

INSTALLATION, START-UP AND SERVICE MANUAL Air Handling Units – AHUS

Air Handling Units – AHUs



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General Considerations

It is recommended that the technical personnel performing the installation and commissioning be qualified and follow the instructions described herein.

This manual contains valuable information on commercial direct expansion air handling units, chilled water units, special-purpose units (high-efficiency filtration

Safety

Please read this manual carefully and follow all safety guidelines.



DANGER

Never: Energize the unit while installation work is ongoing; always lock the main breaker.

Never: Perform work inside the unit while the ventilation system is running.

Never: Remove filters from high-efficiency filtration units or air treatment units without following hazardous waste handling protocols.

Transport and Hoisting:

Upon receipt of the equipment at the job site, ensure it matches the order specifications. If discrepancies are found, contact your advisor immediately.

When unloading the unit from the truck platform, it is recommended to use a forklift.



CAUTION

Always: Verify the unit's weight and dimensions to select appropriate hoisting and handling equipment.

Always: Ensure that electrical connectors are properly secured to prevent loose contacts.

Always: Check that duct is connected to the AHU, return and supply grilles are open, and airflow isn't obstructed.

While transporting it to its final location, ensure there are no obstacles hindering free movement.



If the forklift forks are too short, use fork extensions.



LIFTING

Lifting is a process planned in an orderly and detailed manner to perform load lifting maneuvers using a crane.

Step 1: Verify the load information (air handler) the weight and dimensions are found in the equipment drawing.

Step 2: The crane, carefully choose competent service provider personnel considering the distance and load to be lifted.

Step 3: The workplace verify that it is clear and that there are no elements that could impede safe load lifting.

Step 4: Safety, take all necessary measures and establish safe protocols together with the HSE personnel.

Air handler lifting recommendation:



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DATA VERIFICATION

You have acquired a new air handling unit and it is advisable to review some data before installation.

Data 1: Verify that the cooling capacity corresponds to that required in your thermal load calculation; for air handling units, this information is found in the design drawing previously signed by the purchaser.

Data 2:Power supply. Ensure the voltage, number of phases, and frequency correspond to your field electrical supply.

Data 3: The airflow rate will indicate the available CFM to distribute cold air through your ducts.

Data 4: The external static pressure will indicate the maximum resistance to airflow in your duct (higher duct pressure drop will reduce the airflow delivered by the unit).

Data 5: Dimensions. With these you can confirm whether the available installation space is adequate.

Data 6: Water flow rate. Ensure the required water quantity reaches the unit for proper operation.

These verifications will help you install your air handler safely and reliably.



INSTALLATION

Unit Placement and Leveling: Air handling units are typically installed indoors. If installed outdoors, ensure the unit was specified for outdoor use at the time of purchase. Standard units will require insulation thickness to increase from 12 mm to 24 mm to condensation. For air prevent treatment units, additional roofing is prevent water required to accumulation, paint deterioration, or water ingress.

installed lf on the floor, it is recommended to raise the unit using rubber supports of at least 50 mm in height. These also act as vibration isolators. When placed on a base, ensure the entire bottom surface is properly supported and leveled. Improper leveling may cause drainage issues or operational noise.

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Duct Connections: Ensure the supply and return ducts are correctly connected. For centrifugal fan units, the first elbow in the supply duct should be at least three times the width of the supply outlet to minimize turbulence and protect the blower

Refrigerant Piping **Connections:** Copper piping diameter for both high and low pressure should match the condenser's connection diameters. If not, adapt before reaching the AHU's valve connections. Use silver brazing alloy with at least 5% silver content, and purge with inert gas to prevent soot formation. For standard units with a thermostatic expansion valve (TXV), install the external equalizer line on the suction line and place the sensing bulb downstream of the equalizer, in the direction opposite to refrigerant flow, then insulate it





For VRF kit air handlers to be installed in the field, it is recommended to use solder with 35% silver, as is done at the factory.

For chilled water air handlers, connect the water pipes in the supply and return order as indicated in the drawing and on the label next to the connection pipes. Reversing them will cause a loss of cooling capacity.

The pipes must be insulated and must maintain the required water temperature (Supply: 44°F / Return: 54°F) and the water flow rate specified for the air handler (using an ultrasonic flow meter is recommended—it is a non-invasive measurement tool that indicates flow rate and water velocity within the pipes connected to the air handler).





A lack of a trap can cause overflow.

Drain Connections: Each unit includes a condensate drain pan located below the coil, in the suction section. It has one or two threaded drain connections, as shown in the following image:



A trap (P-trap) must be installed near the drain outlet to prevent odor entry and ensure proper drainage despite high suction pressure.

Location of bulb, thermostatic expansion valve:

On standard Confortfresh models with a thermostatic expansion valve (TXV), the sensing bulb and external equalizer must be installed in the suction line, outside the unit, as illustrated in the following figure:



Incorrect installation can cause the valve to malfunction, resulting in overfeeding and possible liquid contraction. Note: Does not apply to air handlers with VRF kit or chilled water.

Special Equipment:

Confortfresh air handlers can be customized per the customer's specific request. One of the most frequently requested customizations is cabinet segmentation in standard units.



For Modular Air Handling Units (AHUs) with cabinet sections as shown in the following image:



Module Assembly Steps:

Step 1: Identify modules in the sequence Module 1-2-3-4 or verify module names against the unit's drawing.

Step 2: Join modules in the specified order, aligning mating surfaces so connection points face each other and center holes are aligned.

Step 3: Verify levelness, insert the center screw at each module joint, and tighten until modules are fully secured.



Confortfresh informs that product designs and specifications are subject to change without prior notice.

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Paso 4: No gaps should exist between modules. If gaps appear, check levelness and correct. Seal exterior module joints with black polyurethane sealant.

START-UP

Initial Checks:

- 1. Ensure all electrical connections are correctly installed and tightened.
- 2. For centrifugal fans, verify pulley alignment and belt tension. Check motor rotation.
- 3. Check for contact between blower and casing.
- 4. Confirm supply and return ducts, drain line with trap, and filters are installed.
- 5. For air treatment or high-filtration units, verify MERV ratings and filter orientation matches airflow direction.
- 6. Remove any foreign objects obstructing airflow inside the unit.
- 7. Confirm electrical protections match the requirements
- 8. Verify voltage matches the unit's rating.
- 9. Confirm water flow rate matches the unit's requirements.
- 10.Verify chilled water temperature is between 6.6°C and 7.6°C
- 11. Refrigerant pressure (R410a) should exceed 240 psi; otherwise, inspect for leaks (oil stains or leak detector).
- 12. For VRF kits, ensure sensors are

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connected as per the kit manufacturer

13. Close all access doors.

Note: Once all verifications are complete and your air handling unit is in proper condition, it is ready for operation

COMMISSIONING:

This step must be performed by qualified technical personnel.

- 1. Energize the unit to start the fan.
- 2. Verify that the operating voltage matches the required specification and measure the fan's energy consumption using a clamp meter, ensuring it is below the maximum allowed value stated on the equipment's data plate.
- Check refrigerant pressure. If below 100 psi (low) or 320 psi (high), adjust refrigerant charge. Use the superheat method target range: 10–12°C.
- 4. For units with ECM Plugfans, if differential pressure module voltage is at 9.9V, it indicates static pressure exceeds design conditions.

Once the unit is operating normally, make sure all access points are properly closed and all covers are securely fastened.

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SERVICIO

General Recommendations: Always keep the return air path clear. Correct any unsafe conditions promptly.

Plenum Fan Ventilation: Uses EC Plugfan motor with direct drive and is maintenance-free. Bearings should be replaced every 30,000 hours. **Coils:** Copper tube and aluminum fin heat exchangers are factory-coated (bluefin) for durability. Clean using soapy water and rinse with pressurized water. Clean the drain pan to ensure proper drainage.





Centrifugal Ventilation: Includes components such as pulleys, shaft, belts, blower, vibration isolators, etc. Regular maintenance is essential. Ensure belt alignment and proper tension (lifespan: ~90,000 hours). Blower speed must be within ±10% of the rated RPM. **Nota:** Do not use descaling agents on bluefin-coated coils to avoid damaging the coating.



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Air Filters: Standard units use washable high-dust-retention (HDR) wadding filters. High-filtration and air treatment units use certified filters (MERV 8 - 11 - 13 - 15- 16 or HEPA). These are disposable and replaced based on lifespan and pressure drop (monitored via differential pressure gauges).

Standart Air Handling Unit- UMA



High Filtration Air Handling Unit - UMAF





Air Handling Unit- AHU



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Monthly Maintenance Checklist: AHUs are a fundamental part of the air conditioning system, as they are responsible for cooling, filtering, and circulating the air, capturing all airborne particles. To prevent premature deterioration, the following recommendations should be taken into account:

- · Inspect and clean air filters.
- Check fan belt alignment and tension.
- Lubricate bearings, shafts, and other moving parts.
- Inspect, clean and tighten electrical connections.
- Visually inspect the cabinet for burrs or corrosion.
- Check for cracks or leaks and repair if needed.
- Remove rust from fan shaft.
- Check drain pan for sludge or debris.
- · Clean openings and drain lines to maintain proper flow.
- Repair or replace any damaged duct material.



Summary Failure Chart		
Detected Anomaly	Possible Cause	Action to Take
Motor does not start	Absence of voltage	Check electrical installation for both power and control
Motor consumption higher than nominal	Airflow is higher than nominal	Adjust airflow by reducing fan rotation speed through 1) pulley change, 2) frequency adjustment in drive, 3) parameter adjustment in differential pressure module for Plugfan motors
Noise at motor start	Belts slipping	Check belt tension
Airflow lower than normal	Fan rotating in opposite direction	Change fan rotation direction
	Damper/air intake closed	Open dampers
	Installation has more air loss than nominal load	Check filter condition and air loss in ducts
	Fan rotation speed lower than nominal	Increase fan rotation speed through 1) pulley change, 2) frequency adjustment in drive, 3) parameter adjustment in differential pressure module for Plugfan motors
Coil not performing	Water inlet/outlet reversed for chilled water system	Check water connections and reverse them
	Outdoor air intake in coil return	Close return covers or access
	Low refrigerant pressure	Check operating pressures, verify leak, correct and recharge
Water carryover	Flow higher than nominal	Verify all filters are installed; if not, install them
Condensate pan not draining	Fan depression prevents water evacuation from pan	Install appropriately sized trap
	Drain pipe blocked or lacking slope	Clean drain, check slope and adjust