MANUFACTURED FOR:
MITSUBISHI ELECTRIC US, INC.

LAHN-1, LAHN-2, LAHN-3 and LAHN-4 Low Ambient Hoods SWDN-1, SWDN-2, WDN-1, WDN-2 and WDN-3 Wind Deflectors

For use with: CITY MULTI® N-Generation Air Cooled Outdoor Units

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INSTALLATION MANUAL

FOR INSTALLER

For safe and effective use of these items, please read this installation manual thoroughly before installing these components.

For R2 Systems:
*Full cooling capacity down to -10°F.
**In cooling mode or cooling main, to guarantee full capacity, the system must operate with a constant heat load in the zones requiring cooling when ambient temperatures fall below 5°F.

Table of Contents

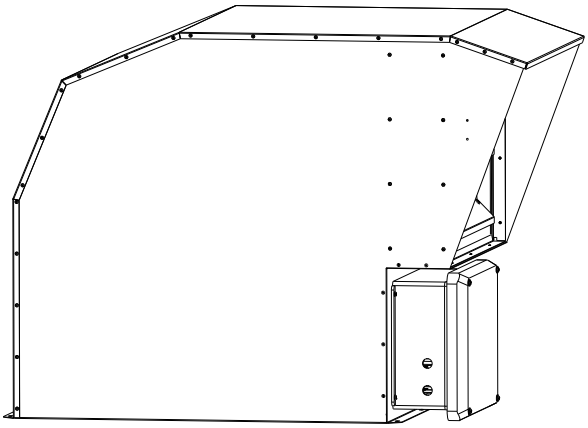
1. Inspecting the shipment

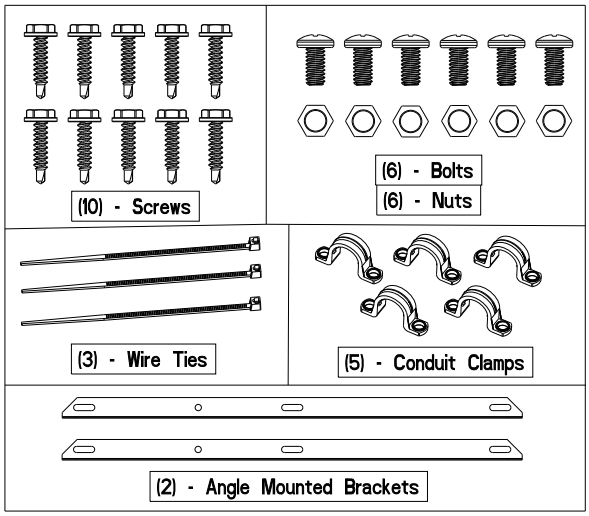
1. Check the item shipping label to confirm components are as ordered.
2. Upon receipt of components, carefully inspect them for possible damage. Take special care to examine the components if the carton is damaged.

If damage is found, it should be noted on the carrier's freight bill. Damage claims should be filed with the carrier immediately. Claims of shortages should be filed with the seller within 5 days.

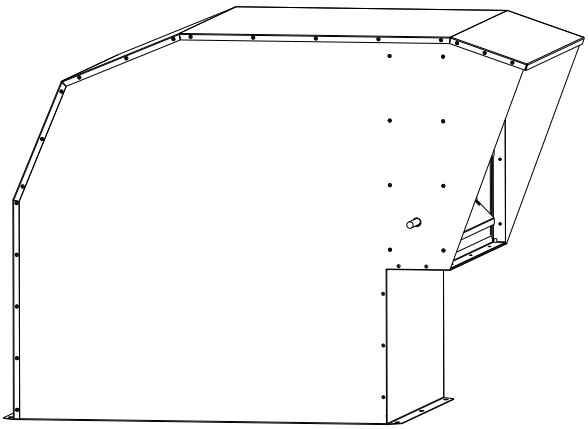
1.1. Components included in the Low Ambient Hood Kit

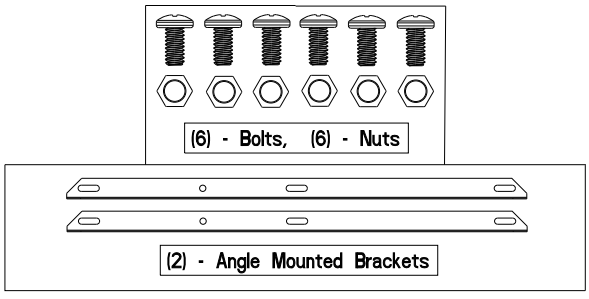
Components included in the LAHN-1/LAHN-3 kit
LAHN-1/LAHN-3 (MAIN) Low ambient hood with damper and control box





Components included in the LAHN-2/LAHN-4 kit
LAHN-2/LAHN-4 (SUB) Low ambient hood with damper





1.2. Front, Rear and Side Wind Deflectors

SWDN-1 - Side Wind Deflectors (2 per package) 25" wide

SWDN-2 - Side Wind Deflectors (2 per package) 25" wide

WDN-1 - Front and Rear Wind Deflectors (2 per package) 32" wide

WDN-2 - Front and Rear Wind Deflectors (2 per package) 22" wide

WDN-3 - Rear Wind Deflectors (2 per package) 32" wide

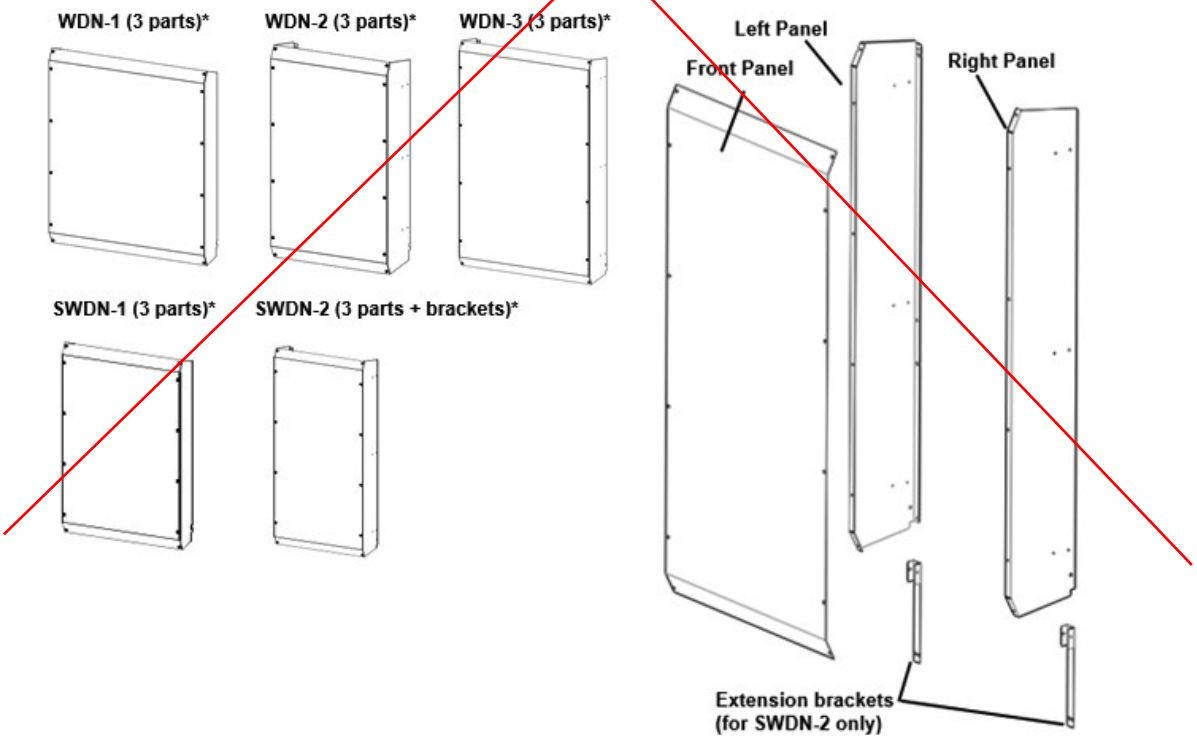
NOTE

SWDN-1, WDN-1 and WDN-2: Per wind deflector, requires 16 fasteners for assembly. Extra fasteners included.

SWDN-2: Per wind deflector, requires 20 fasteners for assembly. Extra fasteners included.

WDN-3: Per wind deflector, requires 18 fasteners for assembly. Extra fasteners included.

** NOT APPLICABLE



****MESCA Provided Snow/Wind Guards Reference:**

Bulletin: CM_PAB_100_19_011_CM_LAHN_Low Ambient Hood_TNU Heat Pump_Release

2. Components required per outdoor unit (ODU)

Component selections for models using multiple modules are based on the modules being placed 1-3/16” apart. If modules are placed further than 15” apart, additional SWDN-1 or SWDN-2 wind deflectors may be required. Also, if multiple models are placed next to each other (less than 15” apart), fewer SWDN-1 or SWDN-2 wind deflectors may be needed.

For clarification of ODU size (S, L, XL, or EXL), please refer to applications guide for your specific ODU model.

Part number	Description
LAHN-1	Low Ambient Hood Assembly (main) with damper control box For single fan ODUs (“S”). Also combined with LAHN-2 for larger dual fan ODUs ("XL, EXL")
LAHN-2	Low Ambient Hood Assembly (sub) Combined with the LAHN-1 for dual fan (“XL”, "EXL") ODUs
LAHN-3	Low Ambient Hood Assembly (main) with damper control box. For dual fan (“L”) ODUs
LAHN-4	Low Ambient Hood Assembly (sub) Combined with LAHN-3 for dual fan (“L”) ODUs
SWDN-1	Side Wind Deflector, fits "S, L, XL, and EXL" ODUs
SWDN-2	Side Wind Deflector (1 package required for "EXL" ODUs)
WDN-1	Front/Rear Wind Deflector (1 package required for the “S”, "EXL" ODUs, 2 packages required for the “XL” ODUs)
WDN-2	Front/Rear Wind Deflector (2 packages required for the “L” ODU)
WDN-3	Rear Wind Deflector (1 package required for "EXL" ODUs)

** NOT APPLICABLE

**MESCA Provided Snow/Wind Guards Reference:

Bulletin: CM_PAB_100_19_011_CM_LAHN_Low Ambient Hood_TNU Heat Pump_Release

3. Safety precautions

Before installing the unit, make sure you read all the “Safety Precautions”. The “Safety Precautions” provide very important points regarding safety. Make sure you follow them.

Symbols used in the text

WARNING

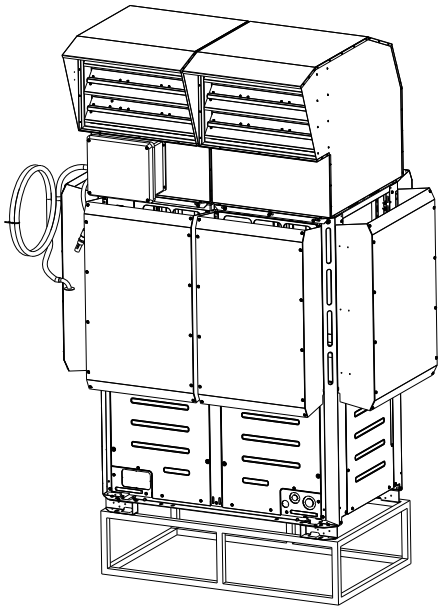
Describes precautions that should be observed to prevent danger of injury or death to the user.

Carefully read the labels affixed to the main unit.

Before attempting installation or service work disconnect all power to this equipment and/or ice formation during defrost.

CAUTION

Describes precautions that should be observed to prevent damage to the unit.



WARNING

This kit must be installed by an authorized dealer or properly trained technician.

- Improper installation by the user may result in water leakage, electric shock, or fire.

Use the specified cables for wiring. Make the connections securely so that the outside force of the cable is not applied to the terminals. - Inadequate connection and fastening may generate heat and cause a fire.

Prepare for typhoons, hurricanes, earthquakes etc. and install the unit at the specified place. - Improper installation may cause the unit to topple and result in injury.

Avoid repairing the LAHN hoods. If the outdoor unit or LAHN hood must be repaired, consult the dealer. Improper repairs to the LAHN hoods or outdoor unit may result in water leakage, electric shock, or fire.

Do not touch the heat exchanger fins. - Improper handling may result in injury.

When handling the product, always wear protective equipment. - E.g.: Gloves, full arm protection, and safety glasses. - Improper handling may result in injury. - If the LAHN hoods are installed improperly, water leakage, electric shock, or fire may result.

Have all electric work done by a licensed electrician according to the “National Electrical code and local Electrical codes” and “Interior Wire Regulations” and the instructions given in this manual and always use a special circuit. - If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result.

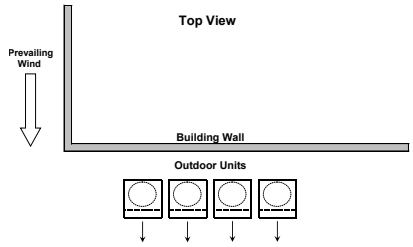
Do not reconstruct or change the settings of the protections devices. - If the pressure switch, thermal switch, or other protection devices are shorted and operated forcibly, or parts other than those specified by Mitsubishi Electric are used, fire or explosion may result.

4. Unit Placement and Clearances

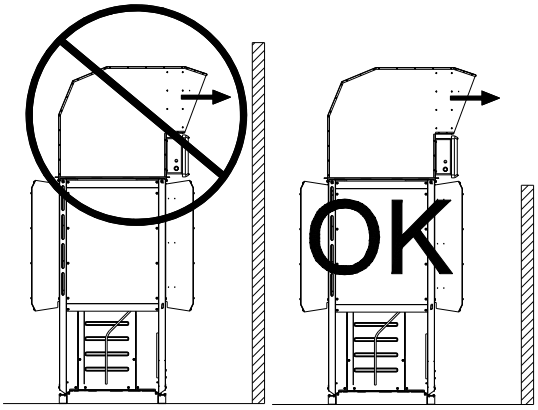
Outdoor units should be located in an area protected from prevailing winds. (Shown below) In high wind locations it may be advisable to locate the units within a walled area.

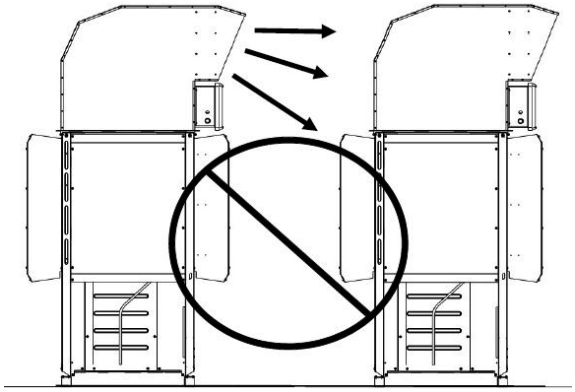
Hood discharge should be directed away from or perpendicular to the prevailing winds. Never toward.

When using the low ambient components, add an additional 8” to the standard mounting clearances.



If the outdoor units are surrounded by an enclosure, the discharge of the hood must direct the air out and over the enclosure walls to prevent air recirculation.





NOTE

When multiple ODUs are placed in close proximity, do not place ODUs such that discharge from one LAK hood will be directed toward another ODU.

IMPORTANT

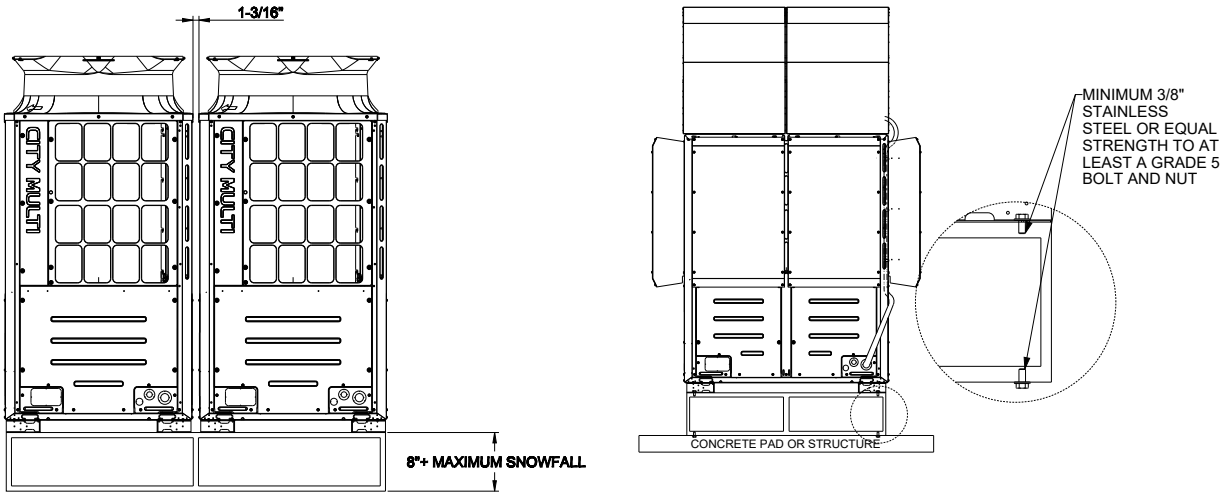
If the unit is located in an area with continuous high winds, the unit may require additional bracing. Contact your local dealer for assistance.

5. Equipment Supports

When modules are combined they should be placed a minimum 1-3/16” apart. By doing so only one set of side wind deflectors (SWDN-1 or SWDN-2) is required per group of modules. The equipment support must be firmly attached to the ground or structure. The outdoor unit must be properly attached to this equipment support with 3/8” stainless steel or equal strength to at least a grade 5 bolt.

IMPORTANT

The equipment supports must elevate the unit at least above the expected maximum snowfall level plus 8” (200 mm). The equipment supports must be an open construction to minimize snow drifting and/or ice formation during defrost.



6. Additional rooftop mounting guidelines

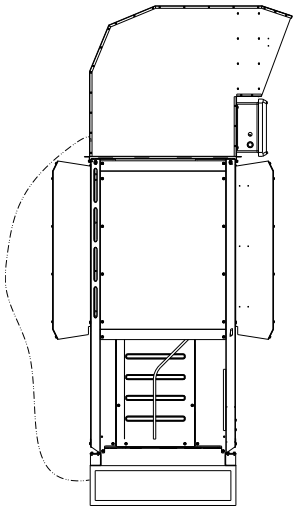
The preferred mounting location for the outdoor units with wind deflectors and hoods is on the ground. However, if this is not possible follow all additional installation guidelines when rooftop mounting. If you have any questions, please consult your distributor.

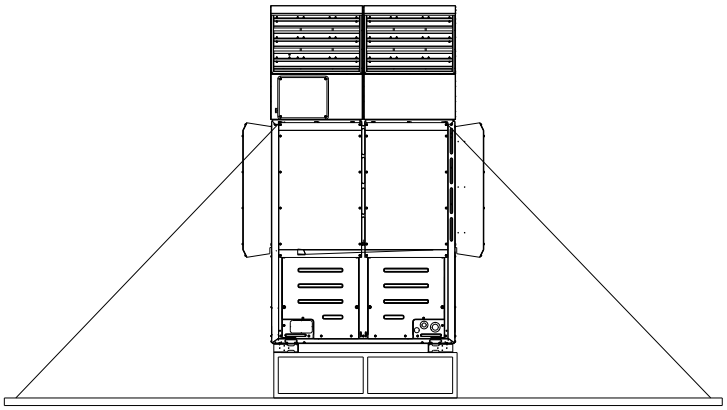
IMPORTANT

The low ambient hood(s) increase the overall height of the units and therefore make them more susceptible to wind stresses. Follow all guidelines when using these on rooftop applications.

For all rooftop installations, safety straps must be attached between the hood(s) and the equipment support structure. Straps should be a minimum 3/16” vinyl coated cable.

Outdoor units should be located in an area protected from prevailing winds. Hood discharge should be directed away from or perpendicular to the prevailing winds. Never toward prevailing winds. When using the low ambient components, add an additional 8" to the standard mounting clearances.





Straps must be attached to the hood securely. Attachment to both the hood and mounting structure is to be with a bolt through connection using a bolt ¼” or larger in diameter. The outdoor unit and equipment support should be firmly attached to the structure. Or, if the equipment support is the type that does not attach to the structure, refer to the equipment support manufacturer’s guidelines for proper size and construction. Depending on location, exposure and other factors influencing the wind, additional support (or cables) may be required such as shown below. Contact your distributor for assistance.

7. Installing the discharge hood(s)

WARNING
Before attempting installation or service work, disconnect all power to this equipment.
Before attempting installation or service work, disconnect all power to this equipment.

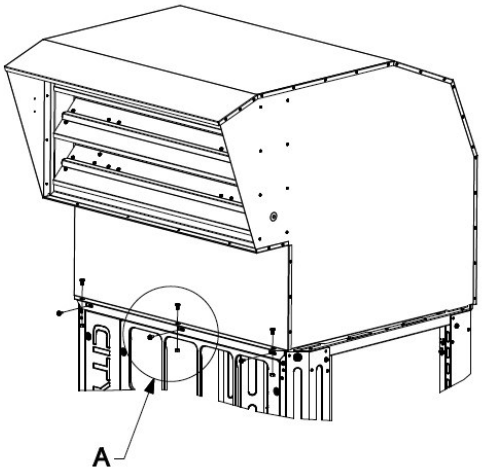
WARNING
Because of component weight, the hood requires that 2 people lift it into place.

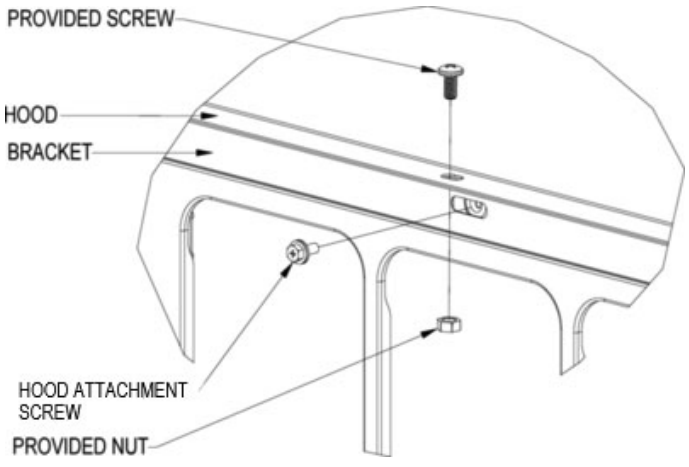
Once the discharge direction (towards the front or rear of the unit) has been determined following the steps below to install the hood(s). The kit comes with two angle brackets, bolts, and nuts to secure the hood in place. Attach the brackets after the hood is in place. See step 4 below.

Install LAHN-1 and LAHN-2 hood(s) according to the following instructions. Follow the same instructions for installing LAHN-3 and LAHN-4 hoods.

STEPS:

1. Remove the hood attachment screws on the front and back of the unit as shown below.
2. Using these same screws, attach the angle brackets as shown in Detail A below. Do not tighten the screws fully at this time.
3. Lift the hood up over the fan guard and set in place. Align holes in the hood with the angle brackets.
4. With the six nuts and bolts provided, attach the hood flange to the bracket as shown.
5. Securely tighten all bolts, nuts and screws.





Connecting the LAHN-1 and LAHN-2 (or LAHN-3 and LAHN-4) hoods when installing on a dual fan module.

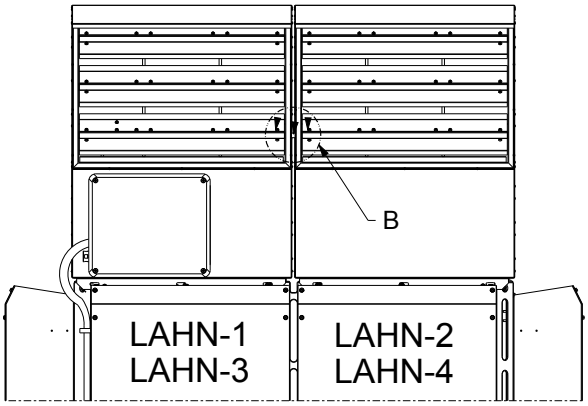
Once the hoods are secured in place on the unit with the dampers in the full open position (as shipped), follow these steps.

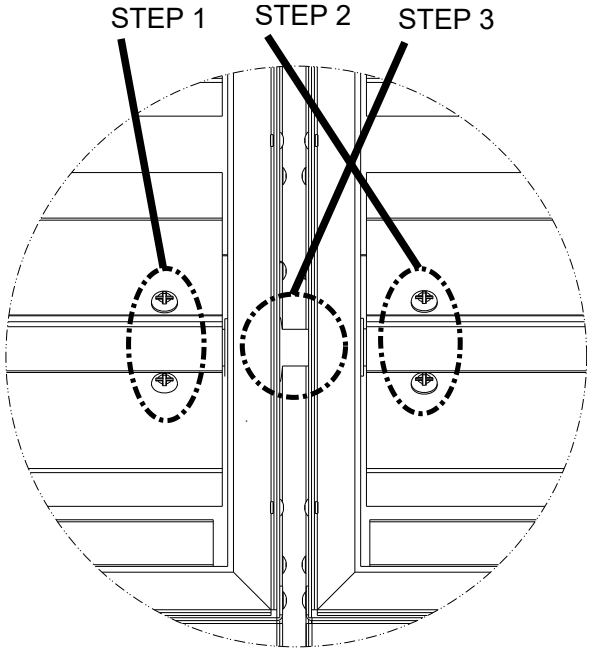
STEPS:

Remove the plastic cap(s) from the end of the damper rod BEFORE proceeding with the following steps

1. Loosen the set screw securing the bottom right damper rod on the LAHN-1 hood. Slide-out and remove the damper rod.
2. Loosen the set screw securing the bottom left damper rod on the LAHN-2 hood. Slide the damper rod out and into the opening on the side of the LAHN-1 hood. Align the rod behind both set screws.
3. Align the dampers in the two hoods and tighten both set screws onto the damper rod using torque of 2.7 N.m.

Detail B shows the above steps.

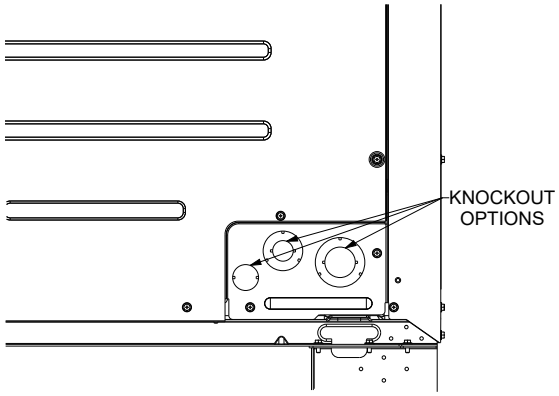




8. Making the electrical connections

WARNING
Before attempting installation or service work, disconnect all power to this equipment.

Remove the available knockout on the wiring entry panel on the bottom front of the unit as shown below.



The flexible conduit can be routed along with the front corner panel of the unit as shown. The direction of hood discharge will determine which side to run the conduit (refer to the following steps)

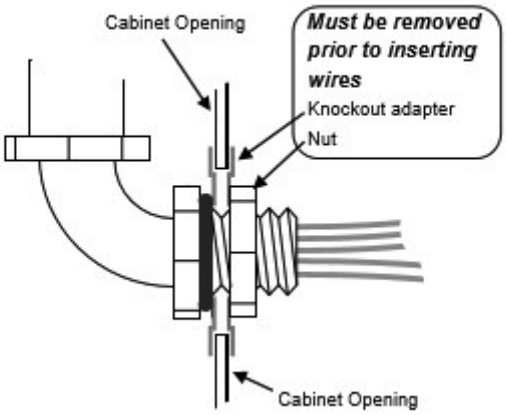
Remove the white connector assembly from the end of the harness by unplugging the two red wire spade terminal disconnects.

Remove the nut and one of the conduit reducer halves from the conduit connector prior to running the wires through the wiring entry panel knockout.

Carefully insert the wires through the opening in the wiring entry panel. Replace the conduit reducer and the connector nut and tighten securely. Refer to the drawing below for reference.

Replace the white connector assembly on the end of the harness by plugging the two red wire spade terminal disconnects together.

Carefully insert the wires through the opening in the wiring entry panel. Replace the conduit reducer and the connector nut and tighten securely. Refer to the drawing below for reference.



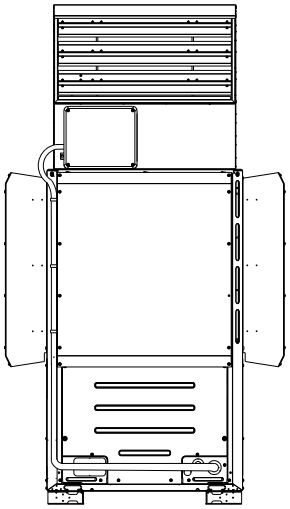
The conduit should be attached with the conduit clamps and screws provided as shown in the following sets of drawings. Front and rear routing locations will be the same method when LAHN-1 and LAHN-2 (or LAHN-3 and LAHN-4) hoods are used in combination on the dual fan modules.

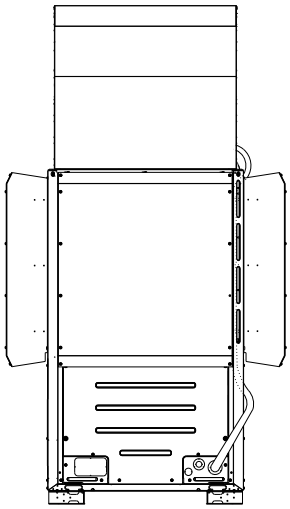
IMPORTANT

Only install conduit clamps on the corner panel as shown or on the wind deflectors. Attaching in other locations risks puncturing the unit internal piping resulting in a leak and loss of refrigerant charge.

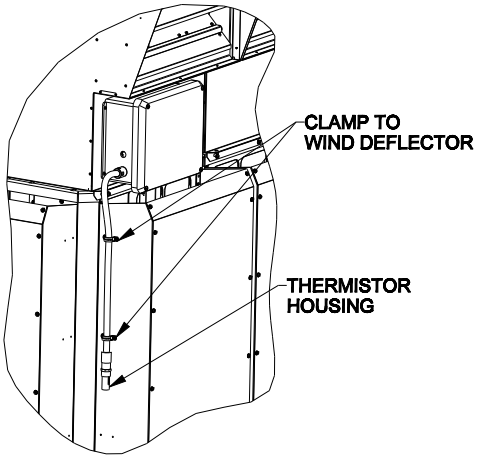
- For front discharge, the conduit should run along the left-hand side.

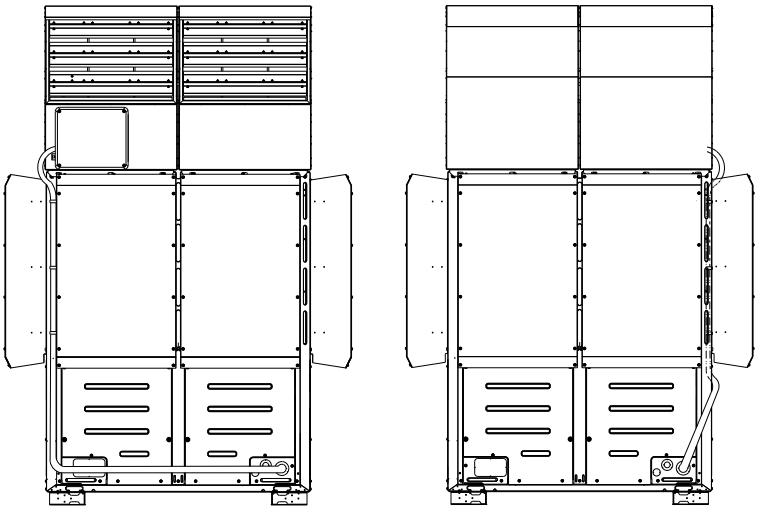
- For rear discharge, the conduit should run along the right-hand side.





The 24” conduit with the Thermistor housing at the end should be attached with the supplied clamp to the corner panel as shown in the detail.





Using the conduit clamps and screws provided securely attach the conduit as shown in the drawings. - Depending on the discharge direction, there may be excess conduit length. This can be coiled and secured to the wind deflector with one of the conduit clamps. - Once the conduit is secured in place route the wires up through the bottom compartment and into the top section of the unit.

The wires will connect to the main control board as shown in the following diagram.

IMPORTANT

Avoid contact between the wires and any refrigerant piping inside the cabinet. If necessary, use wire ties included with the kit to secure away from refrigerant piping.

Follow the steps shown in the following diagram for completing the wiring of the kit.

WARNING

Before attempting installation or service work disconnect all power to this equipment.

MAKE SURE THE POWER SUPPLY TO THE UNIT IS OFF BEFORE PROCEEDING.

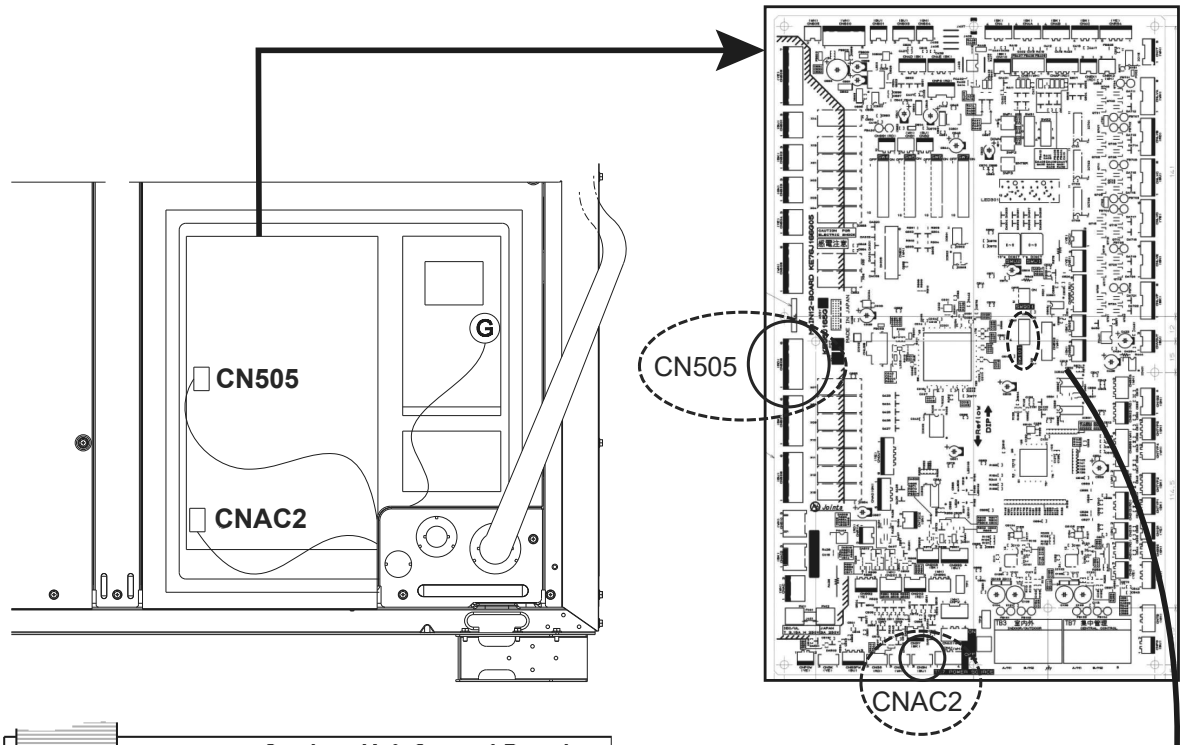
Step 1. Run the wires into the bottom panel controls compartment. Connect ground wire (dotted line) to green ground lug “G” inside the control box. Locate the main PC board.

Step 2. Locate CNAC2 and CN505 connections on the main PC board.

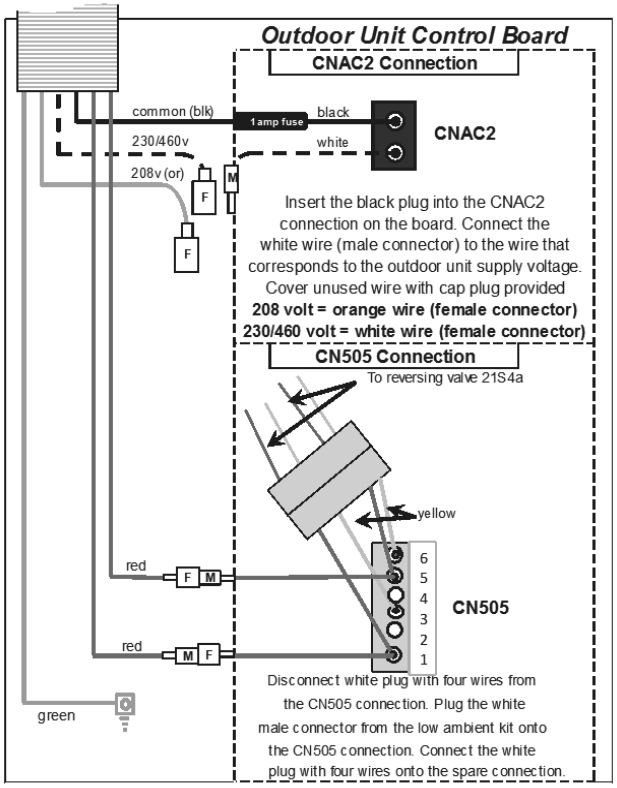
Step 3. Follow the connection instructions on the diagram below.

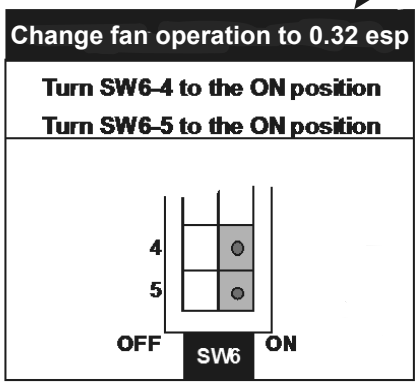
Step 4. Change DIP switch SW6-4 and SW6-5 to ON for 0.32 esp fan operation.

Step 5. Secure any extra or loose wires with wire tie straps provided

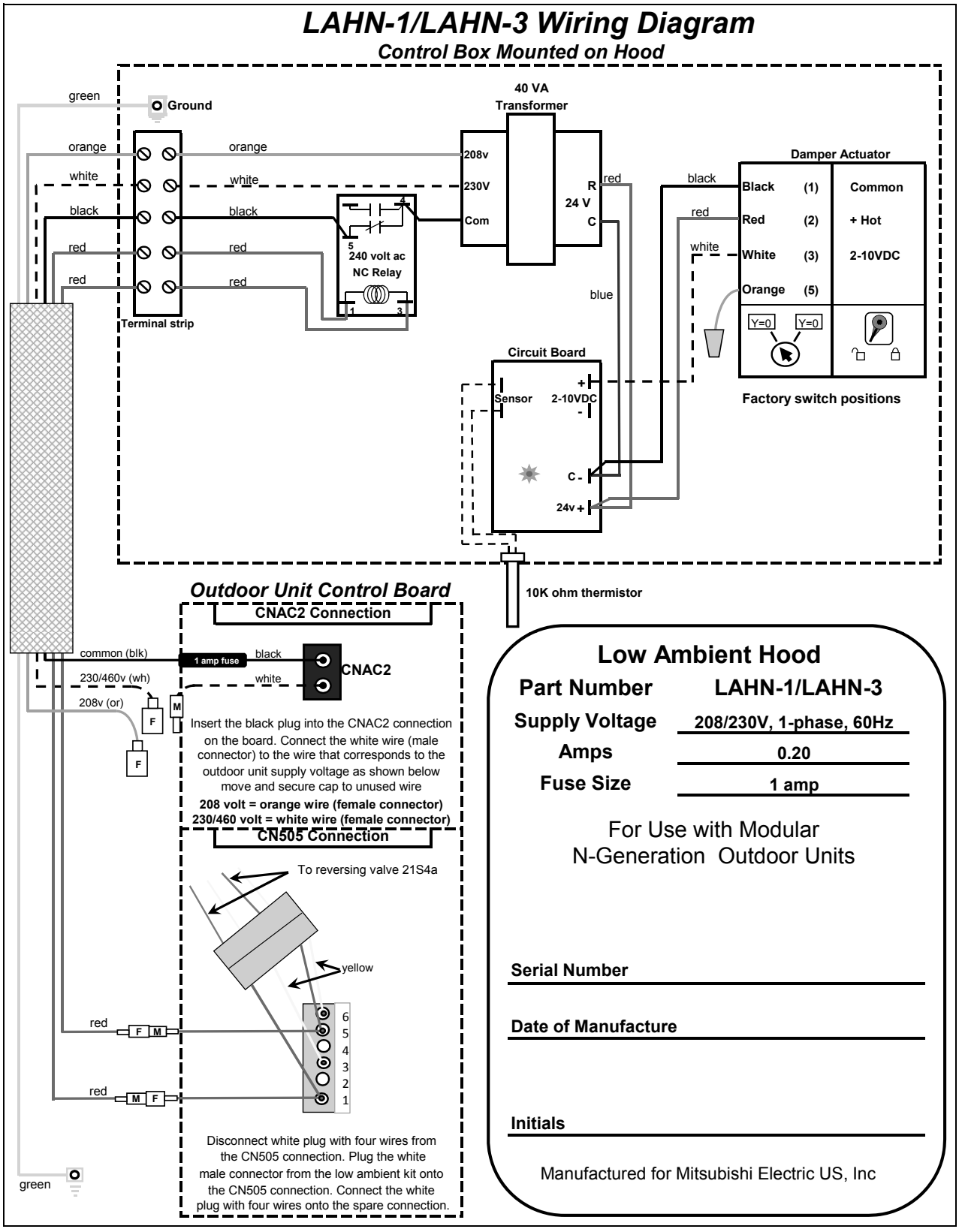


Make connections as shown





9. Wiring diagram



10. Installing the wind deflectors

1. Remove the rear, left, and right side wire guard(s) from the ODU and discard. If the ODU does not have wire guards, skip this step.
AVOID TOUCHING OR DAMAGING THE COIL FINS! INSTALLER MAY RETAIN THE SCREWS FROM THE SIDE WIRE GUARDS FOR WIND DEFLECTOR INSTALLATION, HOWEVER THIS IS NOT NECESSARY.

Fig.1

2. For installation of:

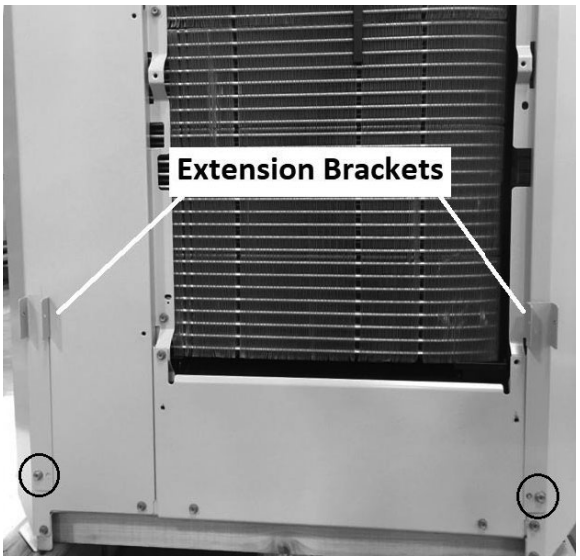
- S or XL ODU, remove parts from the boxes labeled SWDN-1 and WDN-1

- L ODU, remove parts from the boxes labeled SWDN-1 and WDN-2

- EXL ODU, remove parts from boxes labeled SWDN-2, WDN-1 and WDN-3

3. **Follow this step ONLY for EXL ODUs.** If using S, L or XL ODUs, skip to step 4.
Using the screws and extension brackets in SWDN-2, install brackets on both left and right sides of the ODU. For each side, 2 extension brackets should be installed as shown in Fig.2. Take care to ensure brackets are aligned with the ODU vertical side.

Fig. 2



4. For every right edge of the ODU, pick up the right panel of the wind deflector and screw into one of the top-most available holes in the ODU using the screws provided. The position of the top-most available hole differs depending on the designated surface of the ODU. Repeat this step for every left edge of the ODU, using the left panel of the wind deflector. Fig. 3 shows the right panel for S, L, and XL ODU. Fig.4 and 5 show left and right panels, respectively, for EXL ODU. Cutouts of “L” and “R” are included specifically for EXL panels to aid in installation.

Fig. 3

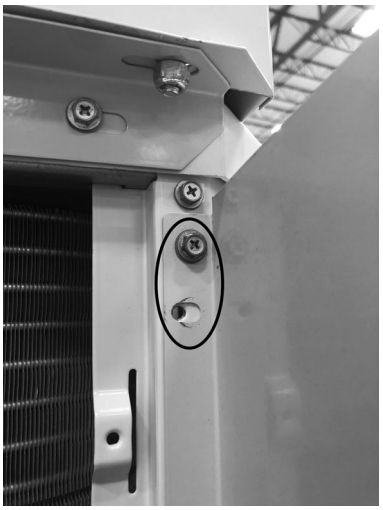


Fig. 4

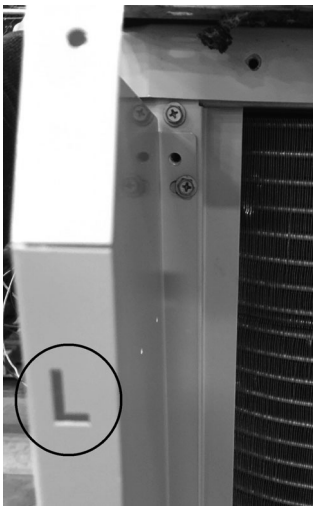
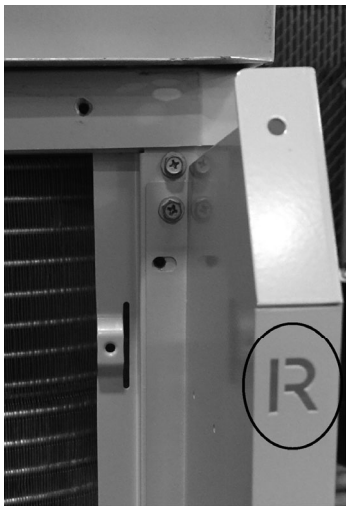


Fig. 5



5. Directions for SWDN-1, WDN-1, WDN-2, and WDN-3 guards. For SWDN-2 (EXL ODUs only), see the next portion of this step. Using the screws provided, screw the bottom of the side panels into the bottom-most available hole in the ODU. The position of the bottom-most available hole differs depending on the designated surface of the ODU. See Figure 6 for screw location for the right-side panel. For WDN-3 guards, a third center screw must be fastened; see Fig.7 as a reference for screw location.

Directions for SWDN-2. Using the screws provided, secure the bottom and center of the side panels (see Figure 7). Note the bottom screw will connect the side panel to the extension bracket (see Figure 8).

Fig. 6

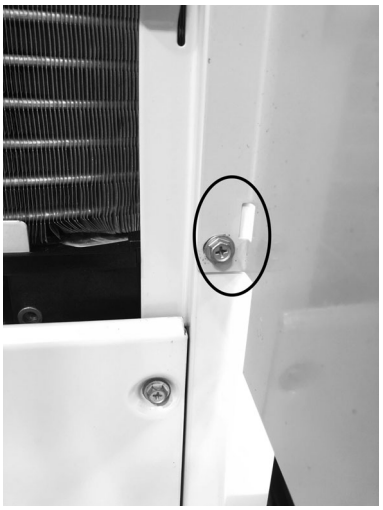


Fig. 7

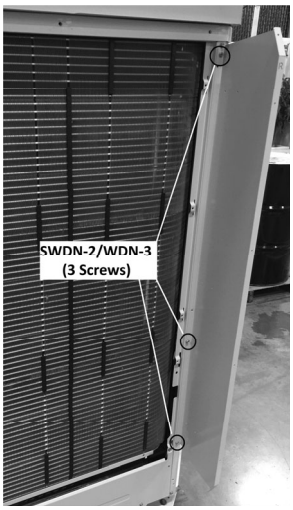


Fig. 8

6. All side panels should now be installed. Before proceeding, check both the front and rear sides of the ODU. The side panels in the center of the ODU should be aligned vertically and at the same height (see Figure 9).

Fig. 9

7. Line up the front panel of each wind deflector with its respective side panels (already installed) and tighten the 12 screws required using a torque of 2.7 N·m. This will require 2 persons to complete. Fig. 10 and 11 show completed side guards for S-XL and EXL guards, respectively.

Fig. 10

Fig. 11

8. **For EXL ODUs only**: For proper hood operation, an additional step (see section 13 Additional louver adjustment) must be followed for hood louver adjustment. **DO NOT SKIP!**

11. Testing the hood

The outdoor unit must be in cooling mode. All hoods and damper controls are tested at the factory before shipping. To perform an operational test once the installation has been completed, follow the steps below. Please refer to the chart and table below for detailed control logic.

Operation testing when the outdoor ambient is ABOVE 40° F

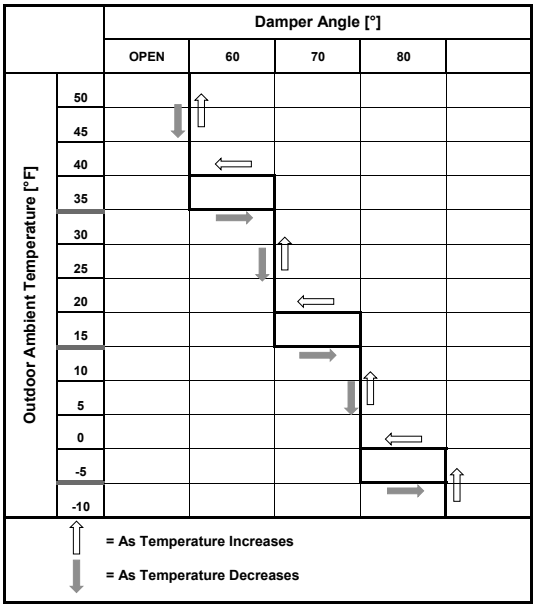
1. Turn on power to the outdoor unit.
2. Make sure the outdoor unit is in cooling mode.
3. Locate the outdoor temperature sensing thermistor at the end of the short conduit coming out the side of the control panel. The thermistor can be seen inside the plastic shield.
4. Using an aerosol dusting sprayer, invert the can and spray the thermistor with very short bursts of the cold liquid. Do not overspray the thermistor as it could be damaged. It may take 10 – 20 seconds for the internal thermistor temperature to drop. The damper will start to move toward the closed position after the thermistor drops below 35° F.
5. Once the thermistor warms above 40° F, it will move back to the fully open position indicating the low ambient kit is working as designed.

Ambient temp [°F]	Hood angle [°]	Output voltage [V]	Resistance [Ω]
-10	80	8.78	117960
-5	80	8.78	100184
0	70	7.9	85340
5	70	7.9	72906
10	70	7.9	62460
15	70	7.9	53658
20	60	7.04	46220
25	60	7.04	39917
30	60	7.04	34562
35	60	7.04	30000
40	OPEN	2	26104
45	OPEN	2	22767

Operation testing when the outdoor ambient is BELOW 35° F

1. Turn on power to the outdoor unit.
2. Make sure the outdoor unit is in cooling mode.
3. The damper will move toward the closed position to a predetermined angle based on the outdoor ambient temperature indicating the low ambient kit is working as designed.
4. Once the thermistor warms above 40° F, it will move back to the full open position indicating the low ambient kit is working as designed.

LAHN Damper Hysteresis Control



If either of the tests above fails, please check all electrical connections according to the previous installation instructions and test again. If the unit still does not test correctly, contact your Mitsubishi distributor.

12. Damper blade adjustment

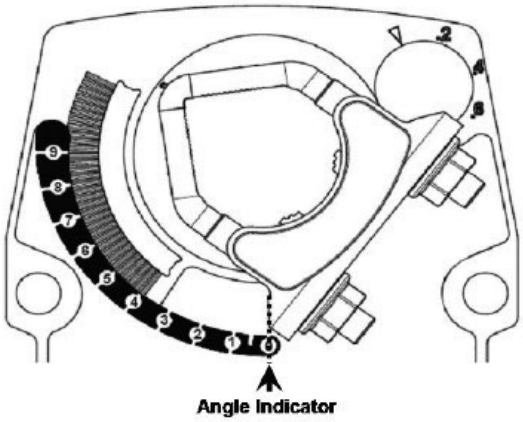
IMPORTANT

It is possible that during shipping, the damper shaft may have moved in the actuator shaft clamp assembly. In some cases, due to manufacturing tolerances, the LAHN blades could close 100%.

The damper should never be 100% closed during operation. When working properly, the damper will be approximately 90% closed at -5 F and below. The following procedure will allow proper adjustment.

The Belimo damper motor within the LAHN control box has a built-in mechanical stop to adjust the maximum angle of rotation. This must be adjusted to 85 degrees and the damper blade position verified or re-set to the proper position (1/4" open) to ensure the unit functions properly.

Belimo motor angle indicating scale shown below



The factory setting for the mechanical stop is shown below at an 85-degree hood angle.

IMPORTANT

ENSURE POWER IS OFF BEFORE STARTING!!

Basic Service Overview

1. Set damper motor stop to 85 degrees.

2. Loosen “U” bolts on the damper shaft.

3. Crank the motor against the 85-degree stop then lock it into position.

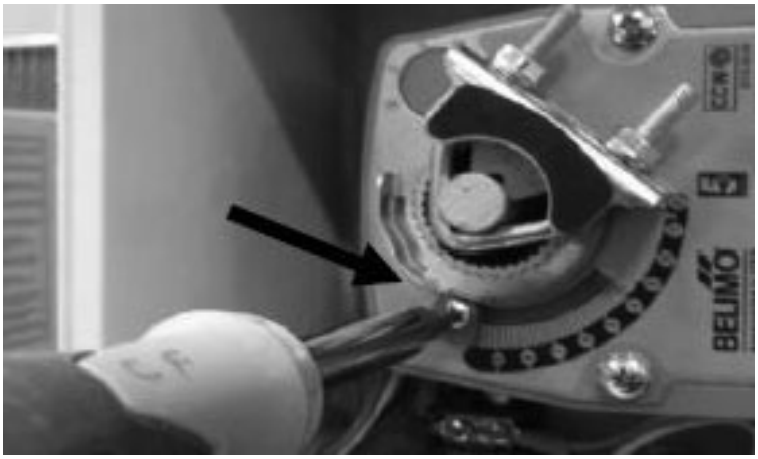
4. Set damper to approx. ¼” open. (Use damper crank handle as spacer.)

5. Re-tighten “U” bolts on the damper shaft.

6. Release motor by slightly cranking with handle. Check operation manually.

7. The goal is to have a ¼” opening on damper assembly in the 85-degree position.

Step 1. Loosen the Philips head screw for the mechanical stop.

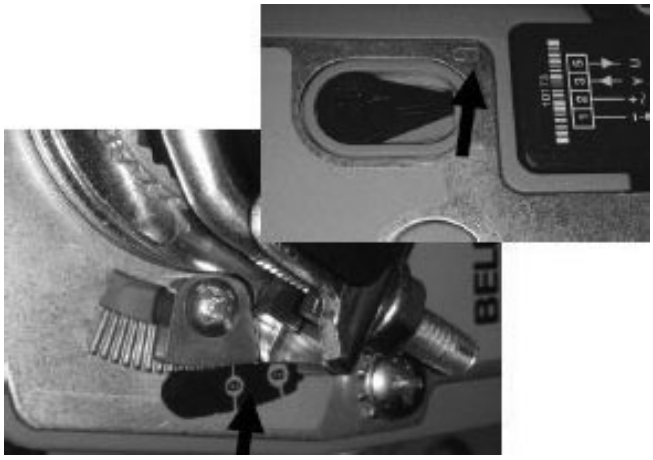


Step 2. Slide the mechanical stop to 85 (halfway between 8 and 9) and tighten the screw, making sure the locating teeth on the stop are engaged into the actuator motor teeth.

Step 3. Loosen the (2) nuts on the damper shaft "U" clamp.

Step 4. Using the crank handle turn the motor counterclockwise until the indicator snugs against the stop at 85 degrees.

Step 5. Lock the motor in the 85 degree position.



Step 6. Close the blades by hand and insert the crank handle under the damper blade near the screws as shown to ensure it is open approximately 1/4 inch at 85 degrees.

Step 7. Holding the blades against the handle re-tighten the (2) nuts on the damper shaft "U" clamp.

Step 8. Ensure that the end of the shaft is flush to the edge of the clamp black surface as shown.

Step 9. Slightly crank the handle to release the motor. The damper will return to the open position.

Review and Manual Test

To ensure the LAHN-1/LAHN-3 unit is functioning as designed, crank the Belimo motor back to the 85-degree position and visually check that the damper does not close completely. Your goal is approximately ¼” opening between the blades at the 85-degree position.

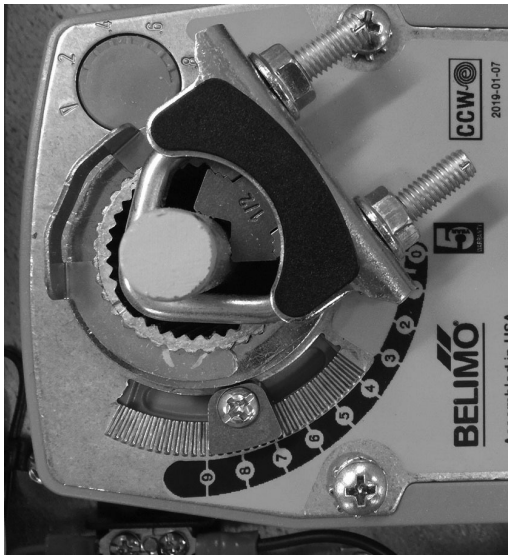
13. Additional louver adjustment: EXL ODUs ONLY

IMPORTANT
This section is only to be followed for EXL ODUs. For clarification on which ODUs are EXL, refer to the Applications Guide.

The previous instructions must be followed to ensure the louver calibration is correct. For EXL LAK hood installation, the following steps MUST be taken to limit the maximum closure of the hood louvers and allow for intended ODU operation.

Step 1. Loosen the Phillips head screw for the mechanical stop.

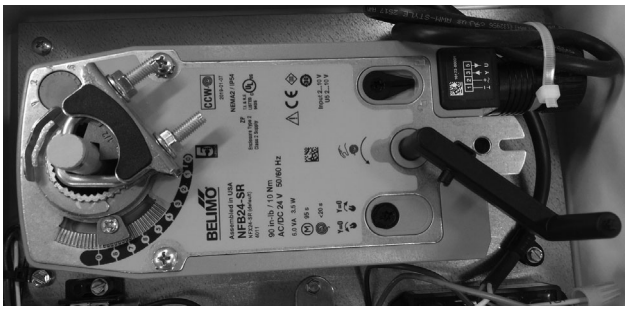
Step 2. Slide the mechanical stop to approximately 65 degrees (between the “6” and "7" marks) and tighten the screw, making sure the locating teeth on the stop are engaged into the actuator motor teeth.

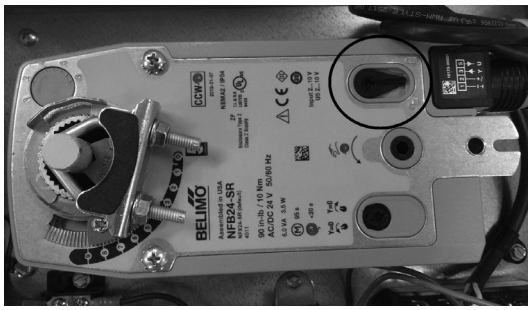


NOTE

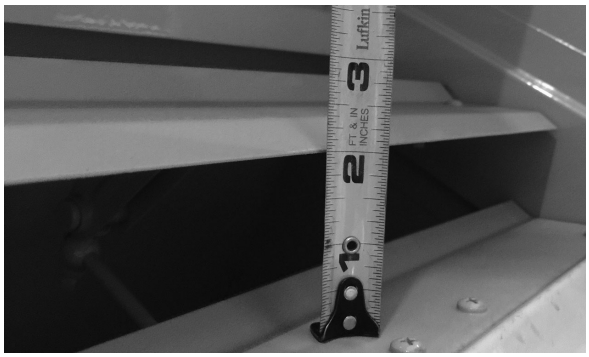
The 65-degree position is likely the correct position for this mechanical stop, however, this may need to be corrected. The final judgement of the correct mechanical stop position will be determined in step 4.

Step 3. Using the included crank handle, turn the motor counter-clockwise until the indicator stops against the mechanical stop. Lock the indicator against the mechanical stop using the locking switch, circled below.





Step 4. Check the louver angle alignment in this position using a tape measure or other device. The gap between louvers should be 2.0". If the gap between louvers differs by more than 1/8" (+/- 0.125"), repeat steps 2 and 3 using a different mechanical stop angle until acceptable louver spacing is achieved. See the image below for a measurement example.



Step 5. Once the louver spacing is adjusted properly, release the locking mechanism on the actuator. The louvers should return to their default open position.

This product is designed and intended for use in the commercial and light-industrial environment.

Please be sure to put the contact address/telephone number on this manual before handing it to the customer.

Manufactured for:
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