

FAN COILS: MODULAR HI-RISE SERIES

# INSTALLATION, OPERATION & MAINTENANCE MANUAL

Part#: I100-90001407 | IOM-051 | Revised: May 14, 2025

Models: M\*Y



Modes:  
M\*Y

# Table of Contents

<b>3</b>	Attentions, Cautions, and Warnings	<b>30</b>	Section Six — Routine Maintenance (All Models)
<b>4</b>	Section One — Receipt and Initial Installation	<b>30</b>	Motor/Blower Assembly
<b>4</b>	Receipt	<b>30</b>	Bipolar Ionizer Brush Cleaning
<b>4</b>	Unpacking and Inspection	<b>30</b>	Coils
<b>5</b>	Handling and Installation	<b>31</b>	Electric Resistance Heater Assembly
<b>6</b>	Unit Clearance and Service Access	<b>31</b>	Electrical Wiring and Controls
<b>7</b>	Section Two — Product Line Specific Installation	<b>31</b>	Valves and Piping
<b>7</b>	Part One – Universal Hi-Rise Units (MUY)	<b>31</b>	Throwaway Filters
<b>12</b>	Part Two – Ditto and Siamese Ditto (MAY/MBY)	<b>32</b>	Permanent Filters
<b>13</b>	Part Three – High Rise, Ditto, and Primary/Secondary (MPY, MAY/MBY, MMY/MSY)	<b>32</b>	Drain
<b>14</b>	Part Four – Mega Mod Units (MGY)	<b>32</b>	Replacement Parts
<b>19</b>	Section Three — Finishing Installation (All Models)	<b>33</b>	Section Seven — Equipment Startup Checklist
<b>19</b>	Grille/Ductwork Installation	<b>33</b>	Receiving and Inspection
<b>19</b>	Outside Air Installation (if required)	<b>33</b>	Handling and Installation
<b>19</b>	Electrical Connections	<b>33</b>	Cooling/Heating Connections
<b>20</b>	Exposed Unit Touch-up and Repainting	<b>33</b>	Ductwork Connections
<b>20</b>	Concealed Unit Enclosure	<b>33</b>	Electrical Conditions
<b>21</b>	Section Four — Controls Operation	<b>33</b>	Unit Startup
<b>21</b>	Board Components and Specifications	<b>34</b>	Appendix A
<b>22</b>	Board Function and Diagnostics	<b>35</b>	Terms and Conditions
<b>25</b>	Section Four — Controls Operation	<b>36</b>	Revision History
<b>27</b>	Board Example Wiring Diagram		
<b>28</b>	Section Five — Startup (All Models)		
<b>28</b>	General Startup		
<b>28</b>	Cooling/Heating System		
<b>28</b>	Direct Expansion (DX) Systems		
<b>28</b>	Air System Balancing		
<b>29</b>	Maximum External Static Pressures		
<b>29</b>	Water Treatment		
<b>29</b>	Water System Balancing		

It is the responsibility of the end user to properly characterize and dispose of all waste materials according to applicable regulatory and legal entities. Where reasonable, safe, and compliant with local regulatory and legal requirements, IEC encourages recycling materials when disposing of its products.

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## Attentions, Cautions, and Warnings

### WARNING

Never pressurize any equipment beyond specified test pressures listed on the unit rating plate. Always pressure test with an inert fluid or gas such as clear water or dry nitrogen to avoid possible damage or injury in the event of a leak or component failure during testing.

### WARNING

No attempt should be made to handle, install, or service any unit without following safe practices regarding mechanical equipment.

### WARNING

All mechanical and electrical connections should be made by authorized personnel in accordance with National and local codes where applicable. The manufacturer assumes no responsibility for personal injury or property damage resulting from improper or unsafe practices during the handling, installation, service, or operation of any equipment.

### CAUTION

Never wear bulky or loose fitting clothing when working on any mechanical equipment. Gloves should always be worn for protection against sharp sheet metal edges, heat, and other possible sources of injury. Safety glasses or goggles should always be worn, especially when drilling, cutting, or working with lubricants or cleaning chemicals.

### CAUTION

Always protect chilled- and hot-water valve bodies, strainers, ball valves, and other flow control related devices from heat caused by soldering or brazing processes.

### CAUTION

Disconnect all power prior to any installation or service (unit may use more than one power source; ensure all are disconnected). Power to remote mounted control devices may not be supplied by unit.

### CAUTION

Always protect adjacent flammable material when welding or soldering. Use a suitable heat shield material to contain sparks or drops of solder. Have a fire extinguisher readily available.

### CAUTION

Hose connection should be hand tightened and then further tightened no more than ¼ revolution.

### CAUTION

**Electric shock can cause death.**

### ATTENTION

This appliance is not intended for use 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 concerning use of the appliance by a person responsible for their safety.

### ATTENTION

The equipment must always be properly supported. Temporary supports used during installation or service must be adequate to hold the equipment securely.

### ATTENTION

No attempt should be made to handle, install, or service any unit without following safe practices regarding mechanical equipment.

## Section One — Receipt and Initial Installation

### RECEIPT

International Environmental Corporation fan coil units represent a prudent investment offering trouble-free operation and long service with proper installation, operation, and regular maintenance.

Your equipment is initially protected under the manufacturer's standard warranty; however, this warranty is provided under the condition that the steps outlined in this manual for initial inspection, proper installation, regular periodic maintenance, and everyday operation of the equipment be followed in detail. Fully review this manual in advance before initial installation, startup, and any maintenance. If any questions arise, please contact your local sales representative or the factory BEFORE proceeding.

The equipment covered by this manual is available with a variety of options and accessories. Consult the approved unit submittals, order acknowledgement, and other manuals for details on unit options and accessories.

The manufacturer assumes no responsibility for personal injury or property damage resulting from improper or unsafe practices during the handling, installation, service, or operation of any equipment.

### UNPACKING AND INSPECTION

All units are carefully inspected at the factory throughout the manufacturing process under a strict detailed quality assurance program, and, where possible, ALL major components and sub-assemblies are carefully tested for proper operation and verified for full compliance with factory standards. Operational testing of some customer-furnished components such as electronic control valves and digital controllers may be a possible exception.

Each unit is carefully packaged for shipment to avoid damage during normal transit and handling. Always store equipment in a dry place, and in the proper orientation as marked on the carton.

All shipments are made F.O.B. factory, and it is the responsibility of the receiving party to inspect the equipment upon arrival. Record any obvious damage to the carton and/or its contents on the bill of lading and file a claim with the freight carrier.

After determining the condition of the carton exterior, carefully remove each unit from the carton and inspect for hidden damage. At this time, check to ensure that "furnished only" items such as thermostats, grilles etc. are accounted for whether packaged separately or shipped at a later date. Record any hidden damage and immediately report to the carrier and file a claim. If a claim for shipping damage is filed, retain the unit, shipping carton, and all packing material for physical inspection by the freight carrier. Store all equipment in the factory shipping carton with internal packing in place until installation.

At the time of receipt, verify the equipment type and arrangement against the order documents. If any discrepancy is found, notify the local sales representative immediately so that proper action may be taken. If any questions arise concerning warranty repairs, notify the factory BEFORE any corrective action is taken. Where local repairs or alterations can be accomplished, the factory must be fully informed of the extent and expected cost of those repairs before work is begun. Where factory operations are required, contact the factory for authorization to return equipment and a Return Authorization Number will be issued. Unauthorized return shipments of equipment and shipments not marked with an authorization number will be refused. In addition, any claims for unauthorized expenses are not accepted by the manufacturer.

## Section One — Receipt and Initial Installation

Model:  
M\*Y

### HANDLING AND INSTALLATION

The units covered in this manual are identified by a tag on top of the unit which shows the floor and riser number for which each unit is designed. Do not install units at locations other than that marked on the unit identification tag. If no specific detail is shown on tag for unit location, determine configuration for the universal unit based on information within this IOM. If any questions arise regarding unit configuration, contact the sales representative or the factory BEFORE proceeding.

While all equipment is designed and fabricated with sturdy materials and may present a rugged appearance, take great care to ensure that no force or pressure is applied to the coil, risers, or piping during handling. Never use the risers to lift the unit. Depending on the options and accessories, some units could contain delicate components that may be damaged by improper handling. Avoid lifting or supporting the cabinet only at the top and bottom to maintain the straight and square cabinet alignment. Lower the unit into the space taking care to properly align the risers to engage the riser swaged sections on the unit below. Never bend or push the risers together to be passed through the floor slot and never lift up or pull down to meet the risers on the floor below or above. The risers are designed with a 3-inch (76.2 mm) swage to accommodate a 2-inch (50.8 mm) overlap and minor floor-to-floor variations.

The equipment covered in this manual IS NOT suitable for outdoor installations. Never store or install the equipment where it may be subjected to a hostile environment such as rain, snow, or extreme temperatures.

During and after installation, take special care to prevent foreign material such as paint, plaster, and drywall dust from being deposited in the drain pan or on the motor or blower wheels. Failure to do so may have serious adverse effects on unit operation, and in the case of the motor and blower assembly, may result in immediate or premature failure. All manufacturer's warranties are void if foreign material is allowed to be deposited on the motor or blower wheels of any unit. Some units and/or job conditions may require some form of temporary covering during construction.

While the manufacturer does not become involved in the design and selection of support methods and components, note that unacceptable system operating characteristics and/or performance may result from improper or inadequate unit structural support. Due to variations in building construction, floor plans, and unit configurations, each installation is different. The actual step-by-step method of installation may vary from unit to unit. Move the risers as little as possible to avoid damage to the unit and internal components.

On certain units, shipping screws or braces must be removed after the unit is installed. Check all tags on the unit to determine which, if any, of these devices need to be removed.

Modes:  
M\*Y

## Section One — Receipt and Initial Installation

### UNIT CLEARANCE AND SERVICE ACCESS

For specific unit dimensions, refer to the product technical catalog for your model. Provide adequate clearance for the removal of the panel, access to controls, or replacement of internal serviceable components including air filters. Allow clearances according to local and national codes.

Service access is available from the front on vertical stack units by removing the return air panel.

**Figure 1: M\*Y**



**Figure 2: MGY**



# Section Two — Product Line Specific Installation

Model:  
M\*Y

## PART ONE – UNIVERSAL HI-RISE UNITS (MUY)

The unique design of the Universal Modular Fan Coil unit allows for field configuration for each unit. Air discharge, riser, drain, and outside air knockouts have been strategically located on each unit. Risers, shown with unit, are for reference only. All risers are factory fabricated and shipped loose for field installation.

It is important that you identify all of the unit feature locations and which knockouts you intend to use before proceeding with the installation. Determine if your application requires a Mating Unit (primary/secondary) and its configuration. Consult your local sales representative or the factory for further details on primary/secondary arrangements.

### Potential Unit Configurations

**Risers:** Risers are available in three locations. Orient the pre-installed supply, return, and drain risers (2-pipe or 4-pipe applications) on any of three sides of the unit (see Figure 3).

**NOTE:** Risers cannot be installed on the return air side of the cabinet.

**Figure 3: MUY**

Return Air

R	D	S
○	○	○

HR	HS	D	CR	CS
○	○	○	○	○

R = Return  
D = Drain  
S = Supply  
2- or 4-pipe

HR = Hot Water Return  
HS = Hot Water Supply  
D = Drain  
CR = Cold Water Return  
CS = Cold Water Supply

Determine unit orientation based on the location of the risers in the building. The riser side of the Universal Modular unit always determines the rear of the unit.

**Return Air:** one location – orient the return air/access panel on the left, right, or front of the unit.

**Supply Air:** five locations (four sides and top) – includes stitched design for ½-inch (12.7 mm) duct flanges.

**Outside Air:** two locations – either side adjacent to the return air opening.

**NOTE:** Do not use the outside air opening on a side if risers are configured on that same side.

### Unit Knockout Locations (Typical)

Figure 4: Knockout Locations (Side View)

Side Supply Air Knockout (1 per side)

Optional Electrical Knockouts

Riser Knockouts (four per side, except on return air side)

Return Air

Outside Air Knockout (two sides only, adjacent to Return Air opening)

Drain Knockout (one per side, except on return air side)

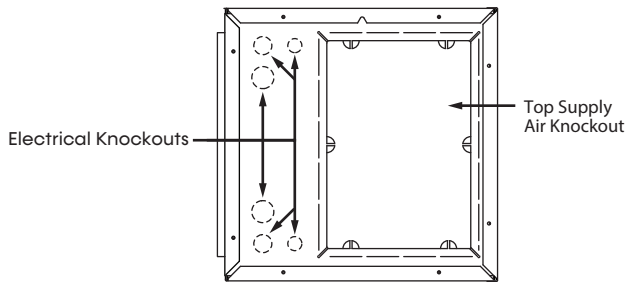
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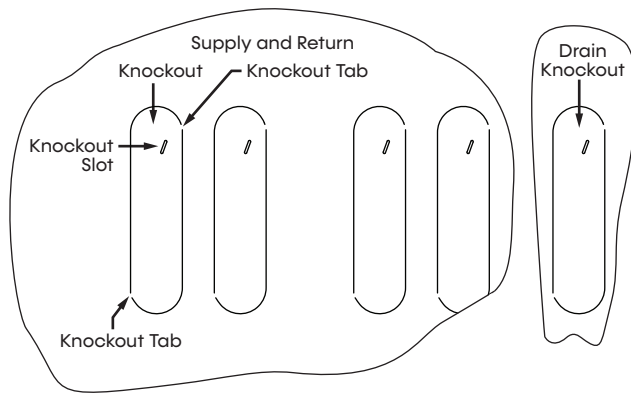
Modes:  
M\*Y

## Section Two — Product Line Specific Installation

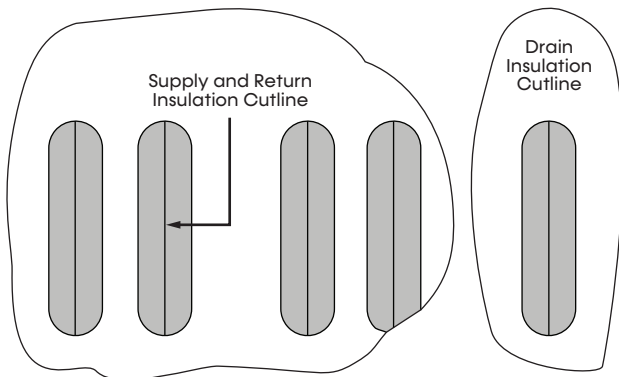
**Figure 5: Knockout Locations (Top View)**



**Figure 6: Knockout Details**



**Figure 7: Cutlines**



### Supply, Return, and Drain Riser Installation

- Three sides of each Universal Modular unit have four supply and return riser knockouts along the center and one drain knockout near the lower part of the unit (see Figure 4). Determine if your application uses a 2-pipe or 4-pipe configuration.
  - 2-pipe configurations:** typically use the two inner riser knockouts.
  - 4-pipe configurations:** use all four riser knockouts.
- Locate and mark the riser and drain knockouts that apply to your particular unit application, insuring proper orientation of the Return Air opening in room.
- Insert a flat head screwdriver into knockout slot shown in Figure 6.
- Pry screwdriver back and forth until knockout tabs break away from the unit.
- Discard knockout. Be careful of sharp edges.
- Use a sharp retractable knife and cut the insulation vertically down the center of the riser and drain knockouts the full length of the knockout (see Figure 7).
- Use adhesive or glue to re-attach insulation that has pulled away from the unit during knockout-removal process.

#### **CAUTION**

Toxic residues and loose particles resulting from manufacturing and field piping techniques such as joint compounds, soldering flux, and metal shavings may be present in the unit and the piping system. Special consideration must be given to system cleanliness when connecting to solar, domestic or potable water systems.



## Section Two — Product Line Specific Installation

Model:  
M\*Y

Thoroughly review submittals and product literature detailing unit operation, controls, and connections **BEFORE** starting to connect and test risers and piping.

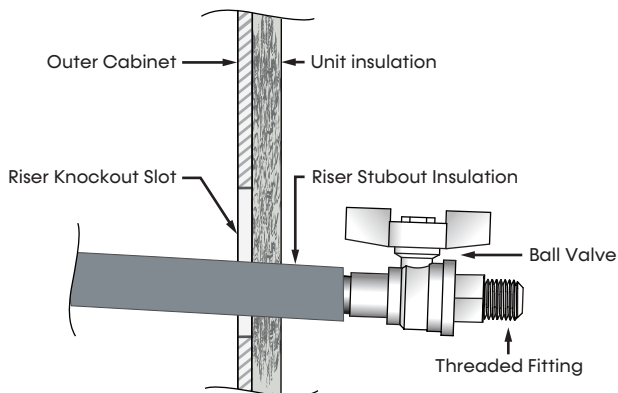
To ensure optimal unit performance, the supply connections are marked on the unit's coil with an "S" meaning supply or inlet and "R" meaning return or outlet, indicating flow direction to and from the coil. Blue letters mark the chilled water connections and red letters mark the hot water connections.

The unit's internal piping is designed to accommodate a total riser vertical movement of  $\pm 1\frac{1}{2}$  inches (38.1 mm), due to thermal expansion and/or contraction, when positioned properly at the job site. Risers must be anchored to the building structure to limit expansion and contraction movement to a maximum of 3 inches (76.2 mm). Riser anchoring, expansion compensation, riser end caps, air vents, and/or flushing loops must be field provided at the jobsite by the installer.

Proper field riser installation and vertical positioning in the unit includes a pipe run-out to the service valves, which are centered in the knockout access slots and that slope down slightly away from the riser (see Figure 8). This prevents condensation from running back to the riser and possible damage from dripping at the bottom of a riser column. Satisfying the specific requirements of the job is the installer's responsibility.

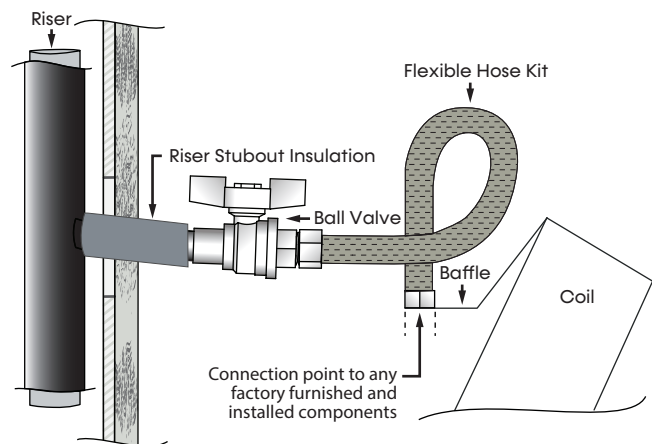
### Riser to Unit Installation

**Figure 8: Riser Installation Example 1**

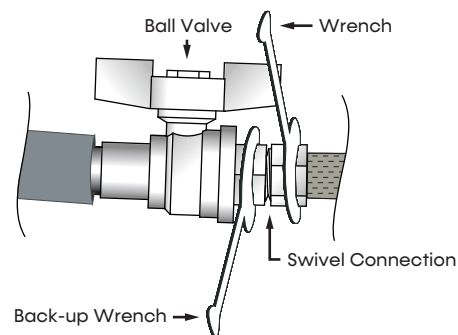


Before making the riser joints, pull the riser insulation away from the joint and protect it from heat during the brazing process. Each riser joint must be in vertical alignment. Variations in floor-to-floor dimensions may require field work such as cutting off or extending the risers. This operation is the responsibility of the installer. The riser joint-filler material must be selected to withstand the total operating pressure (both static and pumping head) to which the system is subjected. Low-temperature lead-alloy solders such as "50/50" and "60/40" are normally not suitable.

**Figure 9: Riser Installation Example 2**



**Figure 10: Swivel Connections**

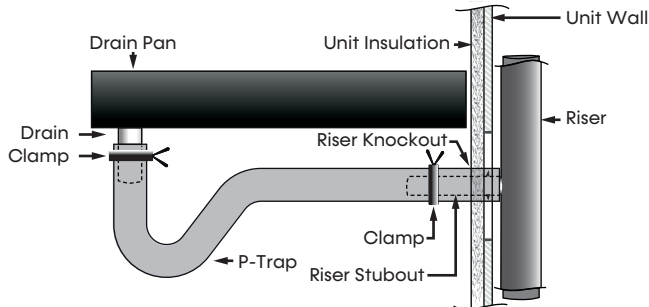


Modes:  
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## Section Two — Product Line Specific Installation

### Riser to Drain Installation

**Figure 11: Stubout Clamping**



1. After the applicable supply, return, and drain knockouts are removed, carefully position the unit so that the riser ball valves penetrate into the unit through the riser knockouts ensuring the insulation penetrates into the unit as shown in Figures 11, 12, and 13.
2. Before anchoring the equipment in place, level, square, and plumb the unit.  
  
The unit may be anchored in place by bolting directly through the unit floor or attaching to the cabinet in some location that does not interfere with drywall or other items such as the supply grille, thermostat, or return access panel. When attaching to the unit cabinet, do not penetrate the cabinet in locations that may damage internal components or wiring. Always anchor the unit securely to prevent movement during construction and riser expansion and contraction.  
  
After anchoring the unit, it is ready for the service connections such as riser connections and electrical.
3. Remove and discard the plastic flare caps on the end of the riser ball valves.
4. All Universal Modular units use reinforced braided stainless steel flexible hose kits for piping between field-installed risers and unit water coils as shown in Figure 9. The hose kit design has threaded connections on each end and allows for riser fluctuations due to thermal expansion.
5. Use a wrench to tighten the swivel connections. Use a backup wrench to hold the riser ball valve stationary to prevent it from bending or twisting during installation as shown in Figure 10. Do not overtighten swivel connections.

#### **CAUTION**

To tighten hose connections, first hand-tighten the connection until snug, then tighten no more than an additional quarter revolution ( $\frac{1}{4}$  turn).

6. Locate the unit's coil fitting.
7. Remove and discard the plastic flare caps on the end of the riser ball valves.
8. Use a wrench to tighten the swivel connections. The baffle acts as a secondary wrench. Do not overtighten swivel connections.

#### **CAUTION**

To tighten hose connections, first hand-tighten the connection until snug, then tighten no more than an additional quarter revolution ( $\frac{1}{4}$  turn).

9. Locate the p-trap drain and rubber hose factory installed to the drain pan connection in the bottom of the unit as shown in Figure 8.
10. Push the rubber drain hose over the riser drain stub out. Do not bend the drain stub out.
11. Adjust the hose clamp over the riser stub out and rubber hose to hold in place as shown in Figure 11.
12. Test for leaks. Repair all leaks before proceeding with installation. When testing with air or another gas, it might be necessary to tighten stem packing nuts on some valves to maintain air pressure in the riser. Pressure test risers with water after closing the unit service valves to prevent flushing debris into the unit valve packages. This allows risers to be drained down after testing in the winter to avoid freeze-up problems. If leaking or defective components are discovered, notify the sales representative BEFORE attempting any repairs.
13. After system integrity is established, pull the riser insulation into place over the joint and glue or seal to prevent sweating and heat loss or gain. Properly cover all of the risers including the riser stub outs with insulation. Internally mounted chilled water piping and valves are located over the drain pan and do not require insulation.

## Section Two — Product Line Specific Installation

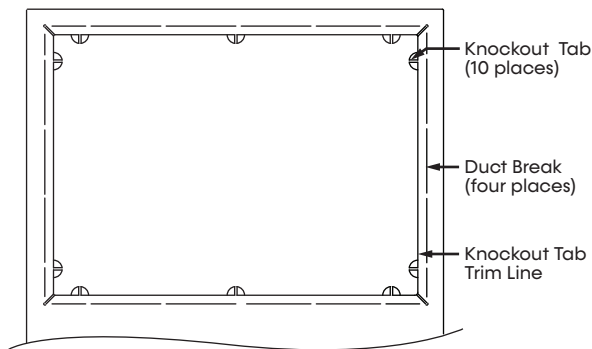
Model:  
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Any fireproofing requirements where risers or piping penetrate floors or walls are the responsibility of the installer. Start this work only after all pressure testing is complete. The fireproofing method used must accommodate pipe expansion and contraction and the piping must be protected from abrasion and chemical attack. The pipe insulation must be maintained to prevent sweating and must be protected from wear or erosion at the joint between the insulation and the fireproofing material.

When no risers are ordered for the Universal Modular unit, it is the installer's responsibility to ensure that an isolation ball valve is installed between each supply and return piping connection to the unit. Flare fittings are factory provided to allow connection between the ball valves and the hoses.

### Supply Air Installation

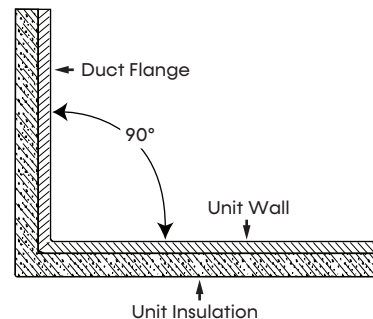
**Figure 12: Supply Knockouts**



1. Each side of the unit has one supply air knockout as well as a supply air knockout on the top of the unit (see Figures 4 and 5).
2. Determine which supply air opening/openings are required for your application.  
**NOTE: Do not use the supply air opening on the riser side of the unit.**
3. Use a sharp retractable knife to trim insulation using center knockout slot/trim line as a guide (see Figure 12).

4. Use a sharp standard needle nose pliers and grab knockout tab (see Figure 12).
5. Twist or pry pliers back and forth until knockout tab breaks away from unit.
6. Repeat for all supply air tabs until all are broken.
7. Discard center knockout piece. Be careful of sharp edges.
8. Use a sharp retractable knife to trim any excess insulation using knockout hole as a guide.

**Figure 13: Drywall Stops**



9. Use duct pliers (hand seamers) to fold duct flange out of the unit 90° for each side of the supply air opening along duct break (see Figure 12). The 90° flanges can now be used as drywall stops to prevent coverage of discharge opening (see Figure 13).
10. Use adhesive or glue to re-attach insulation that pulled away from the unit during knockout-removal process.
11. For ducted applications, apply tape along and around all of the supply air opening knockouts to prevent air leakage.

Complete all installations in compliance with all governing codes and ordinances. Compliance with all codes is the responsibility of the installing contractor.

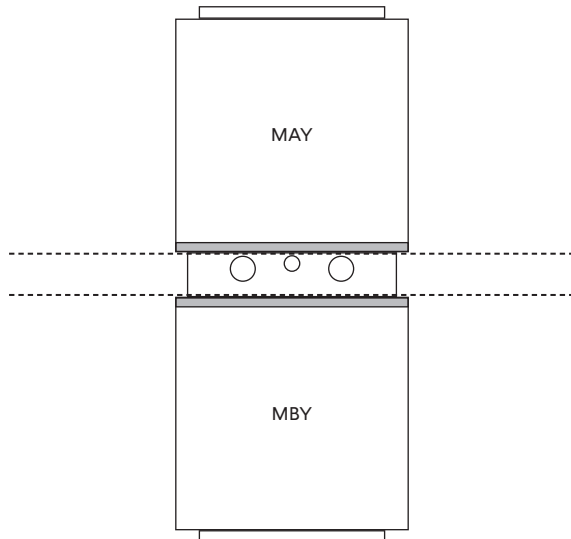
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## Section Two — Product Line Specific Installation

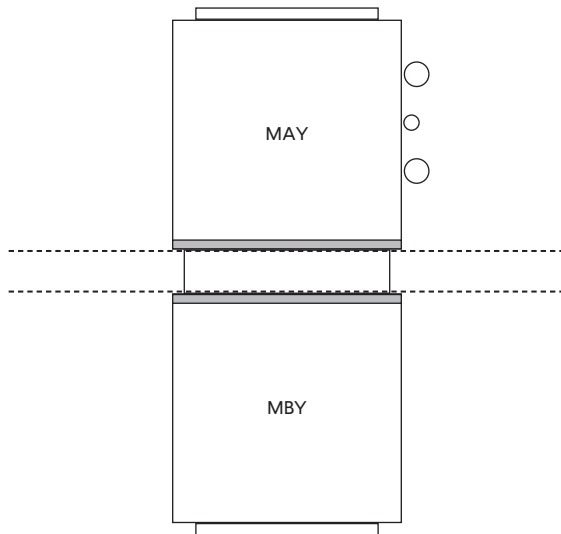
### PART TWO – DITTO AND SIAMESE DITTO (MAY/MBY)

The Ditto and Siamese Ditto Modular Hi-Rise Fan Coils are designed to serve two separate rooms. These products are classified by Underwriters Laboratories Inc. for use in Penetration Firestop Systems. Control Number 27WL. They carry a one-hour rating. See UL Fire Resistance Directory for more information.

**Figure 14: Ditto**



**Figure 15: Siamese Ditto**



Lay out the control lines for the drywall track and studs on the floor and ceiling (A - see Figure 16).

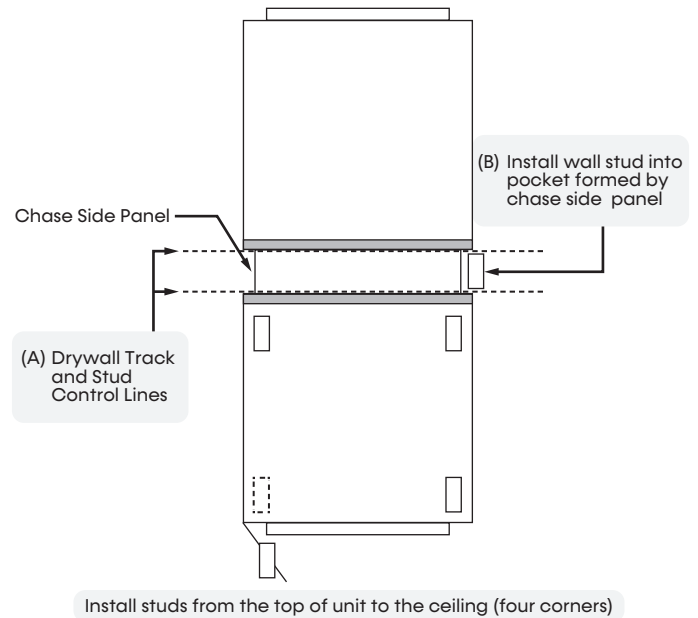
Install tracking now or after the unit is set.

Position the Ditto or Siamese Ditto fan coil assembly between two rooms with the unit drywall separation spotted over the wall control lines.

If not already installed, install the floor and ceiling tracks up to and over the Ditto or Siamese Ditto Fan Coil unit.

Next, position the vertical studs and fasten into each of the stud pockets formed into the chase side panels (B - see Figure 16).

**Figure 16: Unit as Shipped**



You can mechanically fasten the studs to the Ditto or Siamese Ditto Fan Coil. Do not to penetrate the supply or return water risers or internal piping.

Given the levelness of the floor and/or the fan coil assembly, some shimming may be necessary.

Assemble the specified wall construction up to and over the top of the fan coil unit (C - see Figure 17).

After completing fire-wall separation, apply the drywall skin on the surface of the individual fan coils. Apply drywall directly to the surface or install studding on the corners for vertical control (D - see Figure 17).

## Section Two — Product Line Specific Installation

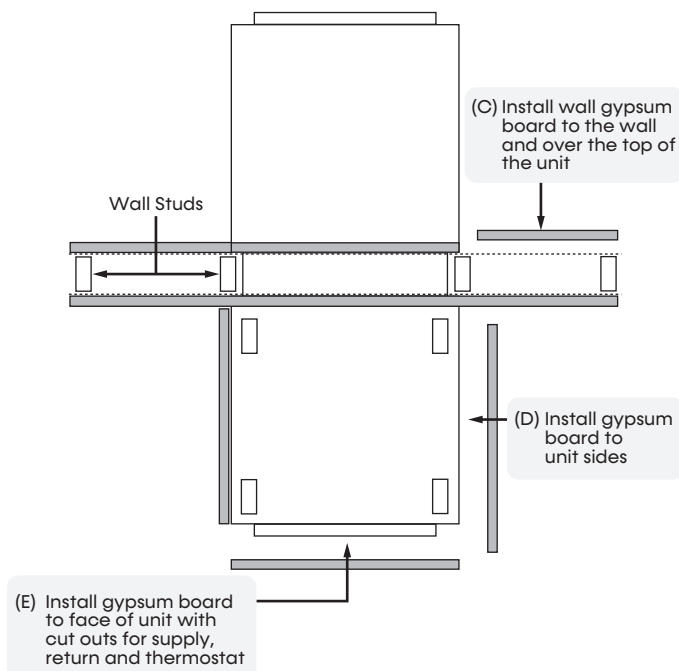
For ease of installation of the access panel, apply drywall on the return air side directly to the surface of the unit (E - see Figure 15). When applying the wall board directly to the unit cabinet, it may be necessary to shim the wall board in some areas to achieve the desired finished wall surface.

After all drywalling and painting is complete, install thermostats, supply air grilles, and return air panels.

### CAUTION

Avoid penetrating the riser, coil, piping and electrical system with sheetrock screws.

Figure 17: On-Site Installation



### PART THREE – HIGH RISE, DITTO, AND PRIMARY/SECONDARY (MPY, MAY/MBY, MMY/MSY)

#### Supply, Return, and Drain Risers

### CAUTION

Toxic residues and loose particles resulting from manufacturing and field piping techniques such as joint compounds, soldering flux, and metal shavings may be present in the unit and the piping system. Special consideration must be given to system cleanliness when connecting to solar, domestic or potable water systems.

Thoroughly review submittals and product literature detailing unit operation, controls, and connections **BEFORE** starting to connect and test risers and piping.

The supply and return connections are marked on the coil stub outs and the valve package with an “S” meaning supply or inlet and “R” meaning return or outlet indicating flow direction to and from the coil. Blue letters mark the chilled water connections and red letters mark the hot water connections.

The unit internal piping is designed to accommodate a total riser vertical movement of  $\pm\frac{3}{4}$  inches (19.05 mm), due to thermal expansion and/or contraction, when positioned properly at the job site. Risers must be anchored to the building structure to limit expansion and contraction movement to a maximum of  $1\frac{1}{2}$  inches (38.1 mm). Riser anchoring and expansion compensation is not included in the factory-supplied unit and must be field provided. While some special riser features are available from the factory, riser end caps, air vents, and/or flushing loops are normally provided on the job by the installer.

Proper riser installation and vertical positioning in the unit provides for a unit piping run-out to the service valves which are centered in the access slots and level or sloping down slightly away from the riser. This prevents condensation from running back to the riser and possible damage from dripping at the bottom of a riser column. Satisfying the specific requirements of the job is the installer's responsibility.

Before making the riser joints, pull the riser insulation away from the joint and protect it from heat during the brazing process. Each riser joint must be in vertical alignment. Variations in floor-to-floor dimensions may require field work such as cutting off or extending the risers. This operation is the responsibility of the installer. The riser joint-filler material must be selected to withstand the total operating pressure (both static and pumping head) to which the system is subjected. Low-temperature lead alloy solders such as “50/50” and “60/40” are normally not suitable.

Never pipe chilled water and hot water risers to drain down into the condensate riser. Extensive water damage can occur due to drain overflow. Drain chilled- and hot-water risers to a remote location away from the unit such as sink, room and floor drains.

Modes:  
M\*Y

## Section Two — Product Line Specific Installation

After finishing the connections, test the system for leaks. When testing with air or another gas, it might be necessary to tighten stem packing nuts on some valves to maintain air pressure in the riser. Pressure test risers with water after closing the unit service valves to prevent flushing debris into the unit valve packages. This allows risers to be drained after testing in the winter to avoid freeze-up problems.

If leaking or defective components are found, notify the sales representative BEFORE any attempting any repairs. Repair all leaks before proceeding with the installation.

After system integrity is established, pull the riser insulation into place over the joint and glue or seal to prevent sweating and heat loss or gain. Internal chilled water piping and valves are located over the drain pan and do not require insulation.

Any fireproofing requirements where risers or piping penetrate floors or walls are the installer's responsibility. Start this work only after all pressure testing is complete. The fireproofing method used must accommodate pipe expansion and contraction and the piping must be protected from abrasion and chemical attack. The pipe insulation must be maintained to prevent sweating and must be protected from wear or erosion at the joint between the insulation and the fireproofing material.

Before anchoring the equipment in place, level the unit, square the cabinet, and bring it into line with any adjacent or included walls.

Anchor the unit in place by bolting directly through the unit floor or attaching to the cabinet in some location that does not interfere with drywall or other items such as the supply grille, thermostat, or return access panel. When attaching to the unit cabinet, do not penetrate the cabinet in locations that may damage internal components or wiring. Always anchor the unit securely to prevent movement during construction and riser expansion and contraction.

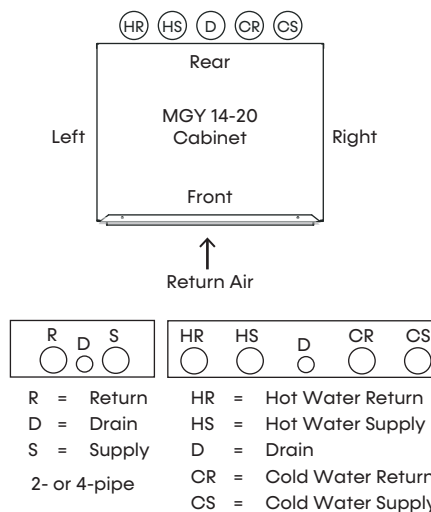
After anchoring the unit, it is ready for the service connections such as riser joints and electrical. At this time, verify that the proper types of service are provided to the unit. On those units requiring chilled water and/or hot water, the proper main size and water temperature should be available to the unit. Compare the electrical service to the unit to the unit nameplate to verify compatibility. Determine the routing and sizing of all piping, the type and sizing of all wiring, and other electrical components such as circuit breakers, service switches, by the individual job requirements. Do not determine this criteria based on the size and/or type of connection provided on the equipment. Complete all installations in compliance with all governing codes and ordinances. Compliance with all codes is the responsibility of the installing contractor.

### PART FOUR – MEGA MOD UNITS (MGY)

The unique design of the Mega Modular Fan Coil unit allows for field configuration of each unit. Risers, shown with unit, are for reference only. All risers are factory fabricated and shipped loose for field installation.

It is important that you identify all of the unit feature locations before proceeding with the installation. Determine whether your application requires a Mating Unit (primary/secondary) and its configurations. Consult your local sales representative or the factory for further details on primary/secondary arrangements.

Figure 18: MGY





## Section Two — Product Line Specific Installation

Model:  
M\*Y

Unit orientation is determined based on the location of the risers in the building. Risers can only be installed on the rear side of the unit and it always determines the rear of the Mega Mod unit. The return air is always on the front (see Figure 15).

### Supply, Return, and Drain Risers

#### CAUTION

Toxic residues and loose particles resulting from manufacturing and field piping techniques such as joint compounds, soldering flux, and metal shavings may be present in the unit and the piping system. Special consideration must be given to system cleanliness when connecting to solar, domestic or potable water systems.

Thoroughly review submittals and product literature detailing unit operation, controls, and connections BEFORE starting to connect and test risers and piping.

The supply and return connections are marked on the coil stub outs and the valve package depending on your configuration. "CS" means cold water supply, "CR" means cold water return, "HS" means hot water supply, and "HR" means hot water return to indicate flow direction to and from the coil. Blue letters mark the chilled water connections and red letters mark the hot water connections.

The unit internal piping is designed to accommodate a total riser vertical movement of  $\pm 1\frac{1}{2}$  inches (38.1 mm), due to thermal expansion and/or contraction, when positioned properly at the job site. Risers must be anchored to the building structure to limit riser expansion and contraction movement to a maximum of 3 inches (76.2 mm). Riser anchoring and expansion compensation is not included in the factory-supplied unit and must be field provided. While some special riser features are available from the factory, riser end caps, air vents, and/or flushing loops are normally provided on the job by the installer.

Proper riser installation and vertical positioning in the unit provides for a unit piping run-out to the service valves which are centered in the access slots and level or sloping down slightly away from the riser. This prevents condensation from running back to the riser and possible damage from dripping at the bottom of a riser column. Satisfying the specific requirements of the job is the installer's responsibility.

### Riser to Unit Installation

Figure 19: Riser Installation Example 1

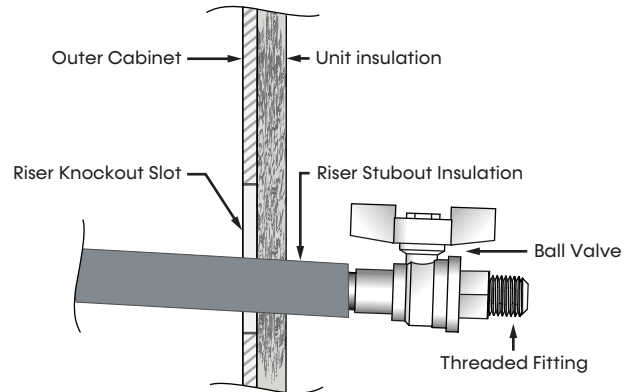


Figure 20: Installation Example 2

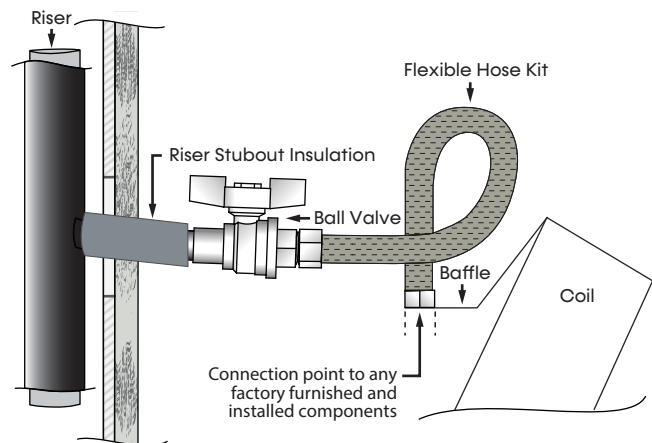
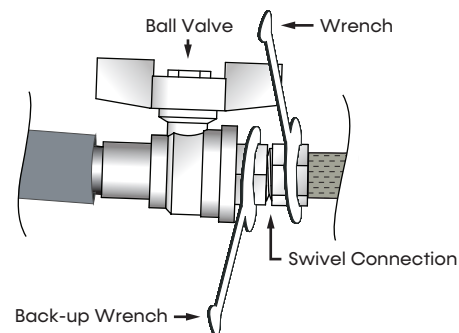


Figure 21: Swivel Connections



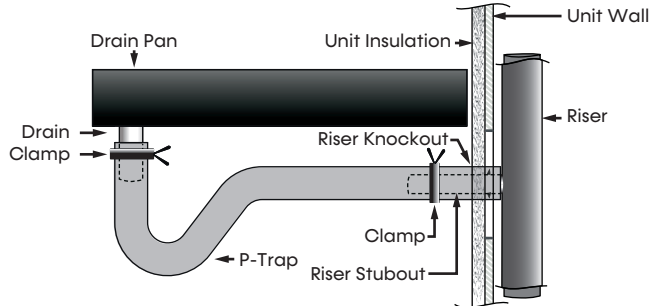


Modes:  
M\*Y

## Section Two — Product Line Specific Installation

### Riser to Drain Installation

**Figure 22: Stubout Clamping**



1. Carefully position the unit so that the riser ball valves penetrate into the unit through the riser slot ensuring the insulation penetrates into the unit as shown in Figures 19 and 20.
2. Before anchoring the equipment in place, level, square, and plumb the unit.

The unit may be anchored in place by bolting directly through the unit's floor or attaching to the buildings walls through the cabinet walls in some location that will not interfere with drywall or other items such as the supply grille, thermostat, or return access panel. When attaching sheetrock to the unit cabinet, care must be taken to not penetrate the cabinet in locations that may damage internal components or wiring. The mounting technique is a matter of choice; however, the unit should always be anchored securely to the building to prevent movement during construction and riser expansion and contraction.

After anchoring the unit, it is ready for the service connections such as riser connections and electrical.

3. Remove and discard the plastic flare caps on the end of the riser ball valves.
4. All Mega Modular units use reinforced braided stainless steel flexible hose kits for piping between field-installed risers and unit water coils as shown in Figure 17. Each hose has threaded connections on each end and allow for riser fluctuations due to thermal expansion.

5. Use a wrench to tighten the swivel connections. Use a backup wrench to hold the riser ball valve stationary to prevent it from bending or twisting during installation as shown in Figure 18. Be careful to not overtighten swivel connections.

#### **CAUTION**

To tighten hose connections, first hand-tighten the connection until snug, then tighten no more than an additional quarter revolution (¼ turn).

6. Locate the unit's coil fitting.
7. Remove and discard the plastic flare caps on the end of the riser ball valves.
8. Use a wrench to tighten the swivel connections. The baffle acts as a secondary wrench. Do not overtighten swivel connections.

#### **CAUTION**

To tighten hose connections, first hand-tighten the connection until snug, then tighten no more than an additional quarter revolution (¼ turn).

9. Locate the p-trap drain and rubber hose factory installed to the drain pan connection in the bottom of the unit as shown in Figure 19.
10. Push the rubber drain hose over the riser drain stub out. Do not bend the drain stub out.
11. Adjust the hose clamp over the riser stub out and rubber hose to hold in place as shown in Figure 19.
12. Test for leaks. Repair all leaks before proceeding with installation. When testing with air or another gas, it might be necessary to tighten stem packing nuts on some valves to maintain air pressure in the riser. Pressure test risers with water after closing the unit service valves to prevent flushing debris into the unit valve packages. This allows risers to be drained down after testing in the winter to avoid freeze-up problems. If leaking or defective components are found, notify the sales representative BEFORE attempting any repairs.

## Section Two — Product Line Specific Installation

Model:  
M\*Y

13. After system integrity is established, pull the riser insulation into place over the joint and glue or seal to prevent sweating and heat loss or gain. Properly cover all of the risers including the riser stub outs with insulation. Internally mounted chilled water piping and valves are located over the drain pan and do not require insulation.

Any fireproofing requirements where risers or piping penetrate floors or walls are the responsibility of the installer. Start this work only after all pressure testing is complete. The fireproofing method used must accommodate pipe expansion and contraction and the piping must be protected from abrasion and chemical attack. The pipe insulation must be maintained to prevent sweating and must be protected from wear or erosion at the joint between the insulation and the fireproofing material.

When no risers are ordered for the Mega Modular unit, it is the installer's responsibility to ensure that a field-supplied isolation ball valve is installed between each supply and return piping connection to the unit. Flare fittings are factory provided to allow connection between the ball valves and the hoses.

Variations in floor-to-floor dimensions may require field work such as cutting off or extending the risers. This operation is the responsibility of the installer. The riser joint-filler material must be selected to withstand the total operating pressure (both static and pumping head) to which the system will be subjected. Low-temperature lead-alloy solders such as "50/50" and "60/40" are normally not suitable.

Never pipe chilled water and hot water risers to drain down into the condensate riser. Extensive water damage can occur due to drain overflow. Drain chilled and hot water risers to a remote location away from the unit such as sink, room and floor drains.

Complete all installations in compliance with all governing codes and ordinances. Compliance with all codes is the responsibility of the installing contractor.

### CAUTION

Allowing the coil to operate "wild" with chilled water without air movement through coil will result in cabinet "sweating" and condensate damage.

### Unit Knockout Locations (Typical)

Figure 23: Knockout Locations (Side View)

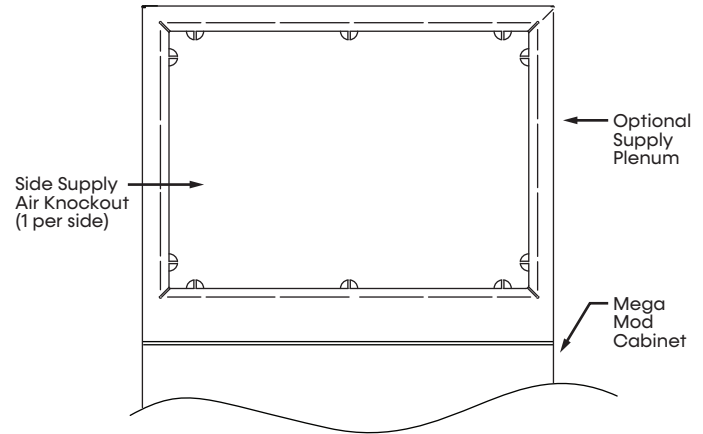
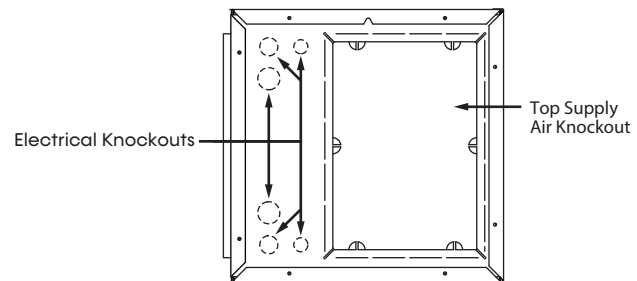
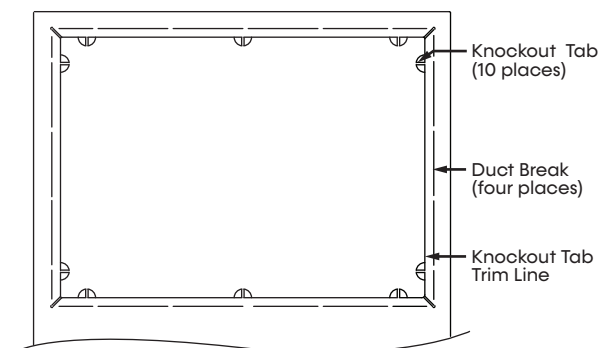


Figure 24: Knockout Locations (Top View)



### Supply Air Installation

Figure 25: Supply Knockouts



Modes:  
M\*Y

## Section Two — Product Line Specific Installation

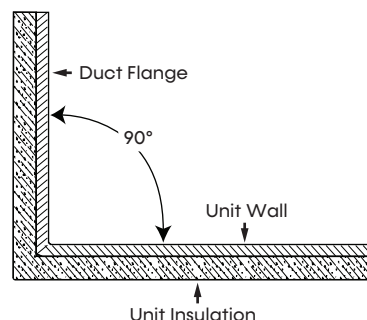
1. If the unit has been ordered with a supply air plenum, each side of the unit has one supply air knockout as well as a supply air knockout on the top of the unit (see Figures 23 and 24).

2. Determine which supply air opening/openings are required for your application.

**NOTE: Do not use the supply air opening on the riser side of the unit.**

3. Use a sharp retractable knife to trim insulation using center knockout slot/trim line as a guide (see Figure 25).
4. Use a sharp pair of standard needle nose pliers and grab the knockout tab (see Figure 25).
5. Twist or pry pliers back and forth until knockout tab breaks away from unit.
6. Repeat for all supply air tabs until all are broken.
7. Discard center knockout piece. Be cautious of sharp edges.
8. Use a sharp retractable knife to trim any excess insulation using knockout hole as a guide.

**Figure 26: Drywall Stops**



9. Use duct pliers (hand seamers) to fold duct flange out of the unit 90° for each side of the supply air opening along duct break (see Figure 25). The 90° flanges can now be used as drywall stops to prevent coverage of discharge opening (see Figure 26).
10. Use adhesive or glue to re-attach insulation that has pulled away from the unit during knockout-removal process.
11. For ducted applications, apply tape along and around all of the supply air opening knockouts to prevent air leakage.

## Section Three — Finishing Installation (All Models)

### GRILLE/DUCTWORK INSTALLATION

Install all ductwork and/or supply and return grilles in accordance with the project plans and specifications. If not included on the unit or furnished from the factory, provide supply and return grilles as recommended in the product catalog.

### OUTSIDE AIR INSTALLATION (IF REQUIRED)

Low-temperature protection is required for units provided with outside air for ventilation to prevent coil freeze-up. This protection may be any of several methods such as a low-temperature thermostat to close the outside air damper or a preheat coil to temper the outside air before it reaches the unit.

Note that none of these methods adequately protect a coil in the event of power failure. The safest method of freeze protection is using glycol in the proper percent solution for the coldest expected air temperature.

The manufacturer assumes no responsibility for undesirable system operation due to improper system design, equipment or component selection, and/or installation of ductwork, grilles, and other related components.

### ELECTRICAL CONNECTIONS

The unit serial plate lists the unit electrical characteristics such as the required supply voltage, fan and heater amperage, and required circuit ampacities. The unit wiring diagram shows all unit and field wiring. Since each project is different and each unit on a project may be different, the installer must be familiar with the wiring diagram and serial plate on the unit BEFORE beginning any wiring.

The unit electrical supply is designed to enter through knockouts provided in the top of the unit and pass down through matching knockouts in the control section top.

Where space allows, power may be pulled directly through the side of the cabinet into the control section.

Never control the fan motor(s) by any wiring or device other than the 3-speed switch or thermostat/switch combination without factory authorization. Fan motor(s) may be temporarily wired for use during construction only with prior factory approval in strict accordance with the instructions issued at that time.

Units with optional factory-furnished and installed aquastats may be shipped with the aquastats mounted on a coil stub out. Remove the aquastat before installation of a valve package. Consult the factory piping diagram in the approved submittals for proper location when reinstalling the aquastats. If the valve package is field-furnished, the aquastat must be installed in a location where it will sense the water temperature regardless of control valve position. A bleed bypass may be required to guarantee proper aquastat operation.

The manufacturer assumes no responsibility for any damages and/or injuries resulting from improper field installation and/or wiring.

Locate and check all components furnished for field installation by either the factory or the controls contractor for proper function and compatibility. Check all internal components for shipping damage and tighten any loose connections to minimize problems during startup.

Any devices such as fan switches or thermostats that have been furnished from the factory for field installation must be wired in strict accordance with the wiring diagram that appears on the unit. Failure to do so could result in personal injury or damage to components, and voids all manufacturer warranties.

Complete all field wiring in accordance with governing codes and ordinances. Any modification of the unit wiring without factory authorization voids all of the factory warranties and nullifies any agency listings.

The manufacturer assumes no responsibility for any damages and/or injuries resulting from improper field installation and/or wiring.

Modes:  
M\*Y

## Section Three — Finishing Installation (All Models)

### EXPOSED UNIT TOUCH-UP AND REPAINTING

Return-access and exposed-cabinet units may be furnished with a baked-enamel finish. Small scratches in this finish may be repaired with touch-up paint available from the factory. Some colors of touch-up paint are available in aerosol containers and all touch-up paint is available in pint, quart, and gallon cans. Contact the factory for availability.

Follow proper safety procedures regarding ventilation and safety equipment. Follow the manufacturer's directions for the products being used.

To repaint the factory-baked enamel, prepare the finish by light sanding with #280 grit sand paper or #000 or #0000 fine steel wool. Wipe the surface with a liquid surface-etch cleaning product such as "No Sand" or "Pasceo." These items are available at most paint product stores. Note that the more conscientiously this preparation is done, the more effective it is.

After this preparation is complete, the factory finish provides excellent adhesion for a variety of air-dried top coats. Enamel provides a more durable, higher gloss finish, while latex does not adhere as well and gives a dull, softer finish. Avoid top coats involving an exothermic chemical process between two components, such as epoxies and urethanes.

Factory aerosol touch-up paint may require a number of light "dust coats" to isolate the factory-baked enamel finish from the quick-drying touch-up paint.

### CONCEALED UNIT ENCLOSURE

Concealed units are designed to have gypsum board or other types of wall board applied directly to the unit cabinet surface to a maximum combined thickness of  $\frac{5}{8}$  inches (15.88 mm). The wall board may be attached with drywall screws or similar fasteners provided they penetrate the cabinet no more than  $\frac{1}{2}$  inch (12.7 mm). These fasteners must be located to avoid damage to internal components and wiring in the same manner as the anchoring fasteners. When applying the wall board directly to the unit cabinet, it may be necessary to shim the wall board in some areas to achieve the desired finished wall surface.

An alternate method of enclosing the unit is to frame one or more sides with studding and apply the wall board to this framing. This method requires specific unit features and return access panels when used on the return-air side of a unit. Units not properly equipped exhibit poor cooling and/or heating performance and could experience excessive or premature component failures.

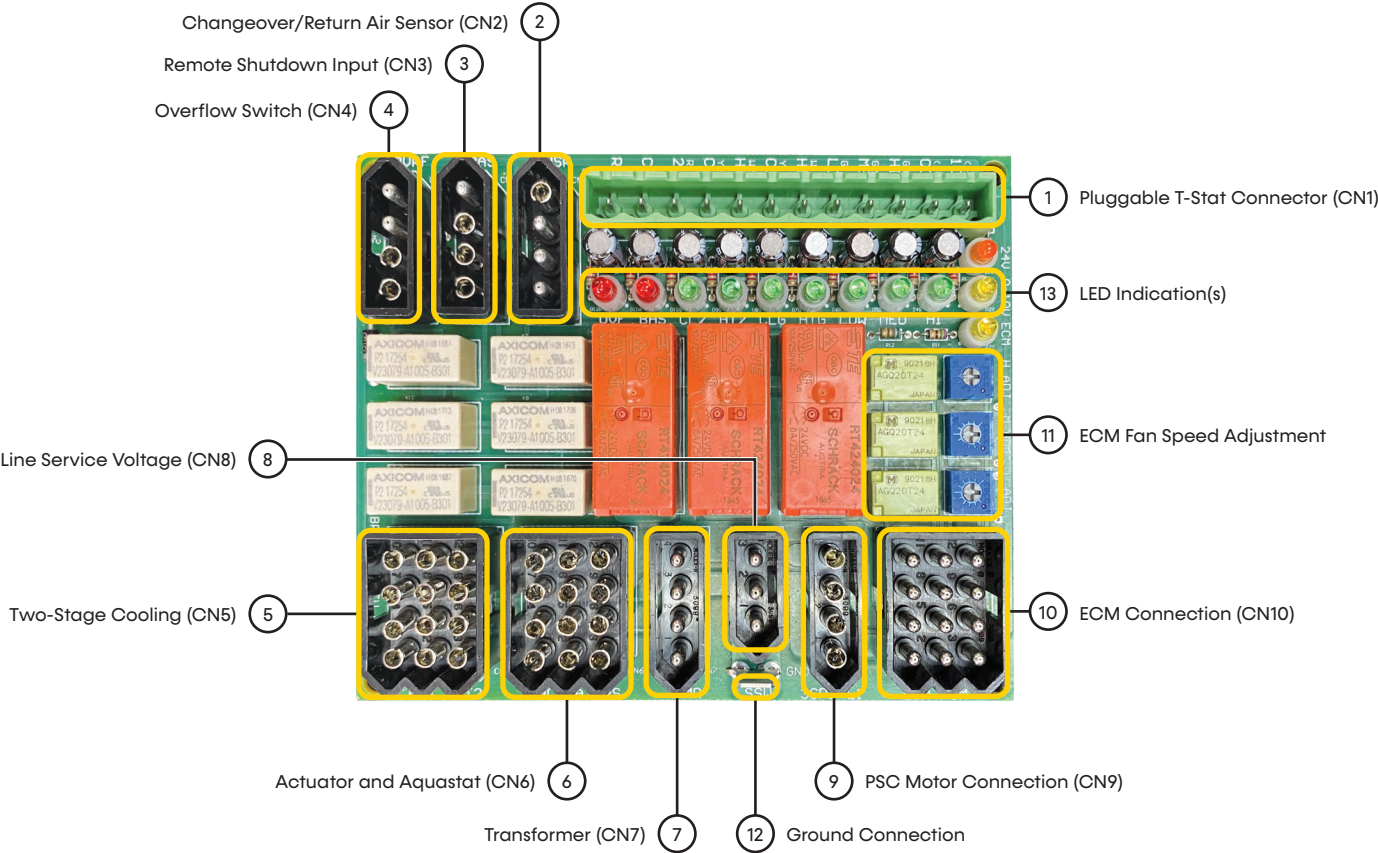
Contact the sales representative or the factory with any questions regarding unit enclosure methods.

Section Four — Controls Operation

BOARD COMPONENTS AND SPECIFICATIONS

Before proper control operation can be verified, all other systems must be operating properly. The correct water and air temperatures must be present for the control function being tested. Some controls and features are designed to not operate under certain conditions. For example, on a 2-pipe cooling/heating system with auxiliary electric heat, the electric heater cannot be energized with hot water in the system. A wide range of controls, electrical options, and accessories may be used with the equipment covered in this manual. Consult the approved unit submittals, order acknowledgments, and other literature for detailed information regarding each individual unit and its controls. Since controls and features may vary from one unit to another, carefully identify the controls used on each unit and their proper control sequence. Information provided by component manufacturers regarding installation, operation, and maintenance of their individual controls is available upon request.

Legend	
1	CN1 – 24V Customer Input (Thermostat)
2	CN2 – Changeover/Return Air Sensor
3	CN3 – Remote Shutdown Input
4	CN4 – Condensate Overflow Switch
5	CN5 –Two Stage Cooling
6	CN6 – Actuator 7 Aquastat
7	CN7 – Transformer
8	CN8 – Line Service Voltage
9	CN9 – PSC Motor Connection
10	CN10 – ECM Connection
11	ECM Fan Speed Adjustment
12	Ground Connection
13	LED Diagnostics (for Multimeter Diagnostics)





Modes:  
M\*Y

## Section Four — Controls Operation

### BOARD FUNCTION AND DIAGNOSTICS

Use proper wire gauge and insulation type based on application and local code requirements.

For detailed IEC 24V thermostat control wiring diagrams, reference thermostat IOMs.

#### CN1 – 24V Customer Input (Thermostat)

##### For Factory Installed IEC 24V Thermostat

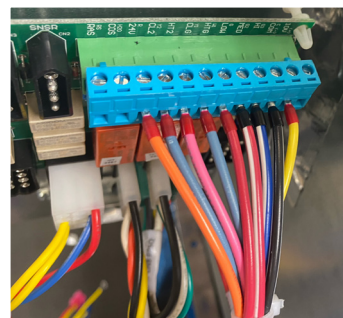
**NOTE: Does not apply to proportional or line-voltage thermostat controls. The diagram below represents a factory-installed IEC 24V thermostat.**

CN1		T - STAT
(+) 10V		Y2/RS+5
(-) COM	YEL ●	PUR ○ RS
G3/HI	BKW ●	ORG ○ R
G2/MED	BUW ●	RDW ○ G
G1/LOW	RDW ●	BLU ○ Y1
W1/HTG	RED ●	BKW ○ G3
Y1/CLG	BLU ●	RED ○ W1
W2/HT2		BUW ○ G2
Y2/CL2		YEL ○ C
R/24V	ORG ●	GRY ○ H20
COS	GRY ●	CK1
RAS	PUR ●	

**Table 1: Thermostat Connections and Functions (IEC)**

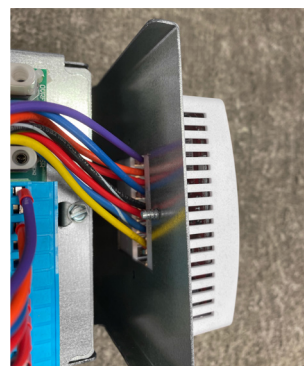
Connection	Function/Description
(+) 10V	Not used
(-) COM	Ground control power
G3 / HI	Fan High Speed
G2 / MED	Fan Medium Speed
G1 / LOW	Fan Low Speed
W1 / HTG	Heat
Y1 / CLG	Cool
W2 / HT2	Heat stage 2
Y2 / CL2	Cool stage 2
R / 24V	24V Controller Power
COS	Changeover sensor
RAS	Room air sensor

**Figure 27: Thermostat Wire Harness Connection**



**Figure 28: Mounted Thermostat Connection**

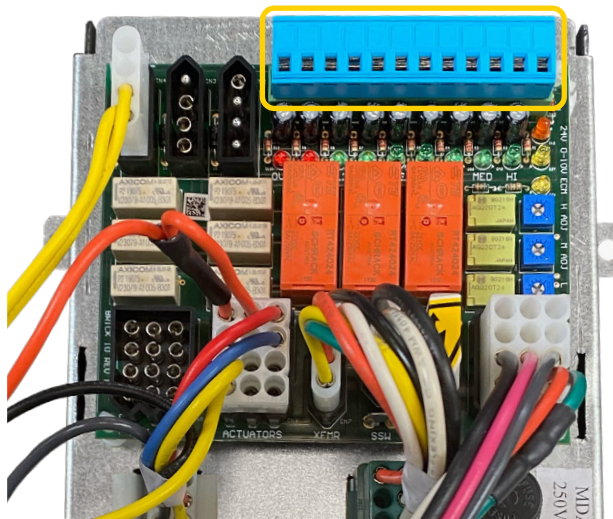
**NOTE: Image depicts an IEC unit-mounted Venture Wi-Fi thermostat.**



**For third-party Thermostat Control or Remote Mounted Thermostat**

**Figure 29: Wire Harness**

**NOTE: Unplug blue connector from control board. Make appropriate thermostat wiring connections and plug connector back to control board.**





## Section Four — Controls Operation

Model:  
M\*Y

**Table 2: Thermostat Connections and Functions**

Connection	Function/Description
(-) COM	Ground control power
G3 / HI	Apply 24V signal for High Speed Control
G2 / MED	Apply 24V signal for Medium Speed control
G1 / LOW	Apply 24V signal for Low Speed Control
W1 / HTG	Apply 24V for Stage 1 heat
Y1 / CLG	Apply 24V for Stage 1 cool
W2 / HT2	Apply 24V for Stage 2 heat
Y2 / CL2	Apply 24V for Stage 2 cool
R / 24V	24V Controller Power
COS	Changeover sensor
RAS	Room air sensor

### CN2 – Changeover/Return Air Sensor

- Power connector for 24V or common-powered sensors
  - 24V powered sensors
    - Applicable for IEC-supplied air sensor for Wi-Fi (E055-71520330), Programmable (E055-71520317), Non-programmable (E055-71520316) 24V IEC thermostats
  - Common-powered sensors
    - Applicable for third-party thermostats
- Sensor/switch
  - 10k thermistor
  - Bimetal switch

### CN3 – Remote Shutdown Input

**NOTE: 85 Board is not used with 0-10VDC motor. Contact Factory for remote shutdown when using 0-10VDC motor.**

- Provides dry contact for signal to BAS system - I/O
  - Dry Normally Open
  - Wet Normally Open
  - Discrete Coil
- When contact activated
  - Motor OFF
  - Actuator OFF (85 Board will not be used with 0-10VDC Actuators)
  - Electric Heat OFF
  - Power to controller remains ON

- BAS LED indication when BAS relay circuit activated

### CN4 – Condensate Overflow Switch

**NOTE: 85 Board is not used with 0-10VDC Motor to meet sequence outlined below.**

- Low voltage condensate switch shuts down the unit when the water level in the drain pan reaches an unsafe level.
  - Switch is normally closed and opens on an increase in water level.
- When contact activated, then
  - Motor OFF
  - Valve Actuator OFF (85 Board is not be used with 0-10VDC Actuators)
  - Electric Heat OFF
  - Power to controller remains ON

- OVF LED indication when condensate switch activated

### CN5 – 2nd Stage Cooling/Heating

- Available with 2-stage coil for part load
  - Available with IEC Venture Wi-Fi Thermostat (E055-71520330). Contact factory for application.
- 24V On/Off, 24V Floating, 0-10V Proportional control
- CL2 or HT2 LED indication when either 2nd stage cooling or heating activated

### CN6 – 1st Stage Cooling/Heating

- 24V On/Off, 24V Floating, 0-10V Proportional control, Line voltage
- SureFlow control available. Contact factory for applications
- CLG or HTG LED indication when either 1st stage cooling or heating activated

### CN7 – Class II Transformer

- 40VA, 75VA option
- 24V LED activated when powered

### CN8 – Incoming Power

Modes:  
M\*Y

## Section Four — Controls Operation

### CN9 – PSC Motor

- 3-speed application
- Either LOW/MED/HI activated when a speed is selected

### CN10 – EC Motor

- 3-speed application
- Solid state switching
- Either LOW/MED/HI activated when a speed is selected
- EC LED indicates speed control is powered

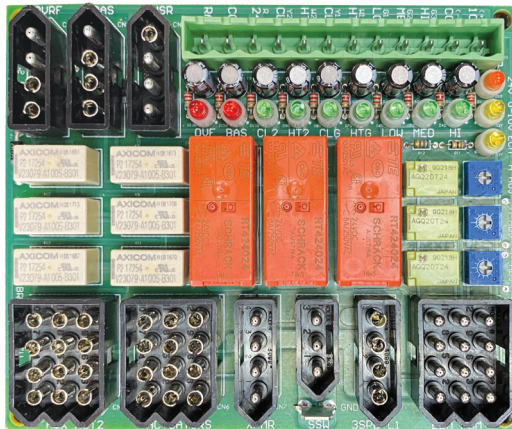
### EC Fan Speed Adjustment

If the unit is equipped with an EC motor blower, additional steps may be required during the air balancing process. Review project submittals or order acknowledgment to determine which EC control scheme the unit has. Alternatively, match the control board to the illustrations.

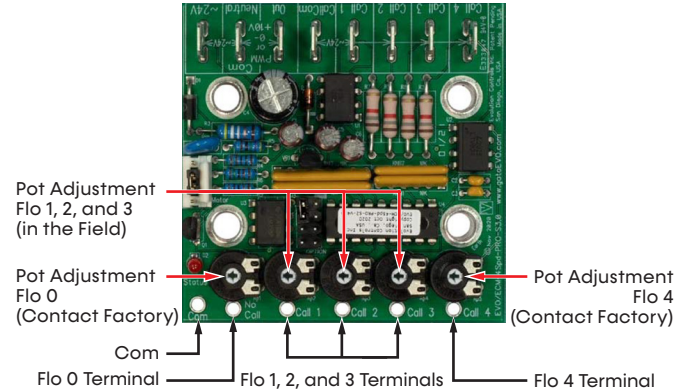
#### CAUTION

Both of the procedures described below require the control box to be powered while adjustments are made. Line voltage components are concealed behind a secondary cover. However, installer should still take all reasonable precautions.

**Figure 30: 3-Speed, Potentiometer Adjustment (ECM Only) (E025-71481108)**



**Figure 31: 4-Speed, Solid State with Potentiometer (EVO/ECM-4Spd-PRO)**



**NOTE: The unit has been factory configured to produce PSC equivalent airflow on high speed, with medium and low speed set at 80% and 60% of high, respectively. If these settings are acceptable, then no further configuring is required.**

If alternative airflows are desired, use board-mounted pots to adjust the airflow associated with each input.

To reset to initial factory settings, reference the voltages found on the sticker next to the pots.

Each output can be adjusted from 0 to 100% of the motor's factory-programmed operating range. Use voltmeter and airflow chart (on control box cover) to set values.

Adjusting the potentiometers requires the use of a multimeter capable of measuring 0~5VDC.

1. Only trained and qualified individuals should attempt to adjust or service components on any electrical component. Failure to follow safety rules could result in electrical shock or hazard.
2. 24VAC power must be supplied to ECM board to make adjustments.
3. Set the electrical multimeter to Volts Direct Current (VDC) on the 0~5 or 0~20VDC scale.

## Section Four — Controls Operation

Model:  
M\*Y

4. Attach black (negative) lead of meter to the "Com" terminal to the left of the potentiometers and below the Status light.
5. Attach the red (positive) lead of the meter to the terminal below the Potentiometer needing adjustment.
  - a. **High Speed:** Using a small screwdriver, turn the H ADJ potentiometer (CW for increasing speed, CCW for decreasing speed).
  - b. **Medium Speed:** Using a small screwdriver, turn the M ADJ potentiometer (CW for increasing speed, CCW for decreasing speed).
  - c. **Low Speed:** Using a small screwdriver, turn the L ADJ potentiometer (CW for increasing speed, CCW for decreasing speed).

### Variable Airflow for 0-10VDC

If a factory-provided thermostat or DDC controller is utilized, then the unit is already correctly configured.

IEC recommends using the specified thermostat or DDC controller to commission the unit whenever possible. However, the blower can be started and operated without the thermostat. Consult factory for further instruction.

### ECM Variable Airflow for 0-10VDC

No control board is required and no field adjustments are possible. The motor uses 0-10VDC signal directly. See the control box label. The fan enables at 1.5VDC.

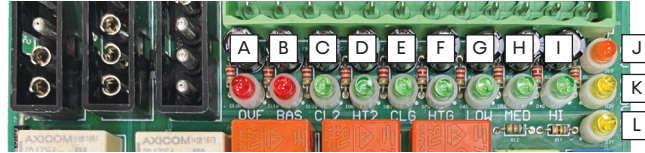
### Ground Tab Connection

- For multimeter diagnostics

Modes:  
M\*Y

## Section Four — Controls Operation

**Figure 32: LED Function and Outcomes (Sequence of Operations)**



**Table 3: LED Function and Outcomes (Sequence of Operations)**

	Item	Description	Outcome
A	Condensate Overflow Switch (OVF)	Condensate switch is tripped by increasing water level in the drain pan	<ul style="list-style-type: none"> <li>• OVF LED Shows Red</li> <li>• Motor OFF<sup>1</sup></li> <li>• Actuator OFF<sup>2</sup></li> <li>• Electric Heat Off</li> <li>• Power to controller remains ON</li> </ul>
B	Remote Shutdown Input (BAS)	24VAC externally applied to BAS CN3 or the internally-powered BAS CN3 loop is closed	<ul style="list-style-type: none"> <li>• BAS LED shows RED</li> <li>• Motor OFF<sup>1</sup></li> <li>• Actuator OFF<sup>2</sup></li> <li>• Electric Heat Off</li> <li>• Power to controller remains ON</li> </ul>
C	Cooling 2 <sup>nd</sup> Stage (24VAC and 0-10VDC) (CL2)	24VAC signal applied to CL2 of CN1. 2 <sup>nd</sup> stage cooling relay (CL2) will actuate and supply 24VAC to Pin 9 of connector CN5. When 0-10VDC is applied to CL2, control signal will passively be present at Pin 7 of the CN5 connector.	<ul style="list-style-type: none"> <li>• CL2 LED shows GREEN</li> <li>• Signal for 2<sup>nd</sup> stage cooling valve present</li> </ul>
D	Heating 2 <sup>nd</sup> Stage (24VAC and 0-10VDC) (HT2)	24VAC signal applied to HT2 of CN1. 2 <sup>nd</sup> stage heating relay (HT2) will actuate and supply 24VAC to Pin 9 of connector CN5. When 0-10VDC is applied to HT2, control signal will passively be present at Pin 7 of the CN5 connector.	<ul style="list-style-type: none"> <li>• HT2 LED shows GREEN</li> <li>• Signal for 2<sup>nd</sup> stage heating valve present</li> </ul>
E	Cooling 1 <sup>st</sup> Stage (24VAC and 0-10VDC) (CLG)	24VAC signal applied to CLG of CN1. 1 <sup>st</sup> stage cooling relay (CLG) will actuate and supply 24VAC to Pin 9 of connector CN5. When 0-10VDC is applied to CLG, that control signal will passively be present at Pin 7 of the CN6 connector.	<ul style="list-style-type: none"> <li>• CLG LED shows GREEN</li> <li>• Signal for 1<sup>st</sup> stage cooling valve present</li> </ul>
F	Heating 1 <sup>st</sup> Stage (24VAC and 0-10VDC) (HTG)	24VAC signal applied to HTG of CN1. 1 <sup>st</sup> stage HTG relay will actuate and supply 24VAC to Pin 12 of connector CN5. When 0-10VDC is applied to HTG, that control signal will passively be present at Pin 8 of the CN6 connector.	<ul style="list-style-type: none"> <li>• HTG LED shows GREEN</li> <li>• Signal for 1<sup>st</sup> stage cooling valve present</li> </ul>
G	Fan Low Speed (24VAC) (LOW)	24VAC signal applied to LOW of CN1. The low speed PSC motor power relay and the low speed ECM signal relays will be activated. Line voltage is present at Pin 2 of CN9 and the adjustable low speed ECM DC signal will be present at Pin 5 of the CN10 connector.	<ul style="list-style-type: none"> <li>• LOW LED shows GREEN</li> <li>• Signal for low speed present</li> </ul>
H	Fan Med Speed (24VAC) (MED)	24VAC signal applied to MED of CN1. The medium speed PSC motor power relay and the medium speed ECM signal relays will be activated. Line voltage is present at Pin 3 of CN9 and the adjustable medium speed ECM DC signal will be present at Pin 5 of the CN10 connector.	<ul style="list-style-type: none"> <li>• MED LED shows GREEN</li> <li>• Signal for medium speed present</li> </ul>
I	Fan High Speed (24VAC) (HI)	24VAC signal applied to HI of CN1. High speed PSC motor power relay and the high speed ECM signal relays will be activated. Line voltage is present at Pin 4 of CN9 and the adjustable high speed ECM DC signal will be present at Pin 5 of the CN10 connector.	<ul style="list-style-type: none"> <li>• HI LED shows GREEN</li> <li>• Signal for high speed present</li> </ul>
J	24VAC Board Power (24V)	24VAC signal supplied from internal transformer. 24VAC required for board operation.	<ul style="list-style-type: none"> <li>• 24V LED shows ORANGE</li> </ul>
K	Power Supply by ECM (ECM)	ECM Motor connected to CN10 and powered by line voltage. Signal from the ECM regulator is present at Pin 6 of the CN10 connector.	ECM LED shows YELLOW

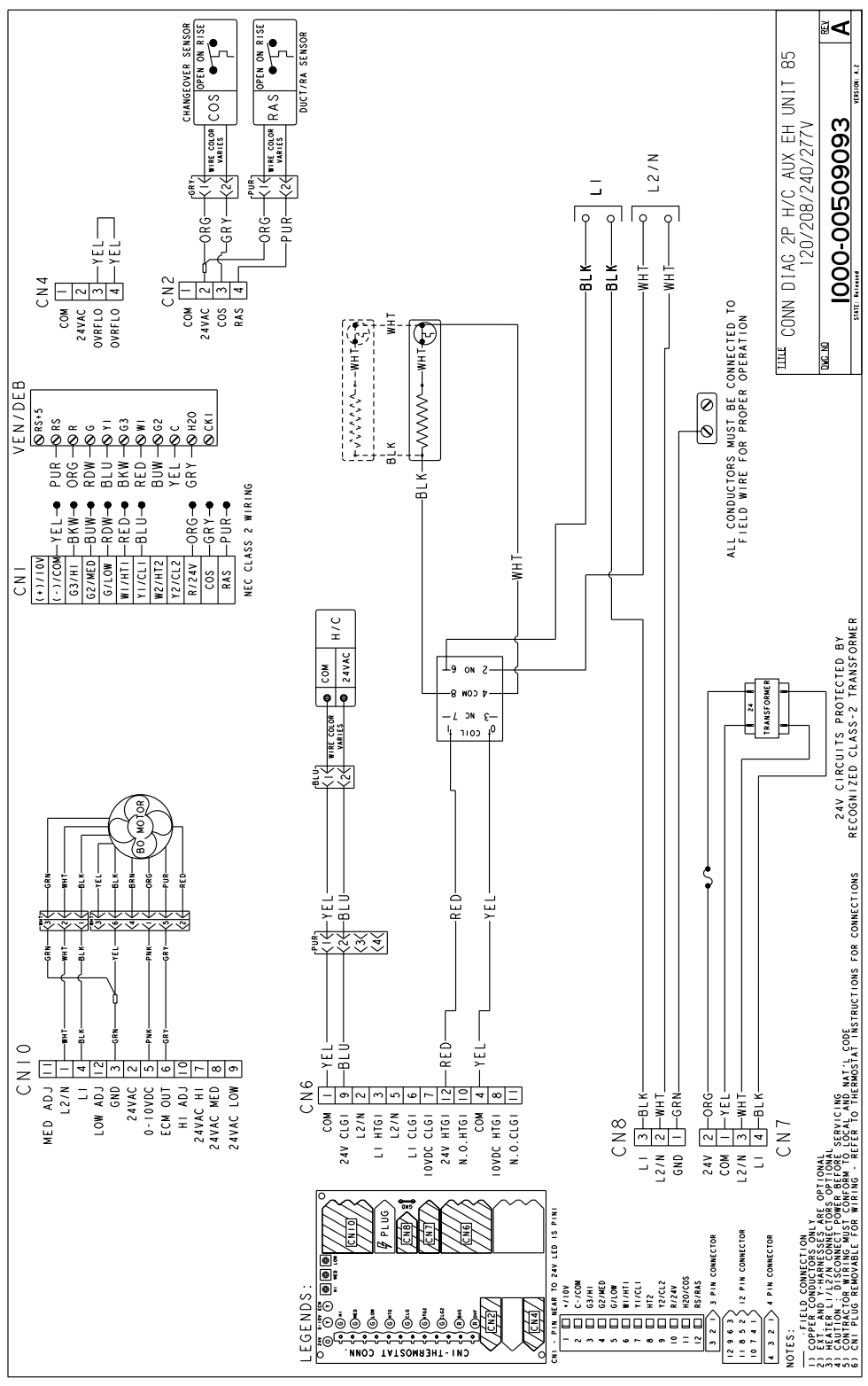
1. The 85 Board is not used with 0-10VDC motor
2. The 85 Board is not used with 0-10VDC actuators

# Section Four — Controls Operation

Model:  
M\*Y

## BOARD EXAMPLE WIRING DIAGRAM

**NOTE:** The wiring diagram is available through the QR code found on the unit serialized name plate label.





Modes:  
M\*Y

## Section Five — Startup (All Models)

### GENERAL STARTUP

Before beginning any startup operation, the startup personnel must familiarize themselves with the unit options, accessories, and control sequence to understand the proper system operation. All personnel should have a good working knowledge of general startup procedures and have the appropriate startup and balancing guides available for consultation.

The building must be completely finished including doors, windows, and insulation. All internal walls and doors should be in place and in the normal position. In some cases the interior decorations and furniture may influence overall system performance. The entire building should be as complete as possible before beginning any system balancing.

The initial step in any startup operation should be a final visual inspection. Inspect all equipment, plenums, ductwork, and piping to verify that all systems are complete and properly installed and mounted, and that no debris or foreign articles such as paper or drink cans are left in the units or other areas.

Check each unit for loose wires, free blower-wheel operation, and loose or missing access panels or doors. Except as required during startup and balancing operations, do not operate fan coil units without all the proper ductwork attached, supply and return grilles in place, and all access doors and panels in place and secure. Install a clean filter of the proper size and type. Failure to do so could result in damage to the equipment or building and furnishings and/or void all manufacturer's warranties.

Maximum operating altitude for units is 13,400 feet (4 km).

All units are IPX0 rated.

### COOLING/HEATING SYSTEM

Prior to the water system startup and balancing, flush the chilled/hot water systems to clean out dirt and debris that may have collected in the piping during construction. During this procedure, flush the system from the supply riser to the return riser through a cross-over loop at the end of the riser column, and ensure all unit service valves are in the closed position. This prevents foreign matter from entering the unit and clogging the valves and

metering devices. Install strainers in the piping mains to prevent this material from entering the units during normal operation.

During system filling, air venting from the unit is accomplished by the use of the standard, manual air-vent fitting, or the optional, automatic air-vent fitting installed on the coil. Vent by depressing the needle valve core. You can unscrew automatic air vents one turn counterclockwise to speed initial venting, but ensure to screw in for automatic venting after startup operations.

#### CAUTION

The air vent provided on the unit is not intended to replace the main system air vents and may not release air trapped in other parts of the system. Inspect the entire system for potential air traps and vent those areas as required, independently. In addition, some systems may require repeated venting over a period of time to properly eliminate air from the system.

### DIRECT EXPANSION (DX) SYSTEMS

**NOTE: Operation of DX equipped fan coils at any fan speed other than high fan speed is not approved and voids the manufacturer's limited warranty.**

#### CAUTION

Do not operate fan coils with a DX evaporator coil plus contiguous hydronic coil without use of a suitable glycol solution that is approved for use by the manufacturer. Failure to follow this instruction voids the manufacturer's limited warranty.

Should the evaporator freeze due to inadequate airflow for any reason, damage may occur to adjacent water- or steam-coil tubing. This type of issue is due to product misapplication and voids the manufacturer's limited warranty.

### AIR SYSTEM BALANCING

All duct stubs, grilles, filters, and return-access panels must be properly installed to establish actual system operating conditions BEFORE beginning air balancing operations.

Each individual unit and the attached ductwork is a unique system with its own operating characteristics. For this reason, air balancing is normally done by balance specialists who are familiar with all procedures required to properly establish air distribution and fan-system operating conditions. Unqualified personnel should not attempt these procedure.

## Section Five — Startup (All Models)

Model:  
M\*Y

Units without ductwork have air volumes predetermined at the factory by supply grille size and normally do not require air balancing other than selecting the desired fan speed. Units furnished with optional dampers on supply grilles may require some small adjustments to “fine tune” the air delivery to each grille. Opposed-blade balancing dampers are not available for all grilles on a unit with electric heat.

After proper system operation is established, record the actual unit air delivery and the actual fan motor amperage draw for each unit in a convenient place for future reference.

### MAXIMUM EXTERNAL STATIC PRESSURES

**Table 4: M\*Y**

	ESP
Max @ High Speed	0.40
Max @ Med Speed	0.30
Max @ Low Speed	0.20

**Table 5: MGY**

	ESP
Max @ High Speed	0.60
Max @ Med Speed	0.40
Max @ Low Speed	0.25

### WATER TREATMENT

Proper water treatment is a specialized industry. IEC recommends consulting an expert in this field to analyze the water for compliance with the water quality parameters listed below, and to specify the appropriate water treatment regimen. The expert may recommend typical additives such as rust inhibitors, scaling preventative, antimicrobial growth agents, or algae preventatives. You may use antifreeze solutions to lower the freezing point.

IEC water coil tubes and headers are constructed of pure copper. Multiple brass alloys may be present in the valve package, depending on unit configuration. It is the user's responsibility to ensure the tube and piping materials furnished by IEC, are compatible with the treated water.

Failure to provide proper water quality may affect the fan coil unit's warranty.

**Table 6: Water Quality Requirements**

Water Containing	Required Concentration
Sulphate	Less than 200 ppm
pH	7.0 – 8.5
Chlorides	Less than 200 ppm
Nitrate	Less than 100 ppm
Iron	Less than 4.5 mg/l
Ammonia	Less than 2.0 mg/l
Manganese	Less than 0.1 mg/l
Dissolved Solids	Less than 1000 mg/l
CaCO <sub>3</sub> Hardness	300 - 500 ppm
CaCO <sub>3</sub> Alkalinity	300 - 500 ppm
Particulate Quantity	Less than 10 ppm
Particulate Size	800 micron max

- Maximum Water Operating Temperature: 190° (87°C)
- Maximum Allowable Water Pressure: 500 PSIG (3447 kpa)

### WATER SYSTEM BALANCING

A complete knowledge of the hydronic system, its components, and controls is essential to proper water system balancing. Unqualified personnel should not attempt this procedure. The system must be complete, and all components must be in operating condition **BEFORE** beginning water system balancing operations.

Each hydronic system has different operating characteristics depending on the devices and controls used in the system. The actual balancing technique may vary from one system to another.

After the proper system operation is established, record the appropriate system operating conditions such as various water temperatures and flow rates in a convenient place for future reference.

Before and during water system balancing, conditions may exist due to incorrect system pressures which may result in noticeable water noise or undesired valve operation. After the entire system is balanced, these conditions do not exist on properly designed systems.



Modes:  
M\*Y

## Section Six — Routine Maintenance (All Models)

Each unit on a job requires its own unique operating environment and conditions, which may dictate a maintenance schedule that differs from other units on a job. Establish and maintain a formal schedule of regular maintenance and an individual unit log. This helps to achieve the maximum performance and service life of each unit on the job.

Follow information regarding safety precautions contained in the preface at the beginning of this manual during any service and maintenance operations.

For detailed information concerning service operations consult your sales representative or the factory.

### MOTOR/BLOWER ASSEMBLY

The type of fan operation is determined by the control components and their method of wiring. This may vary from unit to unit. Refer to the wiring diagram attached to each unit for that unit's individual operating characteristics.

All motors have permanently lubricated bearings. No field lubrication is required.

If the assembly requires extensive service, the motor/blower assembly may be removed from the unit to facilitate such operations as motor or blower wheel/housing replacement.

Do not permit dirt and dust to accumulate on the blower wheel or housing. This can result in an unbalanced blower wheel condition, which can damage a blower wheel or motor. You can clean the wheel and housing periodically using a vacuum cleaner and a brush taking care not to dislodge the factory balancing weights on the blower wheel blades.

### BIPOLAR IONIZER BRUSH CLEANING

The bipolar ionizer is designed to not require replacements parts.

The brushes on the device may become dirty over time and require cleaning to maintain the effectiveness of ion output. Clean the bipolar ionizer brushes and inspect the device at time of each filter change or sooner based on the location, filter effectiveness, and general environment.

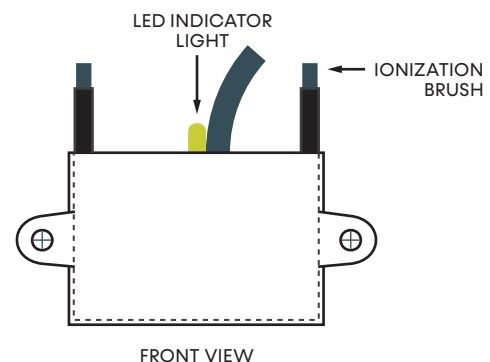
1. To clean the brushes, turn off power to the unit.

**NOTE: When power is OFF, the green LED indicator on the device is not illuminated.**

2. Using a small nylon brush, gently wipe off the two brushes. See the Bipolar Ionizer figure for brush location.
3. After cleaning, restore power.

It is strongly recommended the bipolar ionizer be paired with a Pleated MERV 8 filter for most effective indoor air quality results.

Figure 33: Bipolar Ionizer



### COILS

Coils may be cleaned by removing the filter and brushing the entering air face between fins with a stiff brush. Take care to not damage coil fins. Follow brushing by cleaning with a vacuum cleaner. If a compressed air source is available, the coil may be cleaned by blowing air through the coil fins from the leaving air face. Follow this procedure by vacuuming again. Units provided with the proper type of air filters, replaced regularly, require less frequent coil cleaning.

## Section Six — Routine Maintenance (All Models)

### ELECTRIC RESISTANCE HEATER ASSEMBLY

Electric resistance heaters typically require no normal periodic maintenance when unit air filters are changed properly. The operation and service life may be affected by other conditions and equipment in the system. The two most important operating conditions for an electric heater are proper air flow and proper supply voltage. High supply voltage and/or poorly distributed or insufficient air flow over the element results in element overheating. This condition may result in the heater cycling on the high-limit thermal cutout. The high-limit thermal cutout device is a safety device only and is not intended for continuous operation. With proper unit application and operation, the high-limit thermal cutout will not operate. This device only operates when a problem exists. ANY condition that causes high-limit cutout MUST be corrected immediately. High supply voltage causes excessive amperage draw and may trip the circuit breaker or blow the fuses on the incoming power supply.

After proper air flow and supply power are verified, regular filter maintenance is important to provide clean air over the heater. Dirt that is allowed to deposit on the heating element causes hot spots and eventual element burn through. These hot spots are not normally enough to trip the high-limit thermal cutout device and may not be evident until heater-element failure.

### ELECTRICAL WIRING AND CONTROLS

The electrical operation of each unit is determined by the components and wiring of the unit. This may vary from unit to unit. Consult the wiring diagram attached to the unit for the type and number of controls provided on each unit.

Verify the integrity of all electrical connections at least twice during the first year of operation. Afterwards, inspect all controls regularly for proper operation. Some components may experience erratic operation or failure due to age. Periodically inspect and clean wall thermostats to ensure they do not become clogged with dust and lint.

When replacing any components such as fuses, contractors, or relays, use only the exact type, size, and voltage component as furnished from the factory. Any deviation without factory authorization could result in personal injury or damage to the unit. This voids all factory warranties. Perform all repair work in such a manner as to maintain the equipment in compliance with governing codes, ordinances, and testing agency listings.

Specific information regarding the use and operating characteristics of the standard controls offered by the manufacturer are contained in other manuals.

### VALVES AND PIPING

No formal maintenance is required on the valve-package components most commonly used with fan coil units other than a visual inspection for possible leaks in the course of other normal periodic maintenance. If a valve needs replacement, use the same precautions taken during the initial installation to protect the valve package from excessive heat during replacement.

### THROWAWAY FILTERS

The type of throwaway filter most commonly used on fan coil units should be replaced on a regular basis. For each unit, establish and record the time interval between each replacement based on regular inspection of the filter. Refer to the product catalog for the recommended filter size for each product type and size. If the replacement filters are not purchased from the factory, use the same type and size as those furnished from or recommended by the factory. Consult the factory for applications using filter types other than the factory standard or optional product.

Modes:  
M\*Y

## Section Six — Routine Maintenance (All Models)

### PERMANENT FILTERS

Develop a maintenance schedule for permanent filters in the same manner as throwaway filters. Permanent filters may be cleaned and re-installed in the unit instead of being discarded when dirty. The optional factory permanent filter may be cleaned in hot soapy water to remove any trapped dirt. After cleaning, set aside on its edge to dry.

Before replacing the filter in the unit, recharge it with some type of entrapment film such as Film-Cor Recharging Oil. Spray the filter on both sides or submerge in the film to ensure complete coverage. Do not allow the filter to soak in the film. Immediately remove and drain the excess film from the filter before re-installation in the unit. Consult a local filter supplier for types of available cleaning solutions and charging films.

Permanent filters normally have less static pressure loss than throwaway filters.

### DRAIN

Check the drain before initial startup and at the beginning of each cooling season to ensure that the drain trap and riser are clear. If it is clogged, clear the debris so that condensate easily flows.

Checks the drain periodically during the cooling season to maintain a free-flowing condensate.

If the growth of algae and/or bacteria is a concern, consult an air conditioning and refrigeration supply organization familiar with local conditions for chemicals or other solutions available to control these agents.

### REPLACEMENT PARTS

Use factory replacement parts wherever possible to maintain unit performance, its normal operating characteristics, and the testing agency listings. Purchase replacement parts through a local sales representative.

Contact the local sales representative or the factory before attempting any unit modifications. Any modifications not authorized by the factory could result in personnel injury, damage to the unit, and could void all factory warranties.

When ordering parts, the following information must be supplied to ensure proper part identification:

1. Complete unit model number
2. Unit serial number
3. Complete part description, including any numbers

For warranty parts inquiries, in addition to the information previously listed, a description of the issue with the parts is required. Contact the factory for authorization to return any parts, such as defective parts, to be replaced in warranty. All shipments returned to the factory must be marked with a **Return Authorization Number** which is provided by the factory, if warranty has been approved.

On warranty replacements, in addition to the information previously listed, the unit shipping code which appears on the upper right-hand corner of the serial plate is required. Contact the factory for authorization to return any parts such as defective parts replaced in warranty. All shipments returned to the factory must be marked with a factory-provided Return Authorization Number.

## Section Seven — Equipment Startup Checklist

Model:  
M\*Y

### RECEIVING AND INSPECTION

- ☐ Unit received undamaged
- ☐ Unit received complete as ordered
- ☐ "Furnish only" parts accounted for
- ☐ Unit arrangement/hand correct
- ☐ Unit structural support complete and correct

### HANDLING AND INSTALLATION

- ☐ Mounting grommets/isolators used
- ☐ Unit mounted level and square
- ☐ Proper access provided for unit and accessories
- ☐ Proper electrical service provided
- ☐ Proper overcurrent protection provided
- ☐ Proper service switch/disconnect provided
- ☐ Proper chilled water line size to unit
- ☐ Proper hot water line size to unit
- ☐ All services to unit in code compliance
- ☐ All shipping screws and braces removed
- ☐ Unit protected from dirt and foreign matter

### COOLING/HEATING CONNECTIONS

- ☐ Protect valve package components from heat
- ☐ Connect field piping to unit
- ☐ Pressure test all piping for leaks
- ☐ Install drain line and traps, as required
- ☐ Insulate all piping, as required
- ☐ Connect risers from MM models to MS models
- ☐ Connect risers to unit coil valve package  
(if risers are shipped/installed separately)

### DUCTWORK CONNECTIONS

- ☐ Install ductwork, fittings and grilles, as required
- ☐ Flexible duct connections at unit
- ☐ Proper supply and return grille type and size
- ☐ Control outside air for freeze protection
- ☐ Insulate all ductwork, as required

### ELECTRICAL CONDITIONS

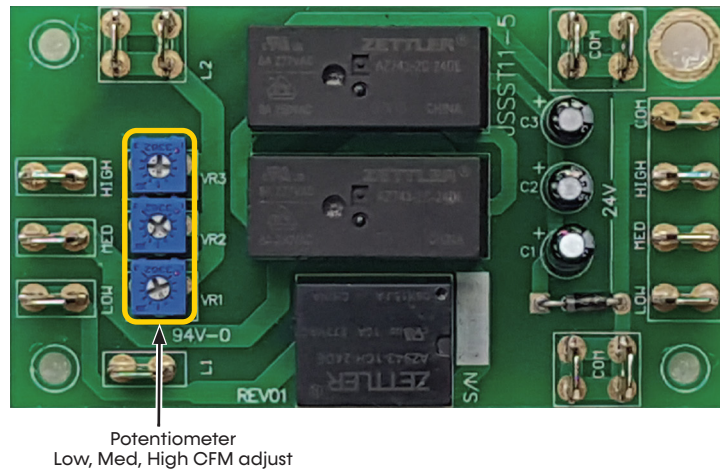
- ☐ Refer to unit wiring diagram
- ☐ Connect incoming power service or services
- ☐ Install and connect "furnish only" parts

### UNIT STARTUP

- ☐ General visual unit and system inspection
- ☐ Check for proper fan rotation
- ☐ Record electrical supply voltage
- ☐ Check all wiring for secure connections
- ☐ Close all unit isolation valves
- ☐ Flush water systems
- ☐ Fill systems with water/refrigerant
- ☐ Vent water systems, as required
- ☐ All ductwork and grilles in place
- ☐ All unit panels and filters in place
- ☐ Start fans, pumps, chillers, etc.
- ☐ Check for overload conditions of all units
- ☐ Check all ductwork and units for air leaks
- ☐ Balance water systems, as required
- ☐ Balance air systems, as required
- ☐ Record all final settings for future use
- ☐ Check piping and ductwall for vibration
- ☐ Check all dampers for proper operation
- ☐ Verify proper cooling operation
- ☐ Verify proper heating operation
- ☐ Reinstall all covers and access panels
- ☐ Verify proper condensate drainage

Modes:  
M\*Y

## Appendix A



The unit is factory configured to produce PSC equivalent airflow on high speed, with medium and low speed set at 80% and 60% of high, respectively. If these settings are acceptable, no further configuring is required.

If alternative airflows are desired, use board-mounted pots to adjust the airflow associated with each input. Each output can be adjusted from 0 to 100% of the motor's factory-programmed operating range. Use voltmeter and airflow chart (on control box cover) to set values.

To reset to initial factory settings, reference the voltages found on the sticker next to the pots.

Adjusting the Low, Medium, and High potentiometers requires the use of a multimeter capable of measuring 0~5VDC.

1. Only trained and qualified individuals should attempt to adjust or service components on any electrical component. Failure to follow safety rules could result in electrical shock or hazard.
2. Unit must be powered to perform the following procedure. If main power is not available, IEC recommends connecting a temporary 24V-40VA power supply in parallel with the secondary outputs of the unit's transformer.
3. Set the electrical multimeter to Volts Direct Current (VDC) on the 0~5 or 0~20VDC scale.
4. Attach black (negative) lead of meter to the DC common terminal, labeled "L2" above the potentiometers.
5. Attach the red (positive) lead of the meter to the red wire that bridges the 0-10VDC outputs: high, medium, and low.
  - a. **High Speed:** Using a small screwdriver, turn the H ADJ potentiometer (CW for increasing speed, CCW for decreasing speed).
  - b. **Medium Speed:** Using a small screwdriver, turn the M ADJ potentiometer (CW for increasing speed, CCW for decreasing speed).
  - c. **Low Speed:** Using a small screwdriver, turn the L ADJ potentiometer (CW for increasing speed, CCW for decreasing speed).



# Terms and Conditions

Model:  
M\*Y

## TERMS AND CONDITIONS

1. Orders shall not be binding upon International Environmental Corporation, an Oklahoma corporation (hereinafter referred to as "IEC") unless accepted by an authorized representative of IEC at its office in Oklahoma City, Oklahoma. No distributor, sales representative or any other person or entity (except authorized employees of IEC at its office in Oklahoma City, Oklahoma) has any authority whatsoever to bind IEC to any representation or agreement of any kind.
2. IEC does not build items to plans and specifications. IEC agrees to furnish only the items as described in IEC's acknowledgment unless IEC's office in Oklahoma City, Oklahoma has previously received and accepted, in writing, approved submittals from Purchaser.
3. Prices acknowledged are firm only if Purchaser releases the goods covered by this order for immediate production by IEC within sixty (60) days from the date of Purchaser's initial offer to purchase and for shipment by IEC within IEC's estimated shipping date, unless otherwise agreed to in writing by IEC at its office in Oklahoma City, Oklahoma. If Purchaser does not meet the terms and conditions of this paragraph, the prices are subject to escalation to those prices in effect at time of shipment without notice to Purchaser.
4. All prices are F.O.B. IEC's factory, unless otherwise agreed by IEC in writing; and, all payments and prices shall be in U.S.A. dollars.
5. If goods are released for production but IEC is prevented by the Purchaser from shipping upon completion or by IEC's estimated shipping date, whichever is later, IEC may at its option, in addition to all other remedies, invoice Purchaser to be payable within thirty (30) days and store the goods at Purchaser's sole expense.
6. Title to and risk of loss to the goods passes to the Purchaser F.O.B. IEC's factory.
7. **Disclaimer**  
It is expressly understood that unless a statement is specifically identified as a warranty, statements made by IEC or its representatives relating to IEC's products, whether oral, written or contained in any sales literature, catalog or any other agreement, are not express warranties and do not form a part of the basis of the bargain, but are merely IEC's opinion or commendation of IEC's products. **EXCEPT AS SPECIFICALLY SET FORTH HEREIN, THERE IS NO EXPRESS WARRANTY AS TO ANY OF IEC'S PRODUCTS. IEC MAKES NO WARRANTY AGAINST LATENT DEFECTS. IEC MAKES NO WARRANTY OF MERCHANTABILITY OF THE GOODS OR OF THE FITNESS OF THE GOODS FOR ANY PARTICULAR PURPOSE.**
8. **Grant of Limited Express Warranty**  
IEC warrants IEC products purchased and retained in the United States of America and Canada to be free from defects in material and workmanship under normal use and maintenance as follows: (1) All complete fan coil units built or sold by IEC for twelve (12) months from date of unit start up or eighteen (18) months from date of shipment (from factory), whichever comes first.  
  
All parts must be returned to IEC's factory in Oklahoma City, Oklahoma, freight prepaid, no later than sixty (60) days after the date of the failure of the part; if IEC determines the part to be defective and within IEC's Limited Express Warranty, IEC shall, when such part has been either replaced or repaired, return such to a factory recognized contractor or service organization, F.O.B. IEC's factory, Oklahoma City, Oklahoma, freight prepaid. The warranty on any parts repaired or replaced under warranty expires at the end of the original warranty period. For information and warranty service contact:  
  
International Environmental Corporation  
Customer Service  
5000 West I-40  
Oklahoma City, OK 73128  
(405) 605-5000  
  
This warranty does not cover and does not apply to: (1) Air filters, fuses, fluids; (2) Products relocated after initial installation; (3) Any portion or component of any system that is not supplied by IEC, regardless of the cause of the failure of such portion or component; (4) Products on which the unit identification tags or labels have been removed or defaced; (5) Products on which payment to IEC is or has been in default; (6) Products which have defects or damage which result from improper installation, wiring, electrical imbalance characteristics or maintenance; or are caused by accident, misuse or abuse, fire, flood, alteration or misapplication of the product; (7) Products which have defects or damage which result from a contaminated or corrosive air or liquid supply or operation at abnormal temperatures; (8) Mold, fungus or bacteria damages; (9) Products subjected to corrosion or abrasion; (10) Products manufactured or supplied by others; (11) Products which have been subjected to misuse, negligence or accidents; (12) Products which have been operated in a manner contrary to IEC's printed instructions; or (13) Products which have defects, damage or insufficient performance as a result of insufficient or incorrect system design or the improper application of IEC's products.  
  
IEC is not responsible for: (1) The cost of any fluids or other system components, or associated labor to repair or replace the same, which is incurred as a result of a defective part covered by IEC's Limited Express Warranty; (2) The costs of labor, materials or service incurred in removal of the defective part, or in obtaining and replacing the new or repaired part; or, (3) Transportation costs of the defective part from the installation site to IEC or of the return of any part not covered by IEC's Limited Express Warranty.  
  
**Limitation:** This Limited Express Warranty is given in lieu of all other warranties. If, notwithstanding the disclaimers contained herein, it is determined that other warranties exist, any such warranties, including without limitation any express warranties or any implied warranties of fitness for particular purpose and merchantability, shall be limited to the duration of the Limited Express Warranty.
9. **Limitation of Remedies**  
In the event of a breach of the Limited Express Warranty, IEC will only be obligated at IEC's option to repair the failed part or unit or to furnish a new or rebuilt part or unit in exchange for the part or unit which has failed. If after written notice to IEC's factory in Oklahoma City, Oklahoma of each defect, malfunction or other failure and a reasonable number of attempts by IEC to correct the defect, malfunction or other failure and the remedy fails of its essential purpose, IEC shall refund the purchase price paid to IEC in exchange for the return of the sold good(s). Said refund shall be the maximum liability of IEC. THIS REMEDY IS THE SOLE AND EXCLUSIVE REMEDY OF THE BUYER OR THEIR PURCHASER AGAINST IEC FOR BREACH OF CONTRACT, FOR BREACH OF ANY WARRANTY OR FOR IEC'S NEGLIGENCE OR IN STRICT LIABILITY.
10. **Limitation of Liability**  
IEC shall have no liability for any damages if IEC's performance is delayed for any reason or is prevented to any extent by any event such as, but not limited to: any war, civil unrest, government restrictions or restraints, strikes, or work stoppages, fire, flood, accident, shortages of transportation, fuel, material or labor, acts of God or any other reason beyond the sole control of IEC. **IEC EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGE IN CONTRACT, FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, OR IN TORT, WHETHER FOR IEC'S NEGLIGENCE OR AS STRICT LIABILITY.**
11. IEC shall have no system design, application or maintenance responsibility or responsibility for mold, fungus or bacteria to Purchaser or any other third party.
12. All sales, goods and services, use, excise, value added, transportation, privilege, occupational consumption, storage, document, transaction or other taxes which may be levied by any taxing authority as a result of this transaction shall be paid by the Purchaser.
13. Unless otherwise agreed to in writing by IEC any technical data furnished in conjunction with this order and not obtainable from another source shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate this order.
14. IEC shall have no liability or other obligation hereunder, if IEC's performance is delayed for any reason or is prevented to any extent by any event such as, but not limited to: any act of God, strike or work stoppage, fire, flood, accident, allocation, or other controls of Government authorities, shortages of transportation, fuel, material or labor, or any other cause beyond IEC's sole control. Any shipping date stated by IEC is IEC's best estimate but IEC makes no guarantee of shipment by any such date and shall have no liability or other obligation for failure to ship on such date, regardless of cause.
15. Payment terms are net thirty (30) days from date of shipment on approved credit. One and one half percent (1 1/2%) per month (18% annual rate) may be charged on past due accounts or the highest rate permitted by applicable law, whichever is lesser. In the event the account is placed for collection, Purchaser shall be responsible for all reasonable attorneys fees or costs on a solicitor and client basis, plus all other costs and expenses incurred by IEC in securing payment.
16. Purchaser shall not cancel the contract without prior written consent of an authorized representative of IEC at its offices in Oklahoma City, Oklahoma. In the event Purchaser cancels the contract with the prior written consent of IEC after the Purchaser's offer to purchase is received and acknowledged in writing, IEC shall be entitled to receive from Purchaser IEC's cost incurred to time of cancellation plus a reasonable allowance for overhead and profit.
17. Purchaser shall not assign any of its interest or rights under this agreement without written consent of IEC.
18. IEC will protect all its lien rights. IEC will not furnish lien waivers or releases until IEC receives payment, in full, at its office in Oklahoma City, Oklahoma from Purchaser for the goods covered by this order. There is no authorized retainage for any reason.
19. This Agreement shall be construed, and the rights and liabilities of the parties hereunder shall be determined in accordance with the laws of the State of Oklahoma. If it shall be found that any portion of this agreement violates any particular law of the United States or any state in the United States having jurisdiction or, if applicable, any law of Canada or any province or territory in Canada having jurisdiction, such portion of the agreement shall be of no force and effect in that political unit, division or sub-division in which they are illegal or unenforceable and the agreement shall be treated as if such portion or portions had not been inserted. In the event that any dispute or disagreement in connection with any order should arise or exist between Purchaser and IEC, jurisdiction and venue for any legal action shall be, if IEC so elects, exclusively in the state or federal courts in Oklahoma County, Oklahoma. The statute of limitations on any claim of the Purchaser against the IEC shall be one (1) year from the date the cause of action accrues.
20. Without regard to any other agreement, all obligations of Purchaser to IEC shall become immediately due and payable if Purchaser becomes insolvent or if Purchaser does not make payments when due or breaches any other agreement or fails to perform any obligation.
21. All orders are expressly limited and made conditional upon acceptance by Purchaser of the terms and conditions set forth above without change. There shall be no understandings, agreements, or obligations (outside these terms and conditions) unless specifically set forth in writing and accepted by signature of an authorized representative of IEC in Oklahoma City, Oklahoma.
22. The parties hereto have requested that these presents and all judicial proceedings relating thereto be drafted in English. Les parties aux présentes ont demandé à ce que les présentes et toutes procédures judiciaires y afférentes soient rédigées en anglais

Modes:  
M\*Y

## Revision History

Date	Section	Action
05/14/25	Attentions, Cautions, and Warnings	Updated a caution concerning hose connection tightening
	Product Line Specific Installation	Updated a caution concerning hose connection tightening
	All	Updated document design



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It is the responsibility of the end user to properly characterize and dispose of all waste materials according to applicable regulatory and legal entities. Where reasonable, safe, and compliant with local regulatory and legal requirements, IEC encourages recycling materials when disposing of its products.

International Environmental Corporation (IEC) works continually to improve its products. As a result, the design and specifications of each product may be changed without notice and may not be as described herein. Please contact IEC for information regarding current design and product specifications. Statements and other information contained herein are not express warranties and do not form the basis of any bargain between the parties but are merely IEC's opinion or commendation of its products. Manufacturer's standard limited warranty applies. The latest version of this document is available at [www.iec-okc.com](http://www.iec-okc.com).