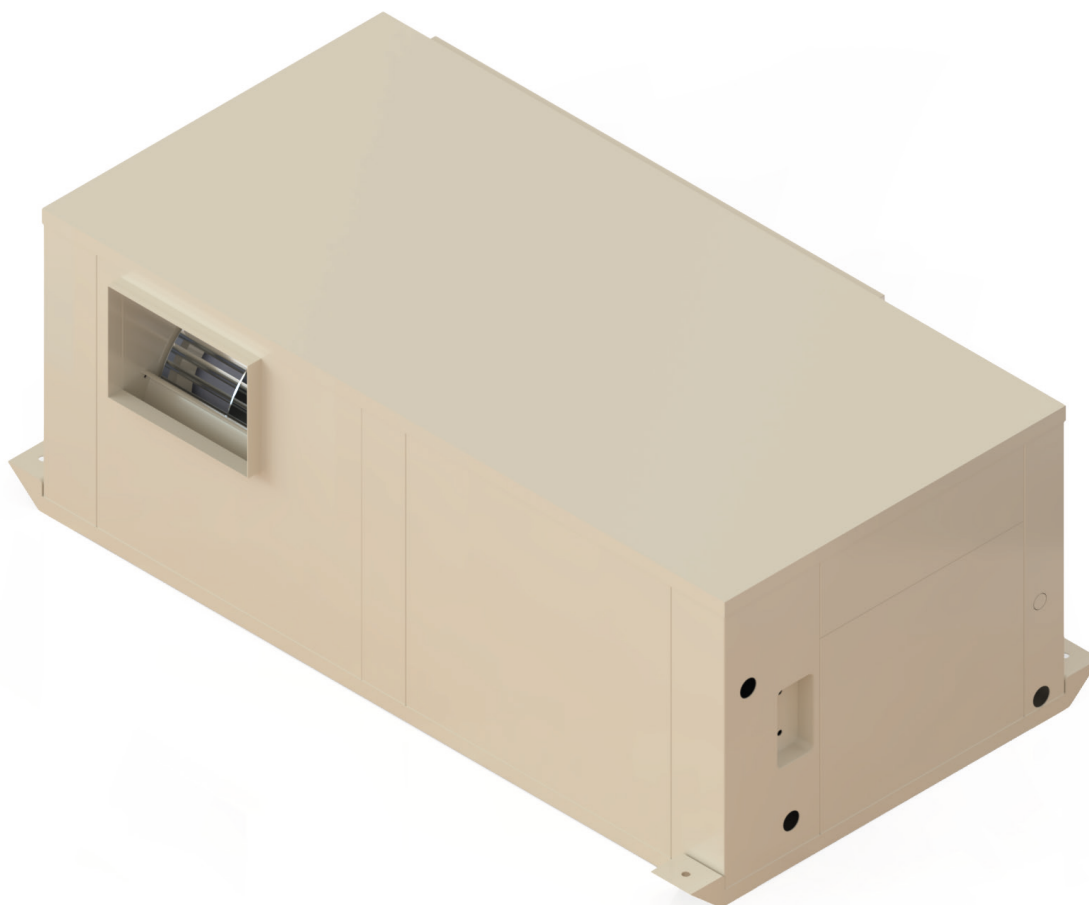




Commercial Manual **EPWC410 SERIES**

Water-Cooled Packaged Unit
Horizontal Discharge
3 TON - 5 TON



3	Precautions
4	General Features
5	Nomenclature
6	Technical Specifications
9	Blower Performance Data
11	Equipment Sizing
14	Electrical Diagram
17	Installation Guidelines
18	Startup Guidelines
19	Maintenance Recommendations
20	Notes

Precautions

In this document, you will find a series of key recommendations to ensure proper start-up, efficient operation, and adequate maintenance of your EPWC410 Series Water-Cooled Packaged Unit. Preventive care will not only guarantee the optimal functioning of the equipment, but it will also extend its useful life, optimize its performance, and help you save time and money in the long run.

By following these simple maintenance and operation steps, you can keep your HVAC system in the best operating conditions possible, maximizing its energy efficiency and avoiding unnecessary and costly breakdowns. Remember, regular maintenance not only improves comfort in your space, but also contributes to the well-being in general and the safety of everyone who uses it.



DANGER



Incorrect mounting, lifting, or movement may cause damage to the unit, property damage, serious personal injuries, or even death. Consult the weight and center of gravity data indicated in the project documentation to know the weights and center of gravity of the unit.



WARNING



Disconnect power source(s) before performing maintenance. Service must be performed by qualified personnel.
Risk of electric shock! May cause injury or death!



WARNING



To prevent the release of refrigerant into the atmosphere, the refrigeration circuit of this unit must be serviced only by technicians who meet local, state, and federal competency requirements.



WARNING



The installation of the system and all components, parts, and associated accessories that form part of the installation must be carried out in accordance with the regulations of ALL pertinent authorities and MUST comply with all applicable codes. It is the responsibility of the contractor/installer to determine and comply with ALL applicable regulations and codes.



WARNING



This device is not designed to be used by persons (including children) with physical, sensory, or mental limitations, or with lack of experience and knowledge, unless they have received supervision or instruction regarding the use of the device by a person responsible for their safety.



WARNING



For mechanical ventilation, the lower edge of the air exhaust opening, where air is removed from the room, shall not be more than 3.94 inches (100 mm) above the floor. The location where the extracted air is discharged from the space by mechanical ventilation must be separated by a sufficient distance, but not less than 9.84 feet (3 m), from the mechanical ventilation air intake openings, to prevent recirculation back into the space.



WARNING



Keep in mind that the center of gravity is not necessarily located in the geometric center of the unit. Additional lifting elements must not be attached or secured to the unit, as this may affect the center of gravity and cause personal injuries or death, as well as damage to property or the unit. Qualified personnel must determine and verify, according to weight data, the lifting center of the unit, the location of the center of gravity, and lifting details according to the unit configuration.



CAUTION



Do not store or install the units in corrosive environments or in places exposed to extreme temperatures or humidity. Corrosive conditions, high temperatures, or humidity can significantly affect performance, reliability, and service life. Always move and store units in a vertical position. Tilting units may cause damage to the equipment.



CAUTION



RISK OF CUT – Failure to follow this precaution may cause personal injury. Metal parts may have sharp edges or burrs. Be careful and use proper protective clothing, safety glasses, and gloves when handling parts and performing unit maintenance to avoid injuries.



CAUTION



RISK OF INSUFFICIENT WATER FLOW – Failure to follow this precaution may result in personal injury. The heat exchanger must be maintained with the proper flow rate according to its capacity. Incorrect flow or improper valve positioning can lead to increased refrigerant gas pressures, which may cause internal damage and deterioration of the equipment.



CAUTION



To extend equipment life, do not use these units as a heat source during the drying process of construction. Mechanical components and filters may become clogged quickly with dust and construction debris, which may damage the system and void the product warranty.



CAUTION



All three-phase scroll compressors must have their rotation direction checked at startup. This verification is performed by checking the compressor's amperage draw. The consumption will be significantly lower compared to the values on the nameplate. In addition, reverse rotation produces a higher noise level compared to correct rotation. Reverse rotation will activate the compressor's internal overload protection within a few minutes. Check the type of compressor before proceeding.



NOTICE



Only install in places not accessible to the general public.



NOTICE



An unconditioned attic is not considered natural ventilation.



NOTICE



Only install in places not accessible to the general public.

Improper handling due to lack of knowledge of instructions or recommendations contained in this document may cause damage to equipment, reduced performance, and shortened service life. We are not responsible for damage caused by incorrect handling, unauthorized modifications, or consequences arising from using unauthorized modifications that alter the correct operation of the equipment. To guarantee safe and efficient operation, it is essential to follow all recommendations in this manual and use only original spare parts. The manufacturer reserves the right to make technical changes or add updates to improve HVAC system operation.

The following information refers to the EPWC410 series. The supplied units may have varying characteristics according to customer requirements. For more detailed information about the purchased equipment, refer to the technical specifications and the unit nameplate.

Construction

Thermotar packaged units, EPWC410 series, are designed for heavy-duty operation. Their construction ensures a fully stable structure, capable of supporting and evenly distributing the static and dynamic loads of internal components.

- Manufactured from heavy-gauge galvanized steel sheet, providing high corrosion resistance.
- Single-wall galvanized steel panels with expanded polyethylene insulation.
- Fully insulated fan-evaporator compartment, with easy-access panels through doors featuring recessed handles.
- Galvanized sheet metal structural base, providing ease and safety during transport and installation.
- Electrostatic powder coating system: a long-lasting professional finish, ideal for aggressive environments.
- Condensate drain pan made of heavy-gauge sheet metal with electrostatic coating.
- Motor-fan assembly mounted on a galvanized steel structure with anti-vibration supports.
- Modular design that facilitates maintenance and allows for future expansions or adaptations.

Fans and Motors

Thermotar EPWC410 packaged units offer a wide variety of fan and motor selection options across different ranges and capacities, ensuring optimal operation according to the user's requirements.

Motors

- Capacities based on design criteria and customer requirements.
- Three-phase electric motor, 220V / 440V
- Protection rating IP54 / IP55
Optional: suitable for classified areas (Explosion Proof) or aggressive environments
- High-efficiency motors (IE3 / IE4) available to reduce energy consumption

Components

- High-efficiency, low-noise scroll compressor
- High and low pressure switches
- Terminal block for 24 V control
- Replaceable air filters, flat or bag type (depending on configuration), with front access
- Compressor heater to ensure proper temperature inside the crankcase
- Evaporator Fan:
 - Centrifugal type (conventional or Plug Fan)
 - Direct drive or belt-driven
 - Forward-curved or backward-inclined blades
- Heat Exchanger (tank, coaxial, or shell-and-tube type):
 - Copper tubing
 - Structural iron casing

Air Cooling

The Thermotar EPWC410 series is equipped with a heat exchanger featuring copper tubes and aluminum fins. Available in different sizes and refrigerant circuit configurations, it provides the appropriate heat transfer area.

- Coils with up to 8 rows for direct expansion and/or chilled water
- Fully removable coil
- Available in Copper/Aluminum and Copper/Copper
- Galvanized steel support structure
- Drain pan available in stainless steel
- Optional: anti-corrosion coating for applications in marine or industrial environments

Control and Operation

- Digital thermostat with programmable scheduling functions
- Optional control system with HMI touchscreen for local monitoring and configuration
- Automatic protections against overcurrent, overpressure, and incorrect phase sequence

Maintenance and Safety

- Front access to all components for inspection and maintenance tasks
- Filters, fans, motors, and coils accessible without the need for special tools
- Warning labels and clear identification of electrical connections and critical components
- Installation and maintenance manual included

EPWC 410 - 060 H - TD - 1

Category

EPWC Water-Cooled Packaged Unit

Refrigerant

290 R290
32 R32
410 R410A

Nominal Capacity

024 2 Ton
030 2.5 Ton
036 3 Ton
042 3.5 Ton
048 4 Ton
060 5 Ton

Cabinet Configuration / Orientation

V Vertical
H Horizontal

Number of Cooling Circuits

(Blank) One (1) Circuit
2C Two (2) Circuits
3C Three (3) Circuits
4C Four (4) Circuits

Transmission

TD Direct drive
TP Standard Belt drive

Power supply

1 220V / 60Hz / 1PH
2 110V / 60Hz / 1PH
3 220V / 60Hz / 3PH
4 440V / 60Hz / 3PH
5 380V / 50Hz / 3PH
6 480V / 60Hz / 3PH
7 380V / 60Hz / 3PH
8 220V / 50Hz / 3PH
9 440V / 50Hz / 3PH

MODEL	EPWC410-036H-TD-1	EPWC410-036H-TD-3	EPWC410-036H-TD-4
GENERAL DATA			
Cooling capacity ^[1] (BTU/h)	36000	36000	36000
Tons of Refrigeration	3	3	3
EVAPORATOR FAN			
Transmission	Direct Drive	Direct Drive	Direct Drive
Number of Fans	1	1	1
Nominal Airflow (CFM)	1200	1200	1200
Fan [DxW] (in)	10 x 8	10 x 8	10 x 8
Number of Engines	1	1	1
Current ^[2] (A)	1.9	1.9	1.9
Power ^[2] (HP)	1/3	1/3	1/3
RPM	1075 (3)	1075 (3)	1075 (3)
EVAPORATOR COIL			
Type (Tube / Fin)	Copper / Aluminum	Copper / Aluminum	Copper / Aluminum
Face Area (ft²)	2.87	2.87	2.87
Rows	4	4	4
Fins Per Inch	13	13	13
FLUID CONDITIONS			
Required Flow Rate (GPM)	9	9	9
Maximum Entering Water Temperature (°F)	85	85	85
HEAT EXCHANGER			
Quantity	1	1	1
Pipe Inlet ^[3] (in)	3 / 4	3 / 4	3 / 4
Pipe Outlet ^[3] (in)	3 / 4	3 / 4	3 / 4
COMPRESSOR			
Refrigerante	R-410A	R-410A	R-410A
Quantity	1	1	1
Type	Scroll	Scroll	Scroll
RLA ^[4] (A)	16.7 / 18.6	10.4 / 11.6	5.8 / 6.4
LRA ^[4] (A)	79.0	73.0	38.0
ELECTRICAL DATA			
V / Ph / Hz	220 / 1 / 60	220 / 3 / 60	440 / 3 / 60
Operating Current (A)	21,0	14,0	8,0
Minimum Circuit Ampacity (A)	26,0	17,0	10,0
Max. Overload Protection (A)	44,0	29,0	16,0
DIMENSIONS [L x H x W] (mm)	1150 x 500 x 650	1150 x 500 x 650	1150 x 500 x 650
NET WEIGHT (kg)	122	122	122
GROSS WEIGHT (kg)	124	124	124

Notes: ¹ Data corresponding to a specific condition. ² This value (A / HP) corresponds to a single motor. ³ FPT thread. ⁴ This value (RLA / LRA) corresponds to a single compressor. Heat exchanger for water-cooled condensation. Unit designed for an external static pressure drop of 0.7 in-wg. The information provided in the table is subject to change without prior notice. The unit color may change without prior notice. Packaged unit designed for use with R-32.

MODEL	EPWC410-048H-TD-1	EPWC410-048H-TD-3	EPWC410-048H-TD-4
GENERAL DATA			
Cooling capacity ^[1] (BTU/h)	48000	48000	48000
Tons of Refrigeration	4	4	4
EVAPORATOR FAN			
Transmission	Direct Drive	Direct Drive	Direct Drive
Number of Fans	1	1	1
Nominal Airflow (CFM)	1600	1600	1600
Fan [DxW] (in)	10 x 10	10 x 10	10 x 10
Number of Engines	1	1	1
Current ^[2] (A)	2.9	2.9	2.9
Power ^[2] (HP)	1/2	1/2	1/2
RPM	1075 (3)	1075 (3)	1075 (3)
EVAPORATOR COIL			
Type (Tube / Fin)	Copper / Aluminum	Copper / Aluminum	Copper / Aluminum
Face Area (ft ²)	3.88	3.88	3.88
Rows	3	3	3
Fins Per Inch	13	13	13
FLUID CONDITIONS			
Required Flow Rate (GPM)	12	12	12
Maximum Entering Water Temperature (°F)	85	85	85
HEAT EXCHANGER			
Quantity	1	1	1
Pipe Inlet ^[3] (in)	1	1	1
Pipe Outlet ^[3] (in)	1	1	1
COMPRESSOR			
Refrigerante	R-410A	R-410A	R-410A
Quantity	1	1	1
Type	Scroll	Scroll	Scroll
RLA ^[4] (A)	19.9 / 22.1	14.5 / 16.1	6.3 / 7.1
LRA ^[4] (A)	109.0	98.0	55.0
ELECTRICAL DATA			
V / Ph / Hz	220 / 1 / 60	220 / 3 / 60	440 / 3 / 60
Operating Current (A)	26,0	20,0	9,0
Minimum Circuit Ampacity (A)	31,0	24,0	11,0
Max. Overload Protection (A)	53,0	40,0	18,0
DIMENSIONS [L x H x W] (mm)	720 x 505 x 1300	720 x 505 x 1300	720 x 505 x 1300
NET WEIGHT (kg)	130	130	130
GROSS WEIGHT (kg)	132	132	132

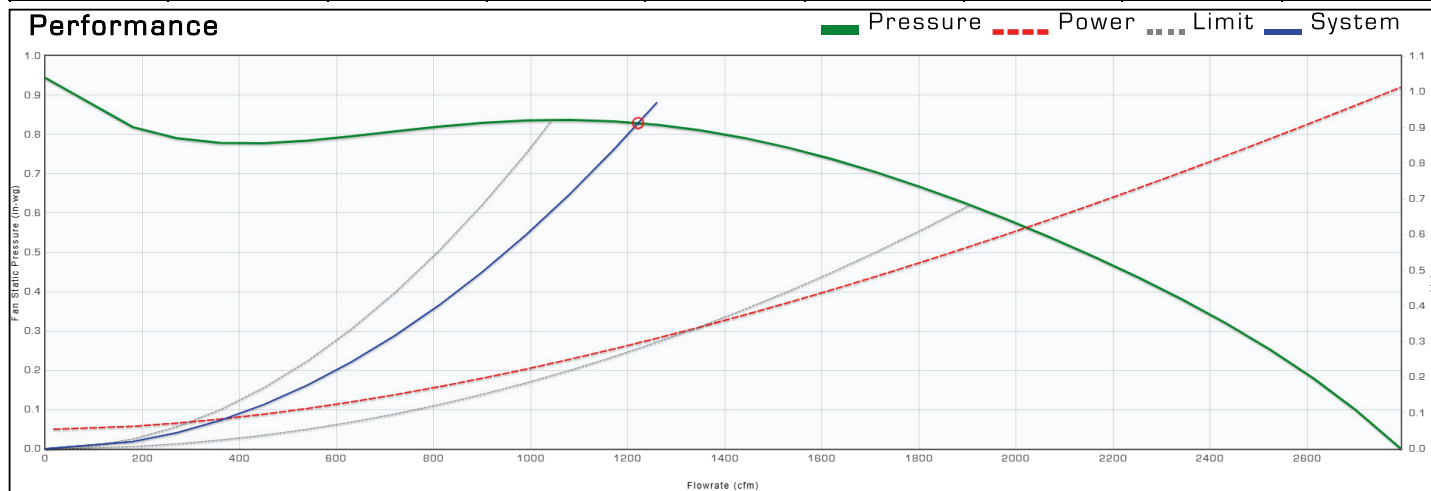
Notes: ¹ Data corresponding to a specific condition. ² This value (A / HP) corresponds to a single motor. ³ FPT thread. ⁴ This value (RLA / LRA) corresponds to a single compressor. Heat exchanger for water-cooled condensation. Unit designed for an external static pressure drop of 0.7 in-wg. The information provided in the table is subject to change without prior notice. The unit color may change without prior notice. Packaged unit designed for use with R-32.

MODEL	EPWC410-060H-TD-1	EPWC410-060H-TD-3	EPWC410-060H-TD-4
GENERAL DATA			
Cooling capacity ^[1] (BTU/h)	60000	60000	60000
Tons of Refrigeration	5	5	5
EVAPORATOR FAN			
Transmission	Direct Drive	Direct Drive	Direct Drive
Number of Fans	1	1	1
Nominal Airflow (CFM)	2000	2000	2000
Fan [DxW] (in)	10 x 10	10 x 10	10 x 10
Number of Engines	1	1	1
Current ^[2] (A)	4.0	4.0	2.0
Power ^[2] (HP)	3/4	3/4	3/4
RPM	1075 (3)	1075 (3)	1075 (3)
EVAPORATOR COIL			
Type (Tube / Fin)	Copper / Aluminum	Copper / Aluminum	Copper / Aluminum
Face Area (ft ²)	3.88	3.88	3.88
Rows	4	4	4
Fins Per Inch	13	13	13
FLUID CONDITIONS			
Required Flow Rate (GPM)	15	15	15
Maximum Entering Water Temperature (°F)	85	85	85
HEAT EXCHANGER			
Quantity	1	1	1
Pipe Inlet ^[3] (in)	1	1	1
Pipe Outlet ^[3] (in)	1	1	1
COMPRESSOR			
Refrigerante	R-410A	R-410A	R-410A
Quantity	1	1	1
Type	Scroll	Scroll	Scroll
RLA ^[4] (A)	25.0 / 27.9	15.9 / 17.7	7.1 / 7.9
LRA ^[4] (A)	134.0	110.0	52.0
ELECTRICAL DATA			
V / Ph / Hz	220 / 1 / 60	220 / 3 / 60	440 / 3 / 60
Operating Current (A)	32,0	22,0	10,0
Minimum Circuit Ampacity (A)	39,0	27,0	12,0
Max. Overload Protection (A)	67,0	44,0	20,0
DIMENSIONS [L x H x W] (mm)	720 x 505 x 1300	720 x 505 x 1300	720 x 505 x 1300
NET WEIGHT (kg)	130	130	130
GROSS WEIGHT (kg)	132	132	132

Notes: ¹. Data corresponding to a specific condition. ². This value (A / HP) corresponds to a single motor. ³. FPT thread. ⁴. This value (RLA / LRA) corresponds to a single compressor. Heat exchanger for water-cooled condensation. Unit designed for an external static pressure drop of 0.7 in-wg. The information provided in the table is subject to change without prior notice. The unit color may change without prior notice. Packaged unit designed for use with R-32.

3TON

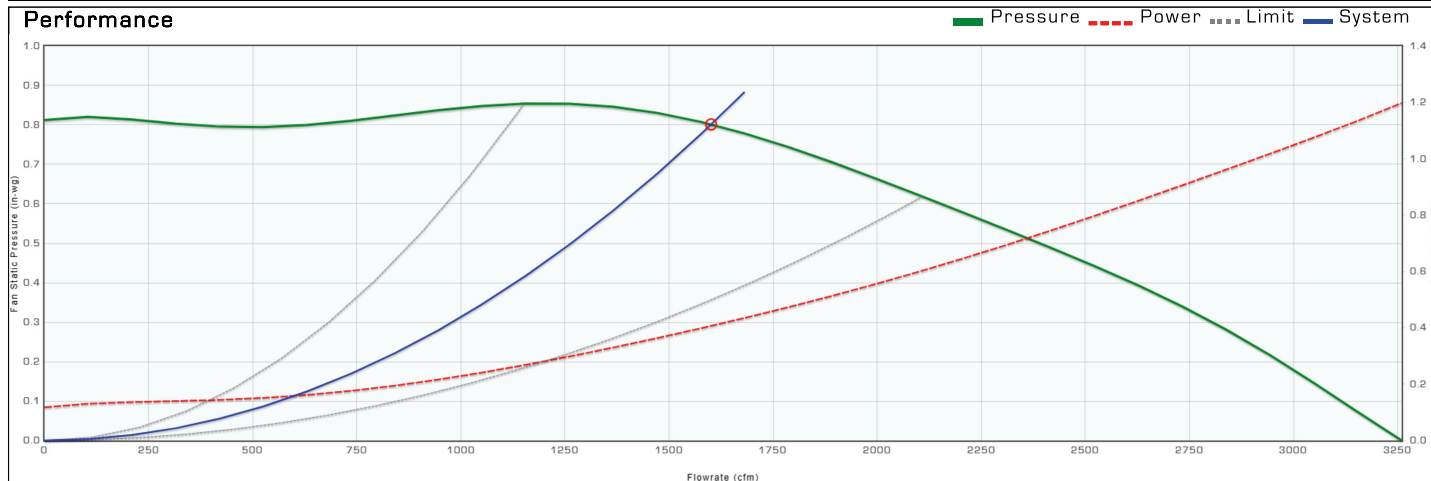
Job Name					Submitted by/notes			
Model	Flow	Pressure	Temperature	Altitude	Density	Q Derate	P Derate	Vav Set Point
DD10-8A	1221 cfm	0.83 in-wg	70 °F	0 ft	0.075 lb/ft³	0 cfm	0.00 in-wg	0.00 in-wg
Fan Tag	Flow	Pressure	Power	Static Efficiency	Total Efficiency	Speed	Outlet Velocity	FEI
	1221 cfm	0.83 in-wg	0.30 hp	53.9 %	63.1 %	900 rpm	1507 fpm	1.71
	Impeller Dia	Outlet Area	Max. Speed	AMCA Class	Drive	Blades	P Volume	TurnDown
	10.0 in	0.81 ft²	2000 rpm	Class I	Direct Drives	48	1.75 ft³	100 %



Sound(Lwi/Lwo)	63	125	250	500	1000	2000	4000	8000	Lw	LwA
	69/84	70/81	68/79	67/73	68/71	64/69	63/65	61/61	76/87	72/77

4TON

Job Name					Submitted by/notes				
Model	DD10-10A	Flow 1601 cfm	Pressure 0.80 in-wg	Temperature 70 °F	Altitude 0 ft	Density 0.075 lb/ft³	Q Derate 0 cfm	P Derate 0.00 in-wg	Vav Set Point 0.00 in-wg
Fan Tag		Flow 1601 cfm	Pressure 0.80 in-wg	Power 0.41 hp	Static Efficiency 49.7 %	Total Efficiency 59.3 %	Speed 910 rpm	Outlet Velocity 1570 fpm	FEI 1.57
		Impeller Dia 10.0 in	Outlet Area 1.02 ft²	Max. Speed 2000 rpm	AMCA Class 0	Drive Direct Drives	Blades 48	P Volume 2.19 ft³	TurnDown 100 %

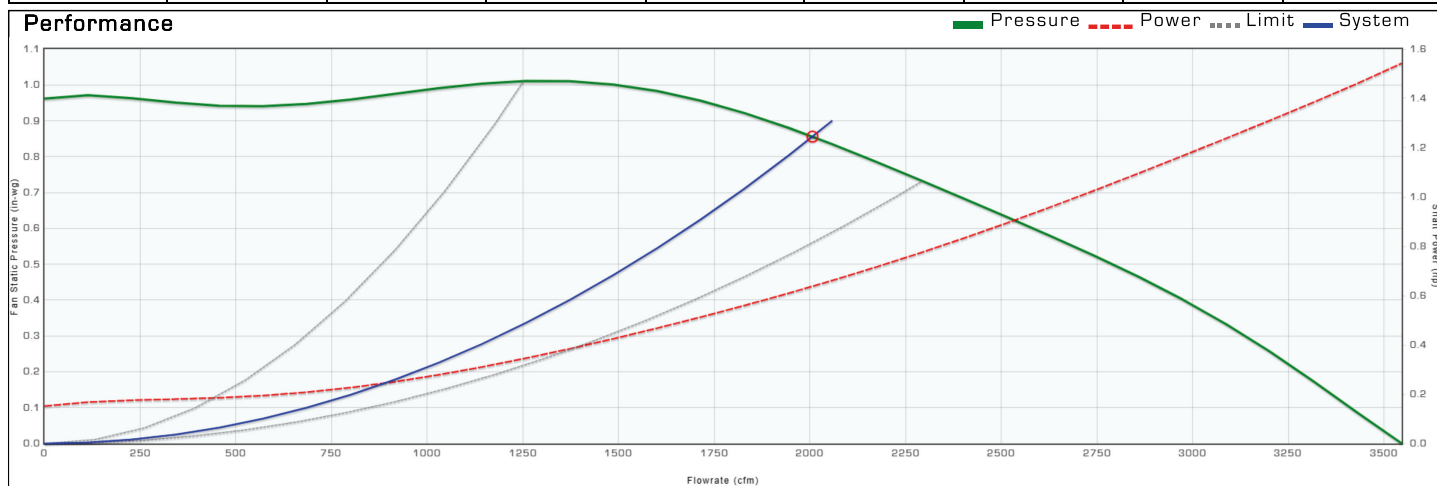


Sound(Lwi/Lwo)	63	125	250	500	1000	2000	4000	8000	Lw	LwA
	70/78	71/75	68/73	67/67	69/65	65/63	64/60	61/55	77/81	73/71

Notes: Airflow performance data is obtained in accordance with AMCA 210-07. Installed performance will vary depending on the extent of the cabinet geometry. Sound data is estimated based on industry experience for the selected product type. The data should be used for comparative purposes only and does not represent installed values.

5TON

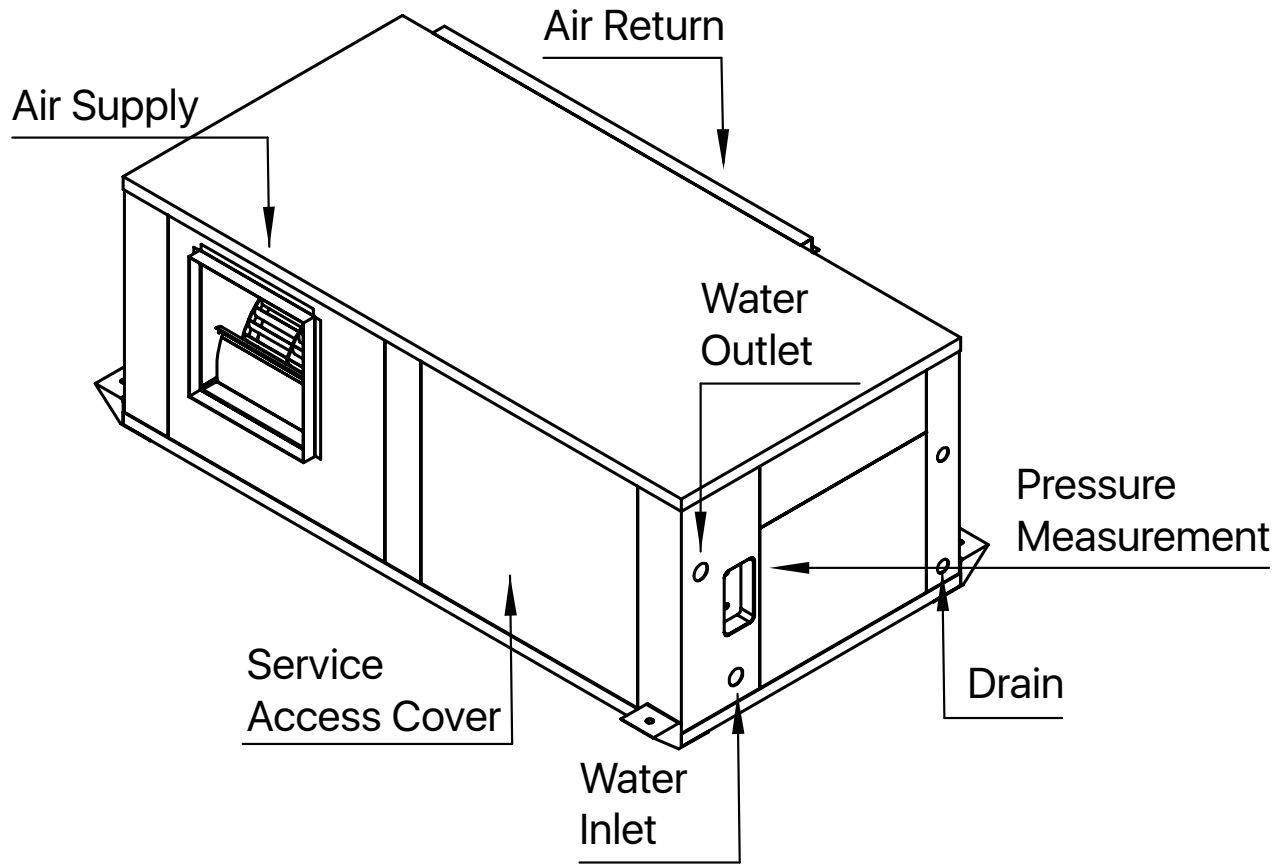
Job Name					Submitted by/ notes			
Model	Flow	Pressure	Temperature	Altitude	Density	Q Derate	P Derate	Vav Set Point
DD10-10A	2006 cfm	0.86 in-wg	70 °F	0 ft	0.075 lb/ft ³	0 cfm	0.00 in-wg	0.00 in-wg
Fan Tag	Flow	Pressure	Power	Static Efficiency	Total Efficiency	Speed	Outlet Velocity	FEI
	2006 cfm	0.86 in-wg	0.64 hp	42.5 %	54.4 %	990 rpm	1967 fpm	1.37
	Impeller Dia	Outlet Area	Max. Speed	AMCA Class	Drive	Blades	P Volume	TurnDown
	10.0 in	1.02 ft ²	2000 rpm	0	Direct Drives	48	2.19 ft ³	100 %



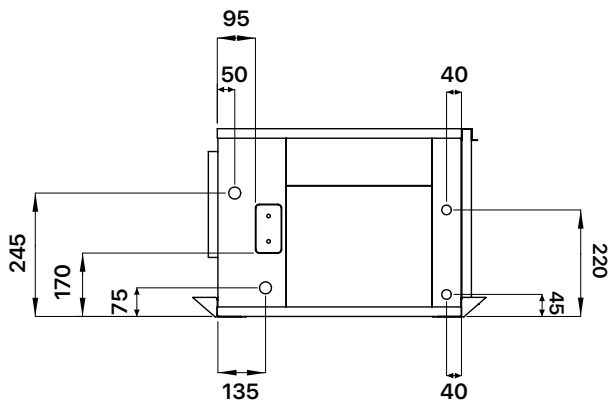
Sound(Lwi/Lwo)	63	125	250	500	1000	2000	4000	8000	Lw	LwA
	74/79	74/75	72/75	71/69	72/67	69/65	67/62	64/57	80/82	76/73

Notes: Airflow performance data is obtained in accordance with AMCA 210-07. Installed performance will vary depending on the extent of the cabinet geometry. Sound data is estimated based on industry experience for the selected product type. The data should be used for comparative purposes only and does not represent installed values.

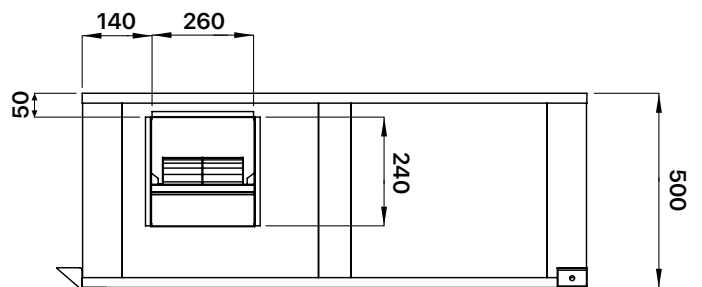
3TON



Side View

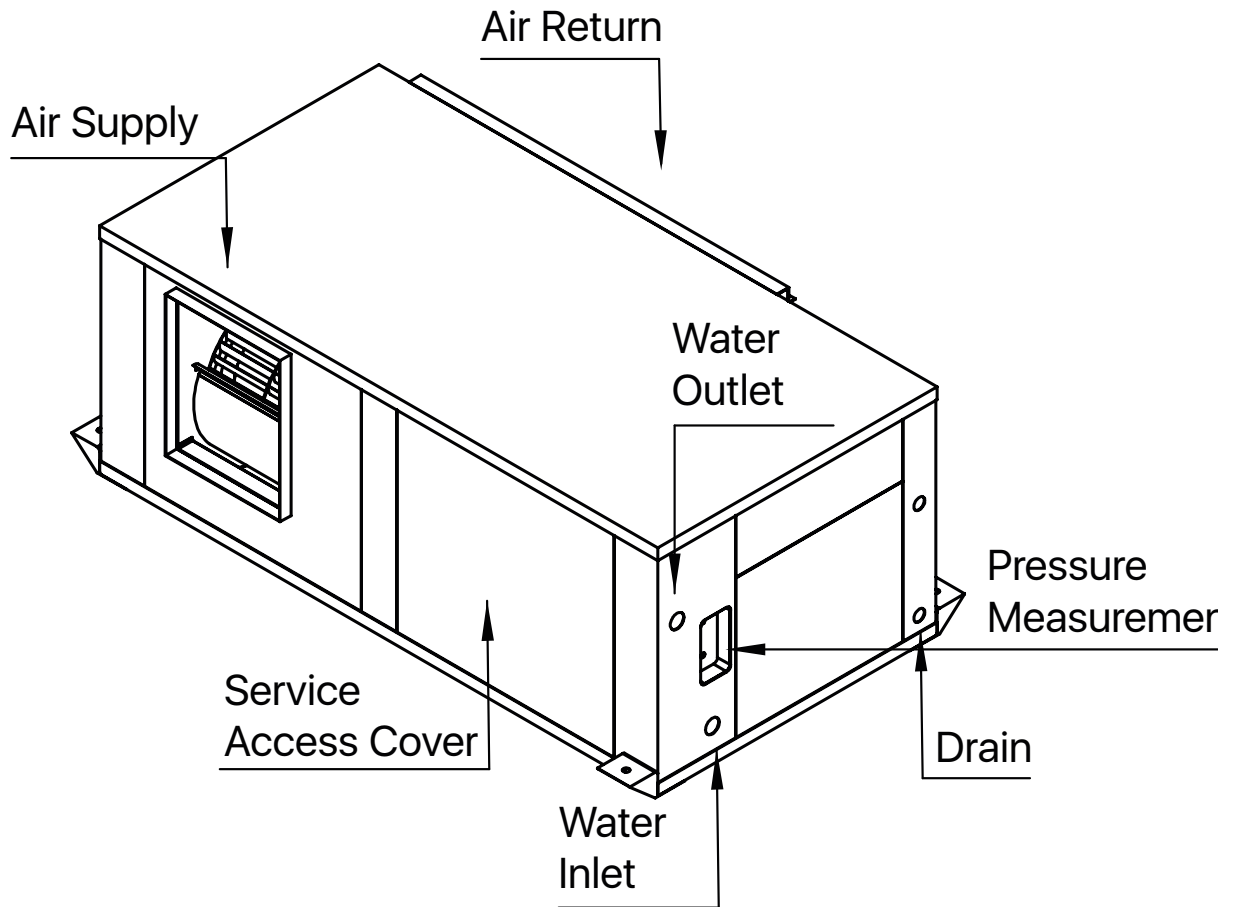


Front View

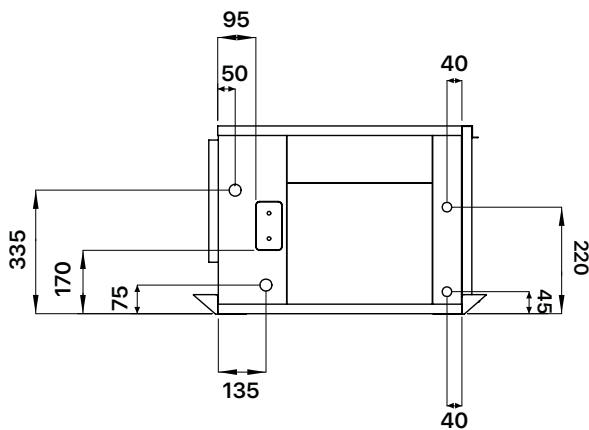


Note: All measurements are in millimeters (mm).

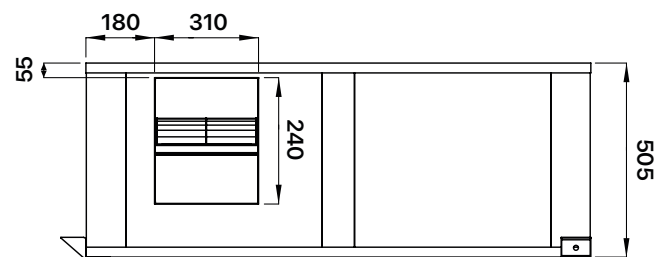
4 TON



Side View

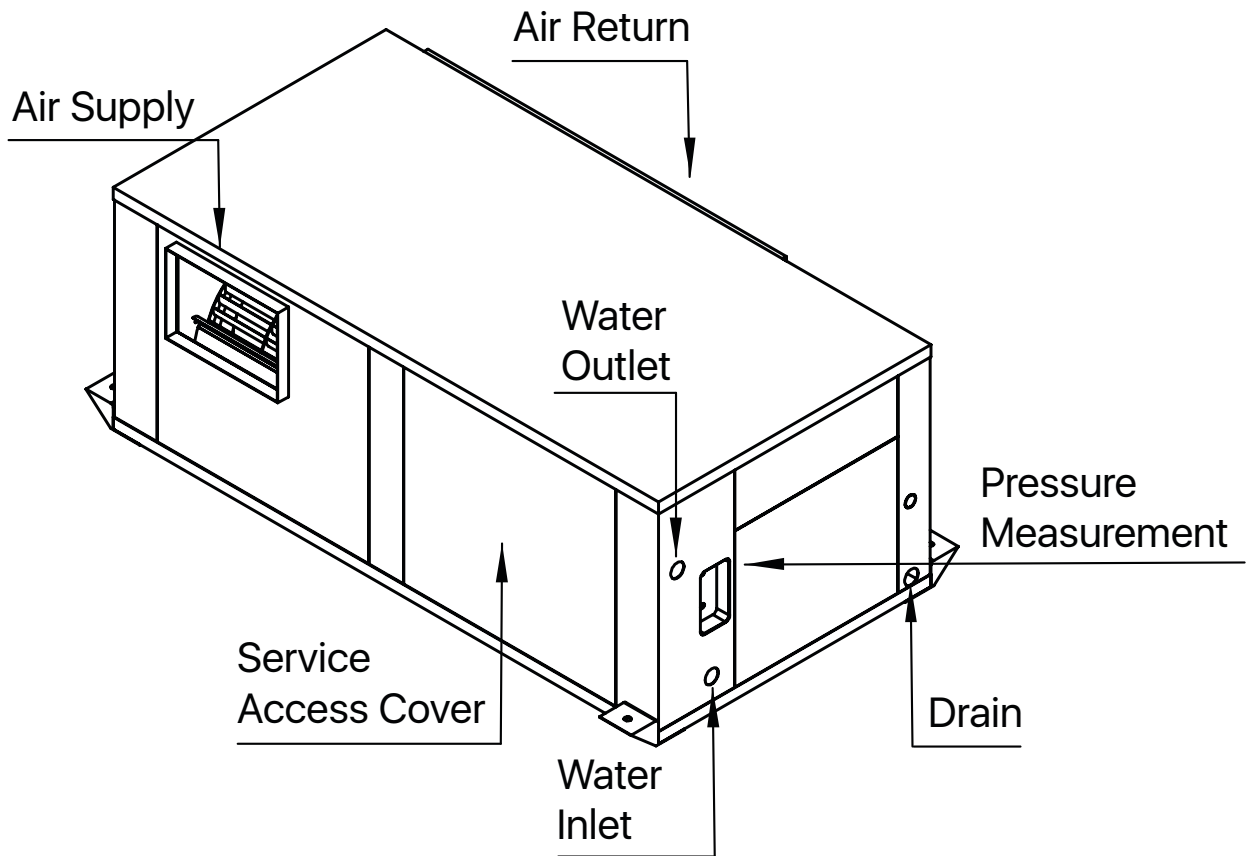


Front View

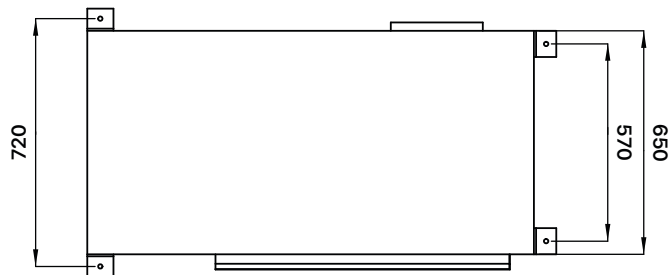


Note: All measurements are in millimeters (mm).

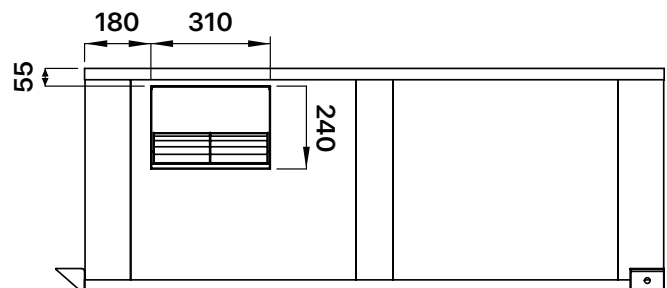
5TON



Top View



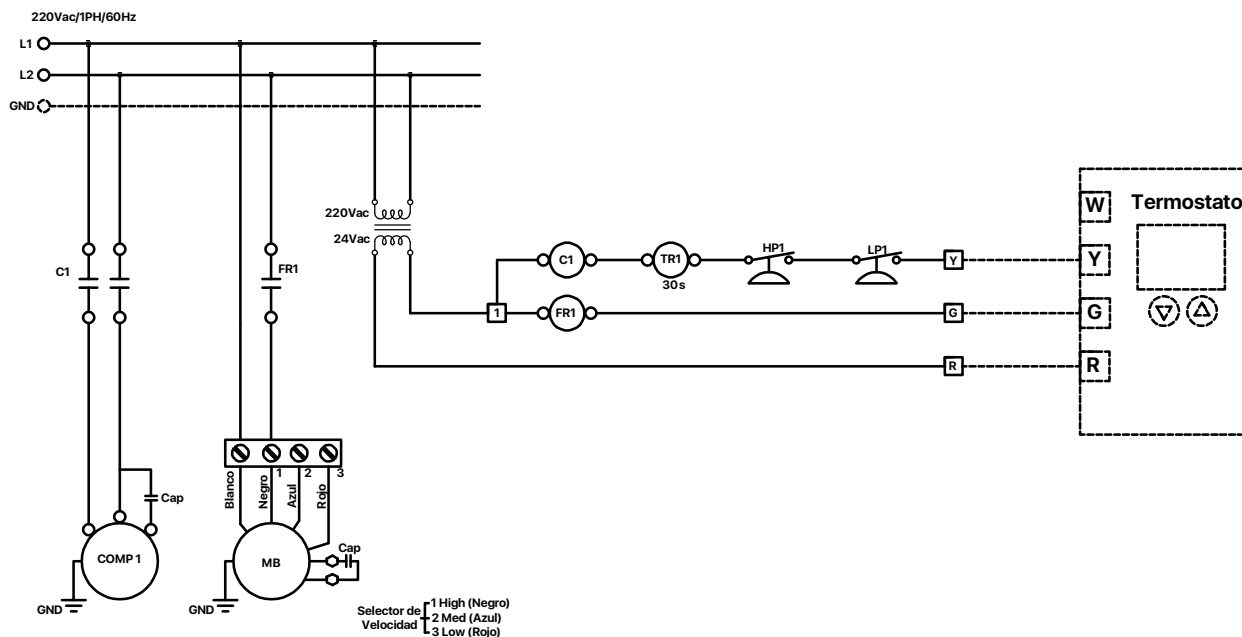
Front View



Note: All measurements are in millimeters (mm).

While performing the electrical installation, the authorized technician must verify that the electrical circuit of the equipment shown below is in compliance:

220V / 1PH / 60Hz



! **WARNING** !

High Voltage: Disconnect the power source(s) before performing maintenance. Service must be performed by qualified personnel. Risk of electric shock! May cause injury or death!

Elements:

COMP: Compressor
 MB: Blower Motor
 L: AC Power Supply Lines
 FR: Auxiliary Relay
 G: Fan Signal
 Y: Condenser Signal
 W: Dehumidifier Signal (N/A)
 R: 24Vac Common Lines
 C: 24Vac Auxiliary Lines
 HP: High Pressure Switch
 LP: Low Pressure Switch

TR: Timer
 C: Contactor
 GND: Grounding

Factory Wiring:

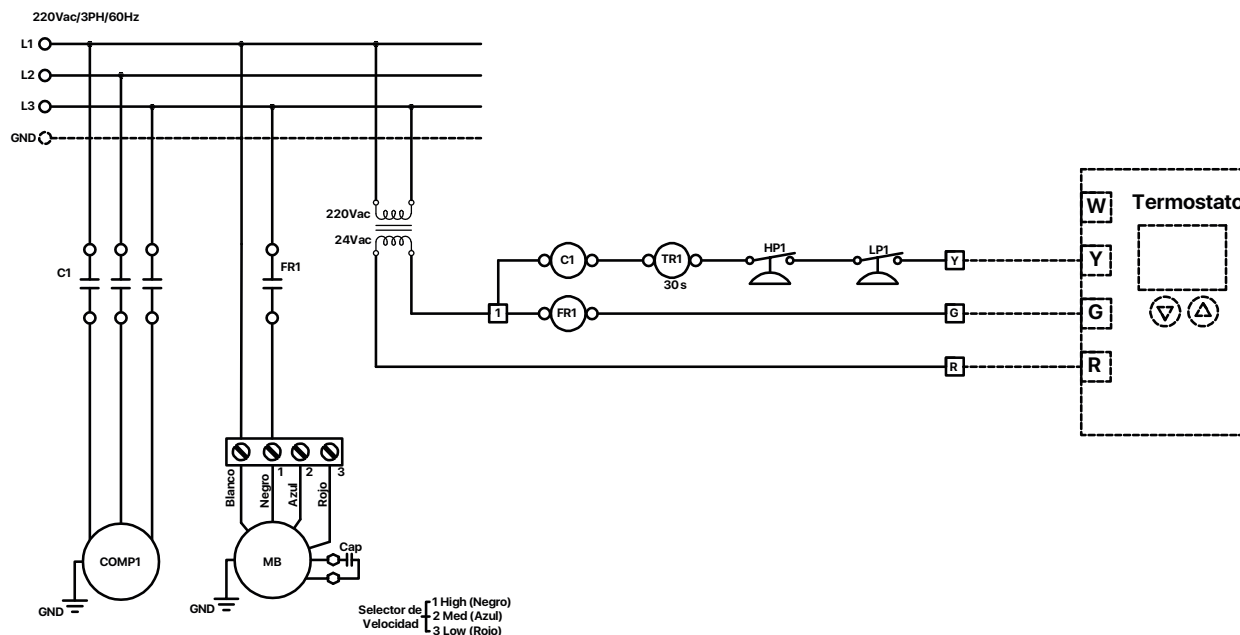
— High Voltage
 - - - Low Voltage

Field Wiring:

- - - High Voltage
 . . . Low Voltage

While performing the electrical installation, the authorized technician must verify that the electrical circuit of the equipment shown below is in compliance:

220V / 3PH / 60Hz



! **WARNING** !

High Voltage: Disconnect the power source(s) before performing maintenance. Service must be performed by qualified personnel. Risk of electric shock! May cause injury or death!

Elements:

COMP: Compressor
 MB: Blower Motor
 L: AC Power Supply Lines
 FR: Auxiliary Relay
 G: Fan Signal
 Y: Condenser Signal
 W: Dehumidifier Signal (N/A)
 R: 24Vac Common Lines
 C: 24Vac Auxiliary Lines
 HP: High Pressure Switch
 LP: Low Pressure Switch

TR: Timer
 C: Contactor
 GND: Grounding

Factory Wiring:

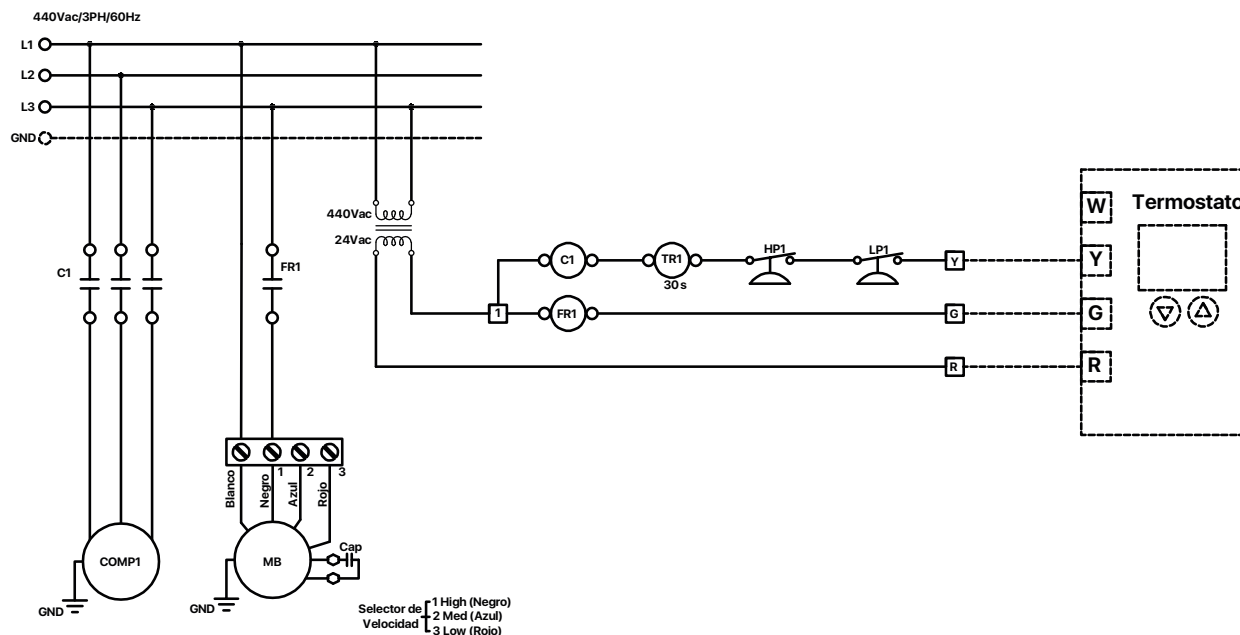
— High Voltage
 - - - Low Voltage

Field Wiring:

- - - High Voltage
 Low Voltage

While performing the electrical installation, the authorized technician must verify that the electrical circuit of the equipment shown below is in compliance:

440V / 3PH / 60Hz



⚠ WARNING ⚠

High Voltage: Disconnect the power source(s) before performing maintenance. Service must be performed by qualified personnel. Risk of electric shock! May cause injury or death!

Elements:

COMP: Compressor
 MB: Blower Motor
 L: AC Power Supply Lines
 FR: Auxiliary Relay
 G: Fan Signal
 Y: Condenser Signal
 W: Dehumidifier Signal (N/A)
 R: 24Vac Common Lines
 C: 24Vac Auxiliary Lines
 HP: High Pressure Switch
 LP: Low Pressure Switch

TR: Timer
 C: Contactor
 GND: Grounding

Factory Wiring:

— High Voltage
 - - - Low Voltage

Field Wiring:

- - - High Voltage
 Low Voltage

The general conditions that must be considered before installing the equipment:

**WARNING**

Work on the equipment must be carried out exclusively by professionals. Do not connect the power supply until all work has been completed.

**CAUTION**

RISK OF CUT – Failure to follow this precaution may result in personal injury. Metal parts may have sharp edges or burrs. Be careful and use proper protective clothing, safety glasses, and gloves when handling parts and performing maintenance on the air conditioning units.

**NOTICE**

For installation only in areas not accessible to the general public, such as mechanical rooms or rooftops.

IMPORTANT CONSIDERATIONS

1. **Electrical Installation:** All wiring must be performed by qualified personnel, in compliance with applicable local and national regulations.
2. **Grounding:** Follow NEC standards or local regulations for grounding to ensure safety and protection against faults.
3. **Power Supply:** Ensure the electrical supply meets the manufacturer's specifications, including voltage stability and current availability.
4. **Safe Environment:** Choose a location away from flammable gases, vapors, or combustible materials that could pose risks during operation or maintenance.
5. **Structural Support:** Ensure the support structure can bear the total weight of the unit, especially considering long-term vibrations and stress.
6. **Weight Distribution:** Most of the weight is in the refrigerant condenser section; the base must be properly reinforced.
7. **Drain location:** Choose a location that allows easy connection to the drainage system. Install a trap to prevent backflow or odors.
8. **Unit Leveling:** Install the unit level to ensure proper performance and avoid operational issues or wear due to vibration.
9. **Seismic Considerations (if applicable):** In seismic zones, secure the unit with anchors or mounting systems compliant with local codes.
10. **Vibration Isolation:** Install vibration isolators between the unit and the base to minimize noise and vibration transmission.
11. **Maintenance Space:** Maintain the minimum recommended clearance for access to maintenance and technical service.
12. **External Visual Inspection:** Check the exterior—top, panels, and hardware—for transport or handling damage.
13. **Internal Inspection Upon Delivery:** Visually inspect internal components upon receiving the unit for bent fins, loose wires, or misaligned fans.
14. **Equipment Verification:** Confirm that the model, options, and voltage match the nameplate to prevent compatibility or warranty issues.
15. **Pest Protection:** Seal cable, pipe, and duct entries to prevent rodents or insects from entering.
16. **Pipe Insulation:** Insulate refrigerant and drain lines to prevent condensation, energy loss, and thermal wear.
17. **Outdoor Electrical Connections:** Use waterproof enclosures and sealants for exterior electrical connections to prevent corrosion or failures.
18. **Air outlet separation:** In units with direct drive, do not combine outlets into the same duct before 1.5 meters (2 meters recommended)
19. **Unobstructed Airflow:** Ensure no obstructions in supply and return air for proper circulation and temperature control.
20. **Duct connections:** Use airtight flexible connectors when installing ducts to prevent transmission of noise, vibration, or thermal stress.
21. **Airflow Verification:** Verify correct fan airflow before sealing to avoid rework.
22. **Labeling and Documentation:** Label all cables and lines. Keep diagrams and manuals accessible near the unit.
23. **Surge protection:** Install protective devices to prevent damage from voltage spikes caused by lightning or electrical fluctuations.
24. **Verification of required water flow rate:** Confirm with the water storage tank that the required gallons per minute (GPM) are supplied to ensure proper performance in the refrigerant gas condensation process within the heat exchanger (tank, coaxial, or shell-and-tube type), preventing loss of efficiency in the unit.
25. **Leak verification:** Confirm proper pressurization of the unit at all joints and refrigerant lines to prevent refrigerant gas leaks and its dispersion into the environment, which could accumulate within the space.

The following is a brief description of the steps for system startup and commissioning (to be carried out only by an authorized technician):

**WARNING**

Never perform work on the equipment without the assistance of qualified professionals. Before making any connection, make sure that the power supply lines are completely disconnected and without energy until all work is fully completed.

STEPS FOR SYSTEM STARTUP:

1. Verify grounding: Confirm that the grounding is reliable and that the wire is properly connected to the building's grounding system. Never connect the ground wire to gas pipes, water pipes, telephone lines, or other non-dedicated systems, as this could compromise equipment safety.
2. Ensure sufficient electrical capacity: Verify that adequate electrical capacity is provided for the operation of the equipment, following the wire gauge specified in the technical specifications.
3. Power from the circuit breaker: Connect the electrical supply to the unit from the circuit breaker. Ensure the breaker capacity is sufficient to protect the equipment and prevent overloads or damage to internal components.
4. Connect the power lines: Connect the power lines to the corresponding terminals. For single-phase units, use the terminals marked L1 and L2. For three-phase units, ensure all three phases (L1, L2, and L3) are correctly connected in the electrical box.
5. Tighten all electrical terminals: Terminals may loosen over time or during transport. Retighten all terminal screws to prevent arcing or electrical failures.
6. Inspect for visible damage or debris: Check the unit for physical damage, loose panels, or foreign objects inside the cabinet before energizing. Remove any obstructions that may affect moving parts or airflow.
7. Check drain lines: Ensure the drain line is free of obstructions and properly directed to avoid overflow or damage to the unit or building.
8. Wire the control lines: From the unit, connect the three control lines (R, G, Y, and O*) as indicated in the electrical box to the corresponding thermostat terminals. This allows proper control of the unit's functions.
9. Verify connections and fastenings: Ensure all electrical connections are correctly made and secured according to the provided wiring diagrams. This guarantees safe installation and proper system operation.
10. Check fan rotation direction (for three-phase units): For three-phase units, confirm that the fan or blower motor rotates in the correct direction. If not, swap two phases (for example, L1 and L2) to correct the rotation.
11. Inspect air filters and ducts before startup: Ensure that filters are clean and properly installed. Also check the ducts for blockages, leaks, or disconnections that may affect airflow and efficiency.
12. Activate switches to power on the unit: Once connected, activate the field switches to energize the unit. Verify that all connections are correct before proceeding.
13. Check refrigerant levels: Before turning on the unit, ensure refrigerant levels are within the recommended range. Low levels can affect performance, efficiency, and damage the compressor. If levels are incorrect, contact a certified technician.
14. Measure voltage and current at startup: After energizing the unit, measure supply voltage and operating current to ensure they are within acceptable ranges according to the nameplate. This helps detect issues like low voltage or overcurrent.
15. Test system operation: After confirming all connections are secure and the unit is energized, test the system to ensure it operates correctly. Set the thermostat to the desired temperature and verify that the unit cools the space without unusual noises or vibrations.
16. Allow unit to run in test mode: After startup, let the system run for at least 15–20 minutes while monitoring pressures, temperatures, and overall operation. This helps detect early signs of malfunction.
17. Adjust the thermostat: The air conditioning system is controlled by the indoor thermostat. Make sure it is set to the desired temperature to maintain a comfortable indoor environment.
18. Program the thermostat (if applicable): If using a programmable thermostat, ensure it is correctly set with schedules, cooling setpoints, and fan settings.

With proper maintenance and care, your air conditioning unit will operate efficiently and cost-effectively. Before performing any maintenance task, consider the following essential safety precautions:

**WARNING**

To avoid equipment damage and prevent personal injury or even death, make sure to completely disconnect the power supply before performing any maintenance task. This includes disconnecting power from both indoor and outdoor units.
NOTE: There may be multiple electrical disconnect switches. Verify and deactivate all of them to ensure your safety.

**WARNING**

Although special attention has been given to minimizing sharp edges during equipment manufacturing, we recommend handling parts very carefully and avoiding placing hands inside the unit without proper precautions.

MAINTENANCE RECOMMENDATIONS

1. Electrical supply inspection: Periodically check the unit's power supply to ensure proper operation. Monitor the current of main components according to the equipment nameplate.
2. Adjust electrical connections: Inspect and tighten all terminals and electrical connections to prevent arcing, voltage drops, or overheating due to loose or corroded connections.
3. Capacitor and contactor inspection/testing (if applicable): Examine capacitors for bulging or leaks and test contactors to ensure proper operation. Faulty components may cause startup failures.
4. Safety controls and sensor inspection: Test the operation of safety switches, pressure sensors, and other automatic shutdown systems to ensure proper functioning during emergencies or overloads.
5. Operating pressure inspection: Periodically check the system's operating pressures (high and low). Ensure they do not exceed the ranges specified for normal operation.
6. Drain line inspection: Ensure there are no blockages in the unit's drain line to prevent water overflow, which could cause damage or improper drainage.
7. Fan motor lubrication (if applicable): Lubricate fan motors and bearings (for models with serviceable components) according to the manufacturer's recommendations to prevent overheating or failure.
8. Air filter cleaning: Clean the air filter to prevent airflow restriction, which can reduce unit efficiency and shorten its service life.
9. Condenser/evaporator coil inspection: Check the condition of the condenser and evaporator coils to ensure they are free of obstructions, allowing proper airflow and heat transfer.
10. Coil cleaning: If necessary, clean the coil with a mild detergent solution and rinse with water. This process may require coil removal. Take care not to damage the fins.
11. Refrigerant line insulation inspection: Check for deterioration of refrigerant line insulation, which can cause energy loss or reduced cooling performance.
12. Blower inspection: Regularly inspect the blower to prevent dirt buildup or friction between the blades, which could affect system performance.
13. Avoid debris accumulation: Keep debris away from or on top of the unit, as this can reduce cooling capacity.
14. Check for unusual noises or vibrations: Listen for abnormal noises (knocking, buzzing, squealing) that may indicate loose components or imminent failure.
15. Thermostat calibration: Periodically check and calibrate the thermostat to ensure precise temperature control and optimal comfort.
16. Return air grille cleaning or replacement: Clean dust and debris from the return air grilles or replace them if they are damaged.
17. System shutdown and restart test: Verify that the system shuts down and restarts correctly after a power interruption or thermostat adjustment.
18. Annual full maintenance: After one year of operation, perform a complete unit inspection, including the motor, bearings, and shaft condition.
19. Continuous cooling tank inspection: Regularly check the condition of the cooling tank or storage vessel to prevent damage caused by the accumulation of dirt or solid debris that may hinder the refrigerant gas condensation process, which can lead to increased pressures and loss of unit efficiency.
20. Cleaning and maintenance of the unit: It is necessary to remove the leak detection sensor located in the evaporator section to prevent potential damage, as it is an electronic component.







In accordance with its policy of continuous progress and product improvement, Thermotar reserves the right to make changes without prior notice. ©2026 THERMOTAR LTDA.