

### NOTICE

Strainers should be inspected regularly and cleaned as needed.

# Troubleshooting

**Table 20: Troubleshooting Refrigeration Circuit**

Symptom	Head Pressure	Suction Pressure	Compressor Amp Draw	Super Heat	Subcooling	Air Temp Differential	Water (Loops) Temp Differential	Safety Lock Out
Undercharge System (Possible Leak)	Low	Low	Low	High	Low	Low	Low	Low Pressure
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	Low Temp/High Pressure

## Troubleshooting the Water Source Heat Pump Unit

### Compressor runs in short cycle

- Check wiring - loose or broken and check for faulty connection.
- Check relays and contacts, also capacitor and wiring.
- Check high pressure switch, low pressure switch and low temperature switch to see if unit is cycling on the safety.
- Check to see if the reversing valve is not hung up and is operating correctly.
- Check condensate overflow sensor in cool mode of operation.
- Check thermostat or room sensor for proper location.

### Neither fan, nor compressor runs and all LED lights are off

- Unit control, check thermostat for correct wiring or faulty thermostat.
- Wire may be loose or broken. Replace or tighten wires.
- Fuse may be blown, circuit breaker is open.
- Low voltage, check power supply voltage.

### Fan operates, compressor does not

- Check wiring - loose or broken and check for bad connection.
- High or Low pressure lockout:
  - a. Cool mode, check water flow.
  - b. Heating mode, check air flow.
  - c. Check reversing valve for proper valve position.

- Check compressor overload - make sure it is closed.
- Check compressor to ground, or for internal short to ground.
- Compressor winding may be open. Check continuity with ohm meter.

### Compressor attempts to start but does not



- Check compressor wiring for defective wiring or loose connection.
- Check for defective compressor internal windings with ohm meter.
- Check for faulty compressor capacitor.
- Check for lock rotor amp draw.

### Insufficient cooling or heating

- Check thermostat for improper location.
- Check for proper air flow - filter could be dirty.
- Check blower assembly for dirt or faulty fan motor capacity.
- Check for low refrigerant charge.
- Check amp draw on blower assembly.
- Check for proper water flow and delta T (°F).

# Refrigerant Information


## Refrigerant Guidelines

 <b>WARNING</b>	
 <b>A2L</b>	<p>This unit contains R-32, a class A2L refrigerant that is flammable. This unit should only be installed, serviced, repaired, and disposed of by qualified personnel licensed or certified in their jurisdiction to work with R-32 refrigerant. Installation and maintenance must be done in accordance with this manual. Improper handling of this equipment can cause equipment damage or personal injury.</p>
<p>For installation only in locations not accessible to the general public.</p> <p>Be aware that R-32 refrigerant may not contain an odor. Place in a well ventilated area to prevent accumulation of refrigerant. When installing the unit in a small room, take measures to keep the refrigerant concentration from exceeding allowable safety limits. Excessive refrigerant leaks, in the event of an accident in a closed ambient space, can lead to oxygen deficiency.</p> <p>Do not pierce or burn this unit.</p> <p>Never use an open flame during service or repair. Never store in a room with continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater.), where there is ignitable dust suspension in the air, or where volatile flammables such as thinner or gasoline are handled.</p> <p>Only use pipes, nuts, and tools intended for exclusive use with R-32 refrigerant in compliance with national codes (ASHRAE15 or IRC).</p> <p>Do not mix air or gas other than R-32 in the refrigerant system. If air enters the refrigerant system, an excessively high pressure results, which may cause equipment damage or injury.</p> <p>Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.</p>	

## Competence of Personnel

Information of procedures additional to usual information for refrigerating equipment installation, repair, maintenance and decommission procedures is required when equipment with flammable refrigerants is affected.

The training of these procedures is carried out by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. The achieved competence should be documented by a certificate.

 <b>WARNING</b>	
<p>Service on this equipment is to be performed by qualified refrigeration personnel familiar with equipment operation, maintenance, correct servicing procedures, and the safety hazards inherent in this work. Causes for repeated tripping of equipment protection controls must be investigated and corrected. Disconnect all power before doing any service inside the unit. If refrigerant leaks from the unit, there is a potential danger of suffocation since refrigerant will displace the air in the immediate area. Servicing this equipment must comply with the requirements of all applicable industry related published standards and local, state and federal, statutes, regulations and codes in regards to refrigerant reclamation and venting. Avoid exposing refrigerant to an open flame or other ignition source.</p>	

Maintaining and servicing R-32 refrigerant should only be performed as recommended by this manual and by personnel licensed or certified in their jurisdiction to handle A2L refrigerants. Dismantling the unit and treatment of the refrigerant, oil, and additional parts must be done in accordance with the relevant local, state, and national regulations.

Only use tools meant for use on R-32 refrigerant, such as a gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, or refrigerant recovery equipment.

The following guidelines align with UL Standard 60335-2-40.

## Maintenance and Repair

- Portable equipment shall be repaired outside or in a workshop specially equipped for servicing units with **FLAMMABLE REFRIGERANTS**.
- Ensure sufficient ventilation at the repair place.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark. The standard procedure to short circuit the capacitor terminals usually creates sparks.
- When brazing is required, the following procedures shall be carried out in the right order:
  - Remove the refrigerant. If the recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
  - Evacuate the refrigerant circuit.
  - Remove parts to be replaced by cutting, not by flame.
  - Purge the braze point with nitrogen during the brazing procedure.
  - Carry out a leak test before charging with refrigerant.
- Reassemble sealed enclosures accurately. If seals are worn, replace them.
- Check safety equipment before putting into service.

## Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using **FLAMMABLE REFRIGERANTS**:

- the actual **REFRIGERANT CHARGE** is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

- marking to the equipment continues to be visible and legible. Markings that are illegible shall be corrected; and
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

### Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system; and
- that there is continuity of earth bonding.

### Sealed electrical and intrinsically safe components

- All sealed electrical components shall be replaced.
- All intrinsically safe components must be replaced.

### Cabling

- Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

### Leak Detection

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. NEVER use the following when attempting to detect flammable refrigerant leaks:

- A halide torch (or any other detector using a naked flame); or
- Substances containing chlorine.

### Detection of flammable refrigerants

The following leak detection methods are deemed acceptable for all refrigerant systems:

- Electronic leak detectors may be used to detect refrigerant leaks. For FLAMMABLE REFRIGERANTS, the sensitivity of electronic leak detectors may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set

at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.

- Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. Examples of leak detection fluids are:
  - bubble method; or
  - fluorescent method agents.
- If a leak is suspected, all open flames shall be removed/extinguished.
- If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to instructions in [“Pressure Testing and Refrigerant Evacuation”](#).

### Pressure Testing and Refrigerant Evacuation

- Make sure that air or any matter other than R-32 refrigerant does not get into the refrigeration cycle.
- If refrigerant gas leaks occur, ventilate the room/area as soon as possible.
- R-32 should always be recovered and never released directly into the environment.
- Only use tools meant for use on R-32 refrigerant (such as a gauge manifold, charging hose, or vacuum pump adapter).

### Removal and evacuation

When breaking into the refrigerant circuit to make repairs, or for any other purpose, conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration.

- The following procedure shall be adhered to:
  - i. safely remove refrigerant following local and national regulations - see [“Recovery”](#) section;
  - ii. purge the circuit with inert gas;
  - iii. evacuate;
  - iv. purge with inert gas;
  - v. open the circuit by cutting (if flammable refrigerant) or brazing.
- The refrigerant charge shall be recovered into the correct recovery cylinders according to local and national codes. For equipment containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the equipment safe for flammable refrigerants. This process might need to be repeated several times.
- Compressed air or oxygen shall not be used for purging refrigerant systems.
- For equipment containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and

continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.

- When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
- Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

## Handling and Storage

### Conditions for safe storage

- Requirements to be met by storerooms and receptacles:
  - Store only in unopened original receptacles
  - Store in a cool and dry location
- Further information about storage conditions:
  - Keep container tightly sealed
  - Store in cool, dry conditions in well sealed receptacle
  - Protect from heat and direct sunlight
- Maximum storage temperature: 40°C (104°F)

### Fire and explosion protection information

Open and handle refrigerant receptacle with care. Keep ignition sources away. Do not smoke. Protect against electrostatic charges. Waste air is to be released into the atmosphere only via suitable separators.

## Commissioning

- Ensure that the floor area is sufficient for the refrigerant charge or that the ventilation duct is assembled in a correct manner.
- Connect the pipes and carry out a leak test before charging with refrigerant.
- Check safety equipment before putting into service.

### Charging procedures

In addition to conventional charging procedures and specific unit charging guidelines, the following requirements shall be followed:

- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigeration system is electrically connected to ground to protect against electrical shock and to ensure safe discharge of static electricity during maintenance or prior to charging with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.
- Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall

be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

## Decommissioning

- If the safety is affected when the equipment is put out of service, the refrigerant charge shall be removed before decommissioning.
- Ensure sufficient ventilation at the equipment location.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark.
- Remove the refrigerant according to details in "[Recovery](#)" section. If recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
- Ensure all isolation valves on the equipment are closed off.

## Labeling

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For equipment containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

## Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.



If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that **FLAMMABLE REFRIGERANT** does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

### Recovery procedure

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant.

It is essential that electrical power is available before the task is commenced.

1. Become familiar with the equipment and its operation.
2. Isolate system electrically.
3. Before attempting the procedure, ensure that
  - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - all personal protective equipment is available and being used correctly;
  - the recovery process is supervised at all times by a competent person;
  - recovery equipment and cylinders conform to the appropriate standards.
4. Pump down refrigerant system, if possible.
5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
6. Make sure that cylinder is situated on the scale before recovery takes place.
7. Start the recovery machine and operate in accordance with instructions.
8. Do not overfill cylinders (no more than 80% volume liquid charge).
9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
10. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

### Disposal

- Waste treatment method recommendation:
  - Must be specially treated adhering to official regulations
  - Incineration in an adequate incinerator is recommended
  - Uncleaned packaging disposal must be made according to official regulations

- Ensure sufficient ventilation at the working place
- The following procedure shall be adhered to:
  - i. safely remove refrigerant following local and national regulations - see ["Recovery"](#) section;
  - ii. evacuate the refrigerant circuit;
  - iii. purge the refrigerant circuit with nitrogen gas for 5 minutes;
  - iv. evacuate again; and
  - v. If compressors are to be removed, cut out the compressor and drain the oil.

## Typical Refrigeration Cycles

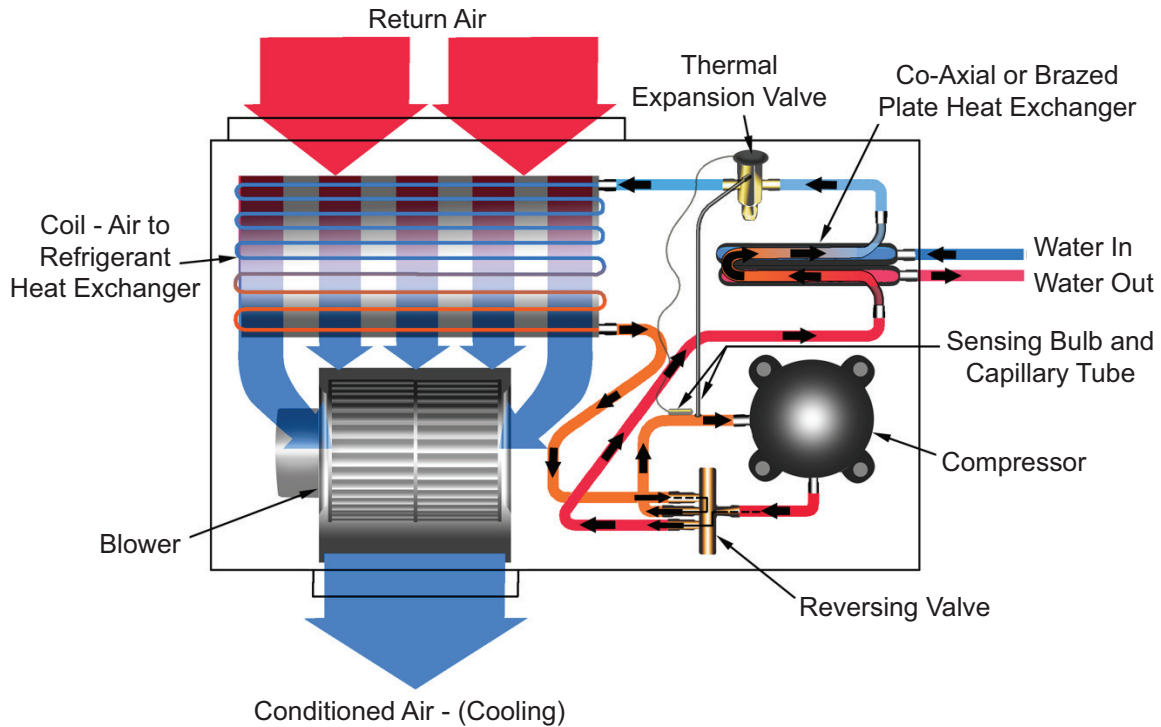
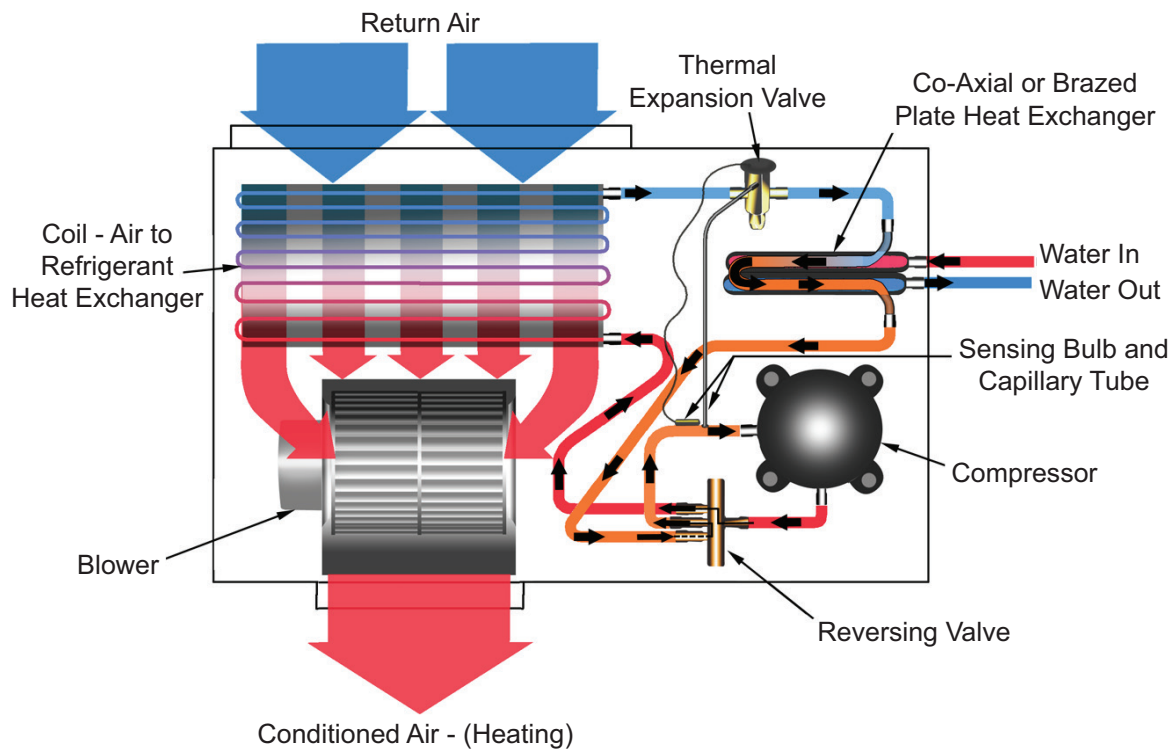
### Cooling Refrigeration Cycle

When the wall thermostat is calling for **COOLING**, the reversing valve is de-energized and directs the flow of the refrigerant (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 valve (TXV) and then 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.

### Heating Refrigeration Cycle

When the wall thermostat is calling for **HEATING**, the reversing valve is energized and directs the flow of the refrigerant (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 thermal expansion valve (TXV) then 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.



**Figure 39: Cooling Mode****Figure 40: Heating Mode**



# Warranty Registration Form

## Unit Check / Equipment Data

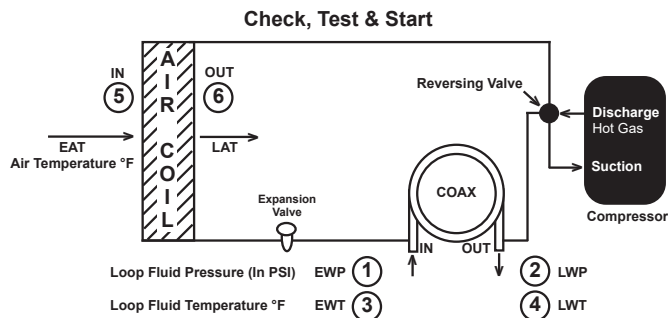
Installation Data	
Job Name _____	Check Test Date: _____
City _____	State _____ Zip _____
Daikin Model # _____	
Daikin Serial # _____	Job site Unit ID # (HP #) _____
General Contractor: _____ Mechanical Contractor: _____	
Technician Performing Start-Up: Name _____ Employer: _____	
<b>Complete equipment data from measurements taken at the locatons indicated on the drawing below.</b>	

Equipment Data	
<b>Flow Rate</b> ① EWP - PSI In _____ minus ② LWP - PSI Out _____ equals $\Delta P$ _____ 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 $\Delta P$ . $\Delta P$ can be converted to GPM by looking in the equipment specification catalog. <b>Caution <math>\Delta P \neq GPM</math></b> <b>Note: A conversion table must be used to find GPM from (Delta) <math>\Delta P</math> measurements.</b>	<b><math>EWP - LWP = \Delta P</math></b>
<b>Loop Fluid Temperature Rise / Drop through Coaxial Heat Exchanger</b> ③ EWT - °F Out _____ minus ④ LWT - °F Out _____ equals Fluid $\Delta T$ _____ $\Delta T$ is the rise or drop in the fluid temperature as it passes through the Coaxial.	<b><math>EWT - LWT = \Delta T</math></b>
<b>Air Temperature Rise / Drop through the air coil</b> ⑤ EAT - °F In _____ minus ⑥ LAT - °F Out _____ equals Air $\Delta T$ _____	<b><math>\Delta T \times CFM \times 1.08 = BTUH \text{ Sensible}</math></b>

**Note 1: Perform Check, Test and Start-Up in the Cooling Mode Only.**

**Note 2: For units with multi-stage compressor operation, verify that the unit is in second stage before logging the requested information.**

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



Warranty Registration Form

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)
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2.													
3.													
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7.													
8.													
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# Limited Product Warranty



## DAIKIN APPLIED AMERICAS INC. LIMITED PRODUCT WARRANTY (United States and Canada)

### WARRANTY

Daikin Applied Americas Inc. dba Daikin Applied ("Company") warrants to contractor, purchaser and any owner of the product (collectively "Owner") that, subject to the exclusions set forth below Company, at its option, will repair or replace defective parts in the event any product manufactured by Company, including products sold under the brand name Daikin and used in the United States or Canada, proves defective in material or workmanship within twelve (12) months from initial startup or eighteen (18) months from the date shipped by Company, whichever occurs first. Authorized replacement parts are warranted for the remainder of the original warranty. All shipments of such parts will be made FOB factory, freight prepaid and allowed. Company reserves the right to select carrier and method of shipment. In addition, Company provides labor to repair or replace warranty parts during Company normal working hours on products with rotary screw compressors or centrifugal compressors. Warranty labor is not provided for any other products.

Company must receive the Registration and Startup Forms for products containing motor compressors and/or furnaces within ten (10) days of original product startup, or the ship date and the startup date will be deemed the same for determining the commencement of the warranty period and this warranty shall expire twelve (12) months from that date. For additional consideration, Company will provide an extended warranty(ies) on certain products or components thereof. The terms of the extended warranty(ies) are shown on a separate extended warranty statement.

No person (including any agent, sales representative, dealer or distributor) has the authority to expand the Company's obligation beyond the terms of this express warranty or to state that the performance of the product is other than that published by Company.

### EXCLUSIONS

1. If free warranty labor is available as set forth above, such free labor does not include diagnostic visits, inspections, travel time and related expenses, or unusual access time or costs required by product location.
2. Refrigerants, fluids, oils and expendable items such as filters are not covered by this warranty.
3. This warranty shall not apply to products or parts : (a) that have been opened, disassembled, repaired, or altered, in each case by anyone other than Company or its authorized service representative; (b) that have been subjected to misuse, abuse, negligence, accidents, damage, or abnormal use or service; (c) that have not been properly maintained; (d) that have been operated or installed, or have had startup performed, in each case in a manner contrary to Company's printed instructions; (e) that have been exposed, directly or indirectly, to a corrosive atmosphere or material such as, but not limited to, chlorine, fluorine, fertilizers, waste water, urine, rust, salt, sulfur, ozone, or other chemicals, contaminants, minerals, or corrosive agents; (f) that were manufactured or furnished by others and/or are not an integral part of a product manufactured by Company; or (g) for which Company has not been paid in full.
4. This warranty shall not apply to products with rotary screw compressors or centrifugal compressors if such products have not been started, or if such startup has not been performed, by a Daikin Applied or Company authorized service representative.

### SOLE REMEDY AND LIMITATION OF LIABILITY

THIS WARRANTY CONSTITUTES THE SOLE WARRANTY MADE BY COMPANY. COMPANY'S LIABILITY TO OWNER AND OWNER'S SOLE REMEDY UNDER THIS WARRANTY SHALL NOT EXCEED THE LESSER OF: (i) THE COST OF REPAIRING OR REPLACING DEFECTIVE PRODUCTS; AND (ii) THE ORIGINAL PURCHASE PRICE ACTUALLY PAID FOR THE PRODUCTS. COMPANY MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, REGARDING PREVENTION OF MOLD/MOULD, FUNGUS, BACTERIA, MICROBIAL GROWTH, OR ANY OTHER CONTAMINATES. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT AND UNDER NO CIRCUMSTANCE SHALL COMPANY BE LIABLE TO OWNER OR ANY THIRD PARTY FOR INCIDENTAL, INDIRECT, SPECIAL, CONTINGENT, CONSEQUENTIAL, DELAY OR LIQUIDATED DAMAGES FOR ANY REASON, ARISING FROM ANY CAUSE WHATSOEVER, WHETHER THE THEORY FOR RECOVERY IS BASED IN LAW OR IN EQUITY, OR IS UNDER A THEORY OF BREACH CONTRACT OR WARRANTY, NEGLIGENCE, STRICT LIABILITY, OR OTHERWISE. THE TERM "CONSEQUENTIAL DAMAGE" INCLUDES, WITHOUT LIMITATION, THOSE DAMAGES ARISING FROM BUSINESS INTERRUPTION OR ECONOMIC LOSS, SUCH AS LOSS OF ANTICIPATED PROFITS, REVENUE, PRODUCTION, USE, REPUTATION, DATA OR CROPS.

### ASSISTANCE

To obtain assistance or information regarding this warranty, please contact your local sales representative or a Daikin Applied office.

Form No. 933-430285Y-01-A (11/2023)  
Part No. 043028500 Rev.0F

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