



Commercial Manual
EP410 SERIES
Horizontal Packaged Unit
3 TON - 5 TON



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Precautions

In this document, you will find a series of key recommendations to ensure proper start-up, efficient operation, and adequate maintenance of your EP410 Series 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



Improper installation, adjustment, alteration, service, or maintenance may result in personal injury, death, or property damage. Therefore, both installation and service must be performed exclusively by a licensed professional installer or an authorized service agency.



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



The lifting angle must not exceed 30 degrees from the vertical, as the unit may become unstable, which could result in damage to the unit, property damage, serious personal injury, or even death.



WARNING



Drain pans must be cleaned periodically. Accumulated material in uncleaned pans may cause illness. Cleaning must be performed by qualified personnel.



WARNING



Please note that refrigerants may be odorless.



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.



WARNING



Children under supervision must NOT play with the appliance.



CAUTION



Lifting devices must not come into contact with the unit beyond the designated lifting support. Extreme care must be taken during installation to avoid damage to control panels, unit handles, piping, and the unit structure.



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



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



Maintenance must be carried out only in accordance with the manufacturer's recommendations.



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 EP410 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 EP410 series packaged units are designed for heavy-duty service. 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 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 steel 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 EP410 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.
- Single-phase permanent split capacitor (PSC) 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
- Evaporator Fan:
 - Centrifugal type (conventional or Plug Fan)
 - Direct drive
 - Forward-curved or backward-inclined blades
- Condenser Fan:
 - Axial type
 - Direct drive
 - Forward-curved or backward-inclined blades

Air Cooling

The Thermotar EP410 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

EP 410 - 060 - TD - 1

Category

EP	Standard Packaged Unit
EPHP	Heat Pump Packaged Unit
EPAPK	Airpack Packaged Unit
PAC	Wall-Mount Packaged Unit
EPTP	Portable Packaged Unit

Refrigerant

410	R410A
290	R290
32	R32

Nominal Capacity

036	3 Ton	120	10 Ton
048	4 Ton	240	20 Ton
060	5 Ton	360	30 Ton
072	6 Ton	480	40 Ton

Air Discharge

	(Blank) Horizontal
DF	Down Flow

Number Of Cooling Circuits

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

Fan Drive Type

TD	Direct Drive
TP	Belt Drive
PF	Plug Fan (Plenum Fan)

Power Supply

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

MODEL	EP410A-036-TD-1	EP410A-036-TD-3	EP410A-036-TD-4
GENERAL DATA			
Cooling capacity ^[1] (BTU/h)	36,000	36,000	36,000
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	1.3
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 (ft ²)	2.9	2.9	2.9
Rows	4	4	4
Fins Per Inch	13	13	13
CONDENSER FAN			
Number of Fans	1	1	1
Type	Axial	Axial	Axial
Number of Motors	1	1	1
Current (A)	1.7	1.7	1.3
Power (HP)	1/4	1/4	1/3
RPM	1075	1075	1075
Fan Diameter (in)	20	20	20
CONDENSER COIL			
Type (Tube / Fin)	Copper / Aluminum	Copper / Aluminum	Copper / Aluminum
Face Area (ft ²)	14.3	14.3	14.3
Rows	1	1	1
Fins Per Inch	17	17	17
COMPRESSOR			
Refrigerant	R410A	R410A	R410A
Quantity	1	1	1
Type	Scroll	Scroll	Scroll
RLA ^[2] (A)	16.7 / 18.6	10.4 / 11.6	5.8 / 6.4
LRA ^[3] (A)	79.0	73.0	38.0
ELECTRICAL DATA			
V / Ph / Hz	220 / 1 / 60	220 / 3 / 60	440 / 3 / 60
Operating Current (A)	23.5	16.5	10.0
Minimum Circuit Ampacity (A)	28.0	19.0	12.0
Max. Overload Protection (A)	46.5	31.0	18.0
DIMENSIONS [L x H x W] (mm)	1450 x 830 x 760	1450 x 830 x 760	1450 x 830 x 760
NET WEIGHT (kg)	135	135	135
GROSS WEIGHT (kg)	137	137	137

Notes: ¹ Data corresponding to a specific condition. ² This Rated Load Amperage (RLA) value corresponds to a single compressor. ³ This Locked Rotor Amperage (LRA) value corresponds to a single compressor. ⁴ 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-410A.

MODEL	EP410A-048-TD-1	EP410A-048-TD-3	EP410A-048-TD-4
GENERAL DATA			
Cooling capacity ^[1] (BTU/h)	48,000	48,000	48,000
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	1.5
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)	3.9	3.9	3.9
Rows	3	3	3
Fins Per Inch	13	13	13
CONDENSER FAN			
Number of Fans	1	1	1
Type	Axial	Axial	Axial
Number of Motors	1	1	1
Current (A)	2.4	2.4	1.0
Power (HP)	1/3	1/3	1/3
RPM	825	825	825
Fan Diameter (in)	22	22	22
CONDENSER COIL			
Type (Tube / Fin)	Copper / Aluminum	Copper / Aluminum	Copper / Aluminum
Face Area (ft ²)	11.4	11.4	11.4
Rows	2	2	2
Fins Per Inch	17	17	17
COMPRESSOR			
Refrigerant	R410A	R410A	R410A
Quantity	1	1	1
Type	Scroll	Scroll	Scroll
RLA ^[2] (A)	21.4 / 23.9	14.5 / 16.1	6.3 / 7.1
LRA ^[3] (A)	135.0	98.0	55.0
ELECTRICAL DATA			
V / Ph / Hz	220 / 1 / 60	220 / 3 / 60	440 / 3 / 60
Operating Current (A)	30.5	22.5	11.0
Minimum Circuit Ampacity (A)	36.5	26.5	12.5
Max. Overload Protection (A)	60.5	42.5	20.0
DIMENSIONS [L x H x W] (mm)	1450 x 830 x 760	1450 x 830 x 760	1450 x 830 x 760
NET WEIGHT (kg)	148	148	148
GROSS WEIGHT (kg)	150	150	150

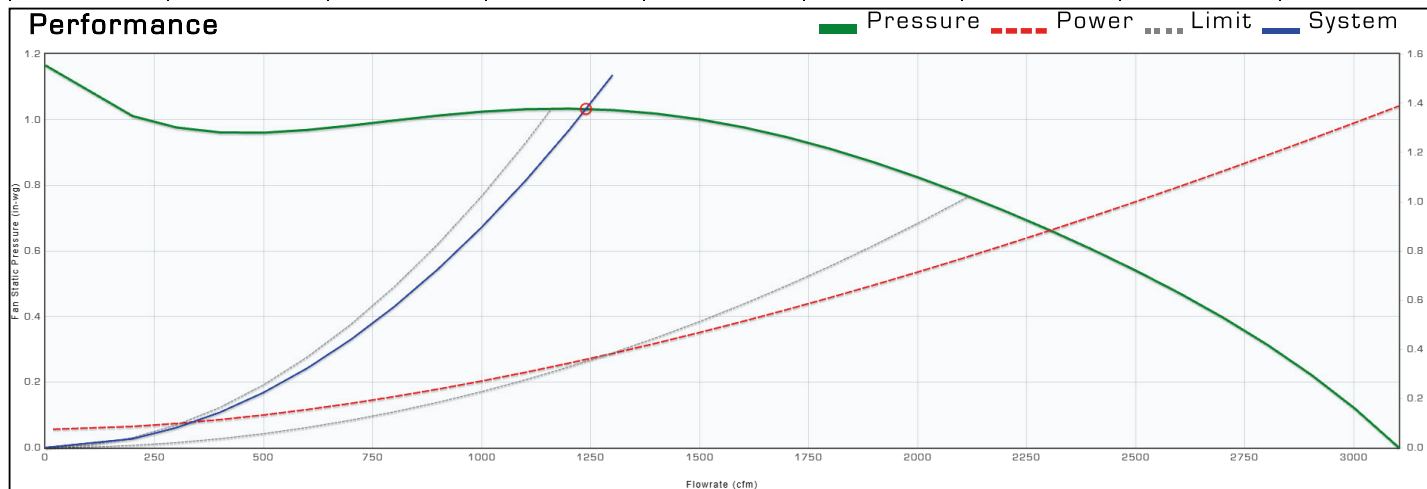
Notes: ¹ Data corresponding to a specific condition. ² This Rated Load Amperage (RLA) value corresponds to a single compressor. ³ This Locked Rotor Amperage (LRA) value corresponds to a single compressor. ⁴ The information provided in the table is subject to change without prior notice. The unit color may change without prior notice. Packaged unit designed for use with R-410A.

MODELO	EP410A-060-TD-1	EP410A-060-TD-3	EP410A-060-TD-4
GENERAL DATA			
Cooling capacity ^[1] (BTU/h)	60,000	60,000	60,000
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)	3.9	4.1	4.1
Rows	4	4	4
Fins Per Inch	13	13	13
CONDENSER FAN			
Number of Fans	1	1	1
Type	Axial	Axial	Axial
Number of Motors	1	1	1
Current (A)	2.4	2.4	1.0
Power (HP)	1/3	1/3	1/3
RPM	825	825	825
Fan Diameter (in)	22	22	22
CONDENSER COIL			
Type (Tube / Fin)	Copper / Aluminum	Copper / Aluminum	Copper / Aluminum
Face Area (ft ²)	14.3	11.4	11.4
Rows	2	2	2
Fins Per Inch	17	17	17
COMPRESSOR			
Refrigerant	R410A	R410A	R410A
Quantity	1	1	1
Type	Scroll	Scroll	Scroll
RLA ^[2] (A)	21.2 / 23.6	16.7 / 18.6	7.8 / 8.6
LRA ^[3] (A)	138.0	136.8	52.0
ELECTRICAL DATA			
V / Ph / Hz	220 / 1 / 60	220 / 3 / 60	440 / 3 / 60
Operating Current (A)	31.0	26.0	13.0
Minimum Circuit Ampacity (A)	37.0	31.0	15.0
Max. Overload Protection (A)	61.0	50.0	24.0
DIMENSIONS [L x H x W] (mm)	750 x 830 x 1450	750 x 830 x 1450	750 x 830 x 1450
NET WEIGHT (kg)	160	160	160
GROSS WEIGHT (kg)	162	162	162

Notes: ¹ Data corresponding to a specific condition. ² This Rated Load Amperage (RLA) value corresponds to a single compressor. ³ This Locked Rotor Amperage (LRA) value corresponds to a single compressor. ⁴ 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-410A.

3 TON

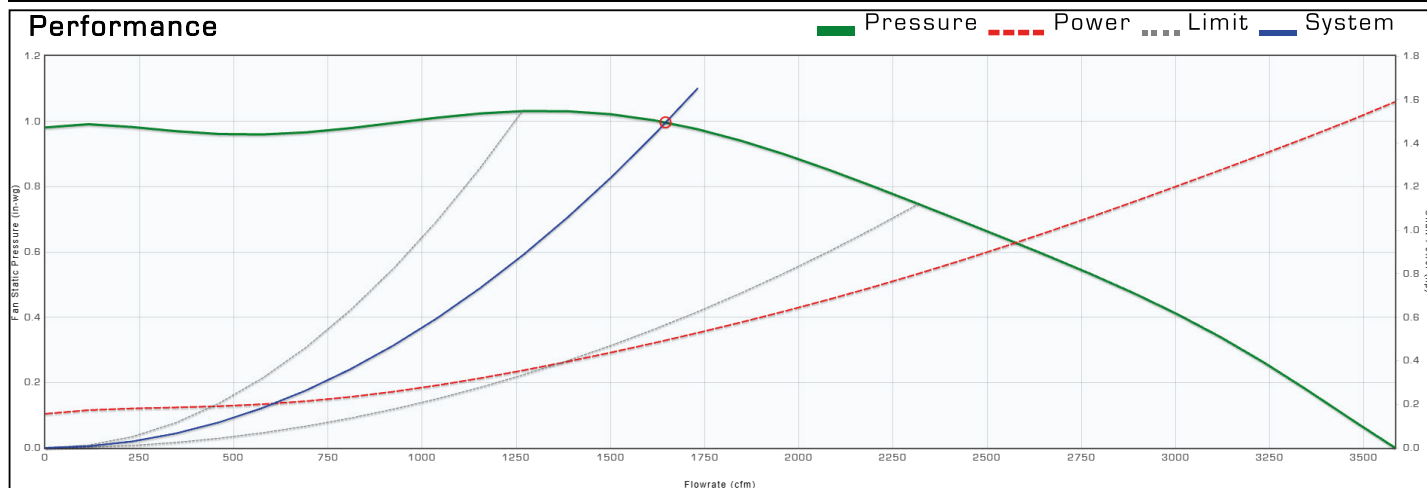
Job Name					Submitted by/notes			
Model	Flow	Pressure	Temperature	Altitude	Density	Q Derate	P Derate	Vav Set Point
DD10-8A	1239 cfm	1.03 in-wg	70 °F	0 ft	0.075 lb/ft³	0 cfm	0.00 in-wg	0.00 in-wg
Fan Tag	Flow	Pressure	Power	Static Efficiency	Total Efficiency	Speed	Outlet Velocity	FEI
	1239 cfm	1.03 in-wg	0.36 hp	56.3 %	64.2 %	1000 rpm	1530 fpm	1.65
	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
	71/87	72/82	69/81	68/76	70/74	66/72	65/68	62/64	78/89	74/80

4 TON

Job Name					Submitted by/notes			
Model	Flow	Pressure	Temperature	Altitude	Density	Q Derate	P Derate	Vav Set Point
DD10-10A	1646 cfm	1.00 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
	1646 cfm	1.00 in-wg	0.49 hp	52.4 %	60.9 %	1000 rpm	1614 fpm	1.53
	Impeller Dia	Outlet Area	Max. Speed	AMCA Class	Drive	Blades	P Volume	TurnDown
	10.0 in	1.02 ft²	2000 rpm	Class I	Direct Drives	48	2.19 ft³	100 %

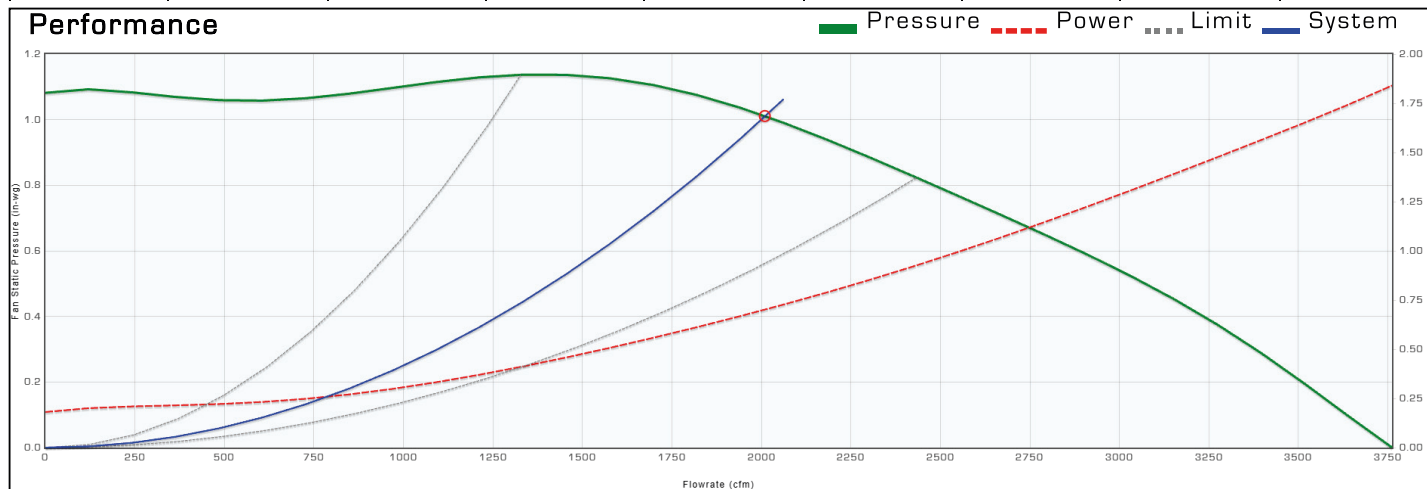


Sound(Lwi/Lwo)	63	125	250	500	1000	2000	4000	8000	Lw	LwA
	71/81	72/76	69/75	68/70	70/68	66/66	65/62	62/58	78/83	74/74

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.

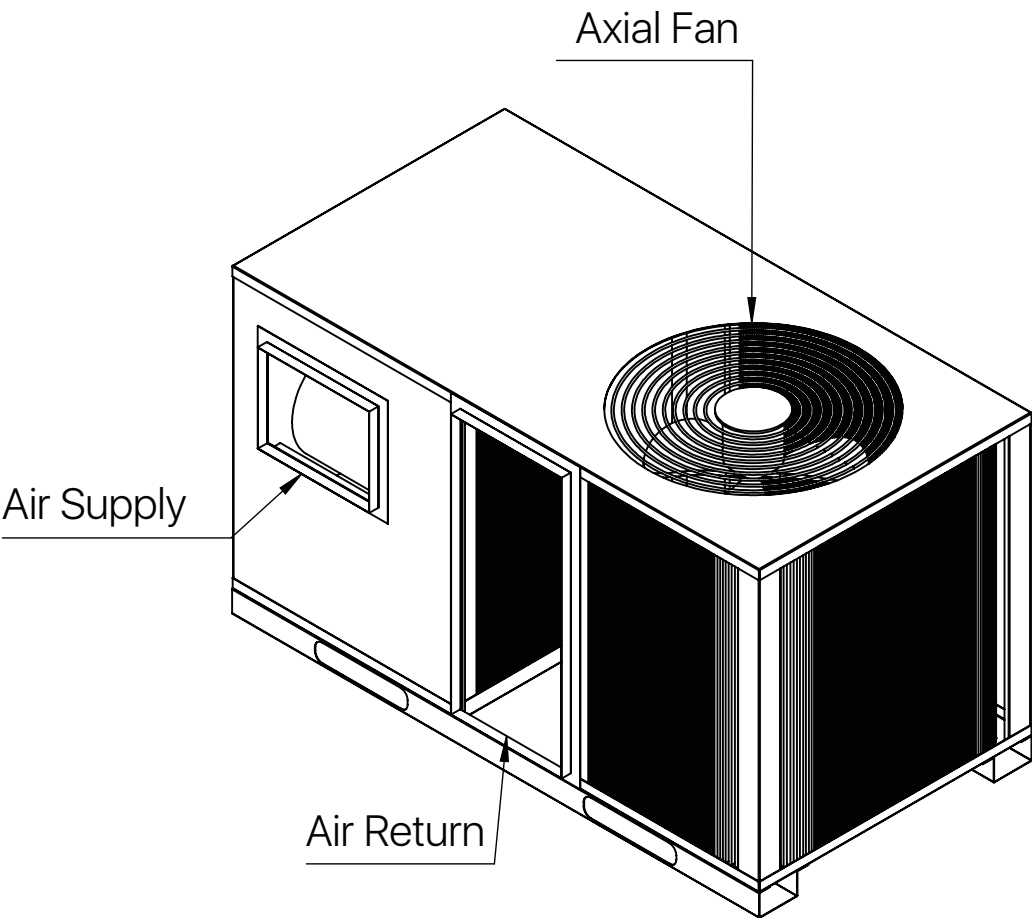
5 TON

Job Name					Submitted by/notes			
Model DD10-10A	Flow 2009 cfm	Pressure 1.01 in-wg	Temperature 70 °F	Altitude 0 ft	Density 0.075 lb/ft ³	Q Derate 0 cfm	P Derate 0.00 in-wg	Vav Set Point 0.00 in-wg
Fan Tag	Flow 2009 cfm	Pressure 1.01 in-wg	Power 0.70 hp	Static Efficiency 45.7 %	Total Efficiency 56.6 %	Speed 1050 rpm	Outlet Velocity 1970 fpm	FEI 1.37
	Impeller Dia 10.0 in	Outlet Area 1.02 ft ²	Max. Speed 2000 rpm	AMCA Class Class I	Drive Direct Drives	Blades 48	P Volume 2.19 ft ³	TurnDown 100 %

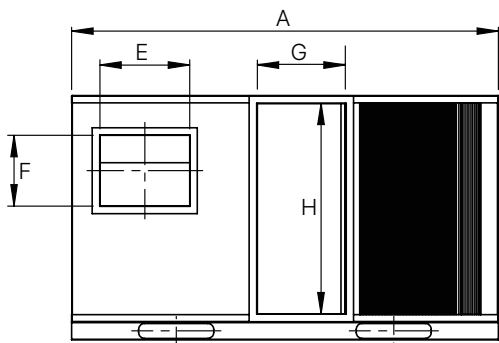


Sound(Lwi/Lwo)	63	125	250	500	1000	2000	4000	8000	Lw	LwA
	74/81	75/78	72/77	71/71	73/69	69/67	68/64	65/59	81/84	77/75

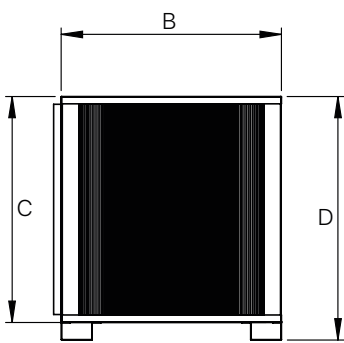
Notes: Airflow performance data is obtained in accordance with AMCA 210-07. Installed performance will vary depending on the extent of the cabinet geometry. Sound data is estimated based on industry experience for the selected product type. The data should be used for comparative purposes only and does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



Front View



Side View



MODEL	A	B	C	D	E	F	G	H
EP410A-036TD-1	1450	750	770	830	265	240	298	716
EP410A-048TD-1	1450	750	770	830	305	240	280	716
EP410A-060TD-1	1450	750	770	830	305	240	280	716

Note: All measurements are in millimeters (mm).

Safety Clearance Distance

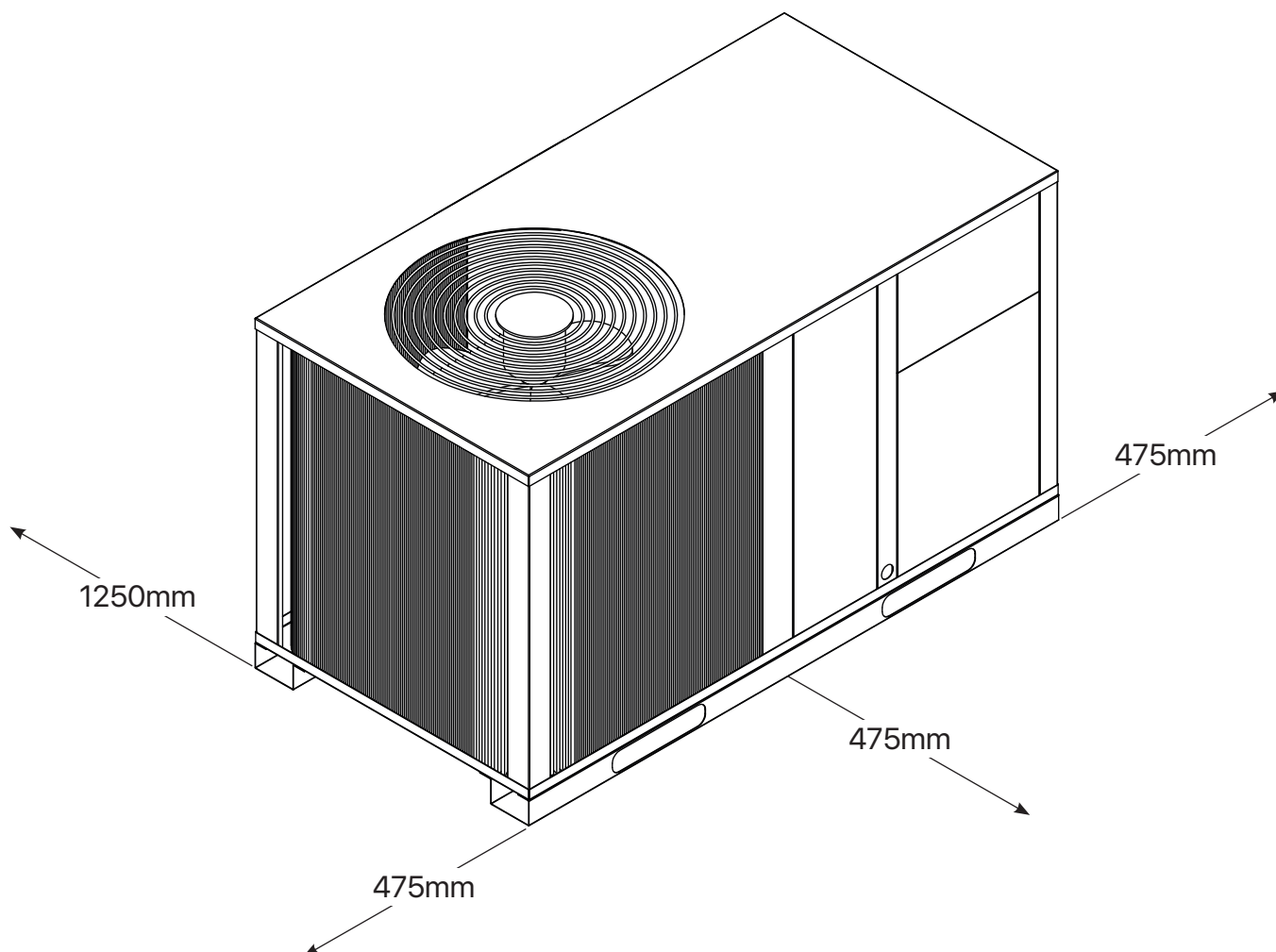
The following are the minimum recommended clearances for ventilation. The installer must consider each application and provide adequate ventilation. Failure to do so may result in improper unit operation.

Reasons for maintaining clearance:

1. Door opening – All hinged access doors require sufficient space to open fully and allow standard maintenance, such as filter replacement.
2. Component removal – In the event of a component failure, such as an energy recovery wheel, lateral clearance will be required to allow full removal from the unit.
3. Condenser airflow – Packaged units dissipate heat through proper airflow across the condenser coil. If airflow is restricted, the unit may not operate properly.

4. Air recirculation – Whether from building exhaust or a gas burner flue, a minimum distance is required to prevent these unwanted air streams from approaching the outdoor air intake.
5. Applicable codes – Whether electrical or otherwise, many municipalities require minimum clearances around electrical or motor-driven equipment.

The following minimum clearances must be observed for proper unit performance and serviceability. It is very important that air outlets are not combined into the same duct before a minimum distance of 1.5 meters, and preferably 2 meters.





DANGER



Improper mounting, lifting, or relocation of a unit may result in equipment damage, property damage, serious personal injury, or even death. Refer to the certified dimensioned drawings included in the project documentation for unit weights and center of gravity information.



WARNING

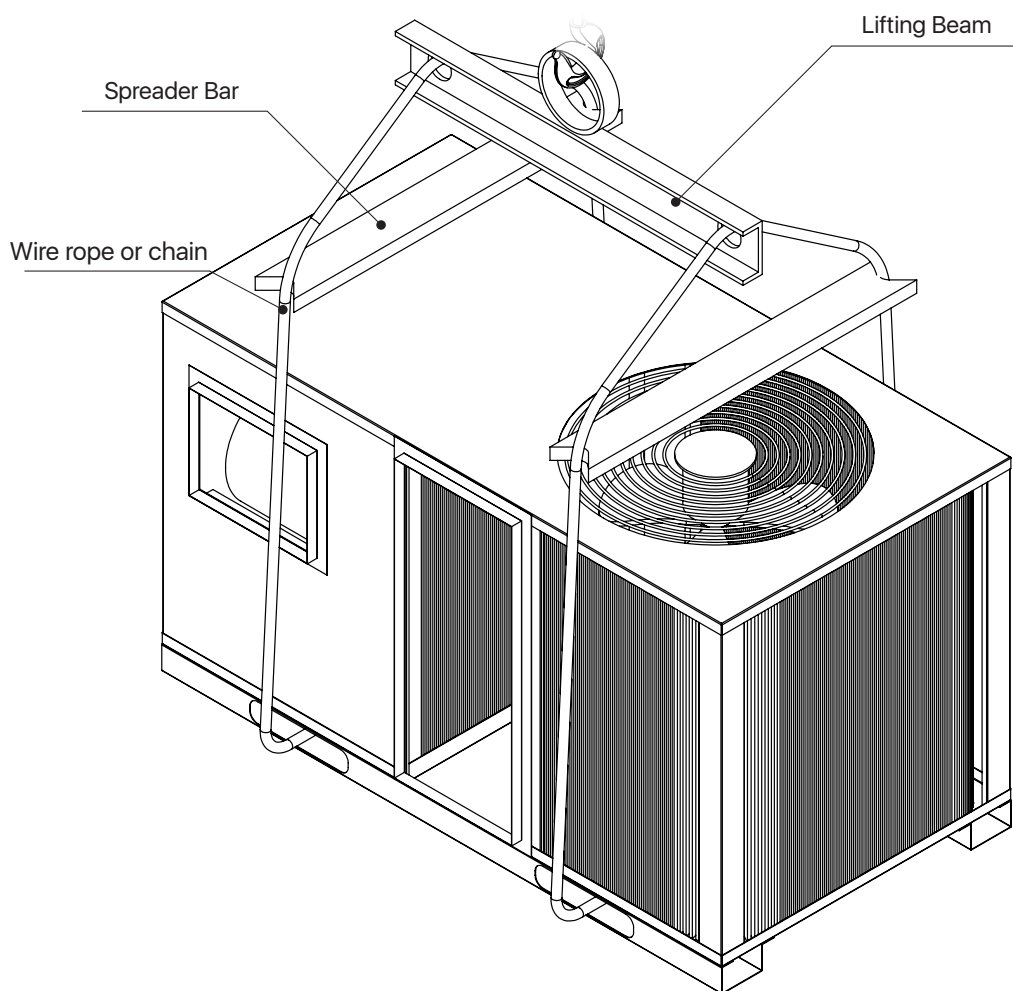


The lifting angle shall not exceed 30 degrees from the vertical, as the unit may become unstable, which could result in equipment damage, property damage, serious personal injury, or even death.

The equipment is designed to withstand the loads associated with lifting and handling operations in accordance with ASME P30.1 – Planning for Load Handling Activities, or its

equivalent. Lifting instructions are intended for the installation of newly delivered equipment. If a previously installed unit is to be moved for relocation or disposal, the condition of the equipment must be evaluated. Additionally, the unit must be properly drained, as the weight and center of gravity values do not account for the presence of water during lifting.

Installation shall be performed only by qualified personnel familiar with applicable local codes and regulations, and experienced with this type of equipment. The lifting equipment and rigging methods must be determined by the Lift Director in accordance with the current edition of ASME P30.1, or its equivalent, and must be suitable for the required load capacity. It is the customer's responsibility to consult a certified rigging contractor to properly and safely lift, hoist, and move components and subcomponents as required.



Refrigeration Piping Diagram



WARNING



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



WARNING

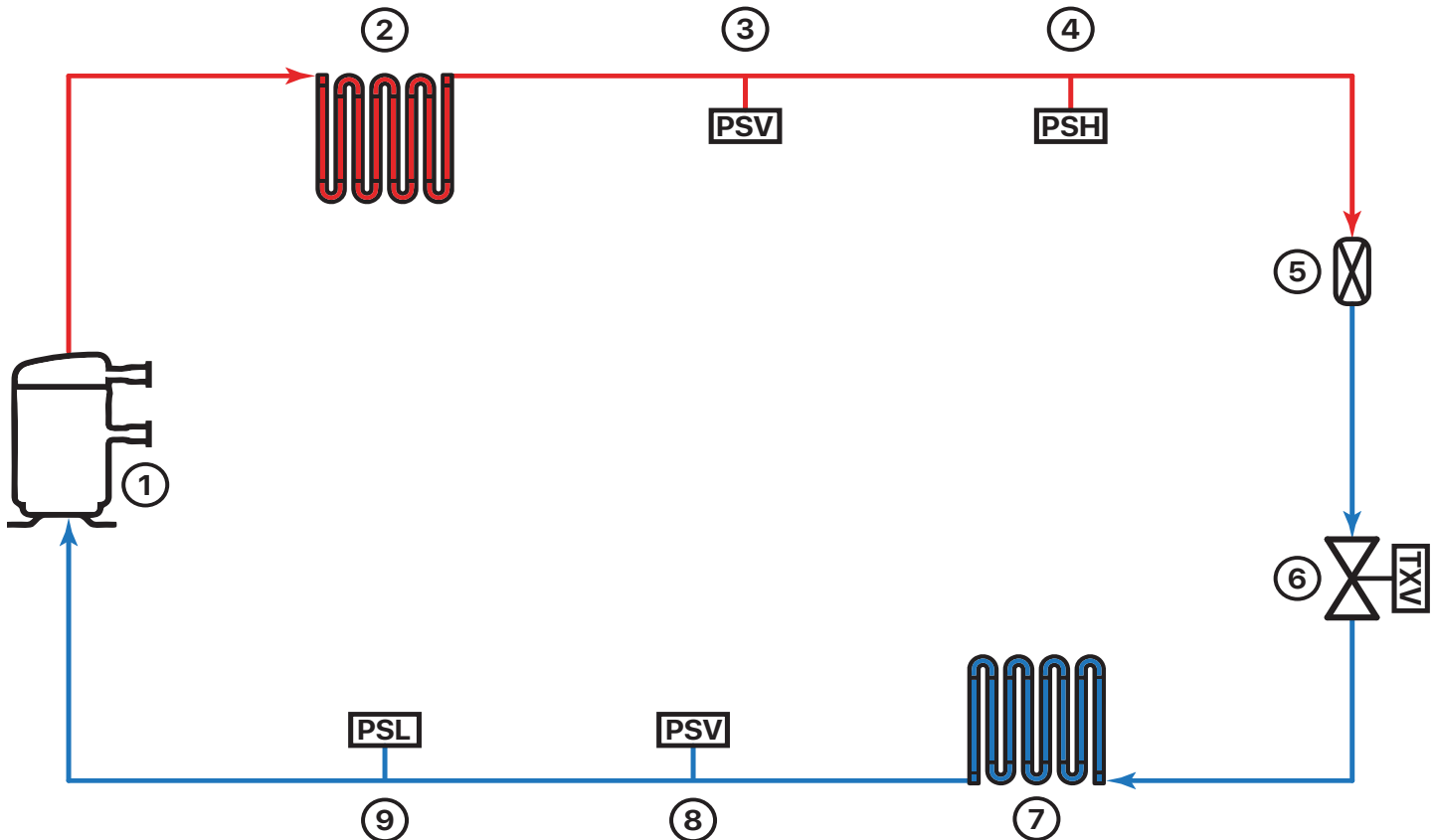


Please note that refrigerants may be odorless.

Some refrigeration and air conditioning units are designed with more than one independent refrigeration circuit. This configuration allows for more efficient operation, increased cooling capacity, and, in some cases, redundancy to ensure service continuity in the event of a failure. Each circuit operates independently and consists of the essential components of the refrigeration cycle.

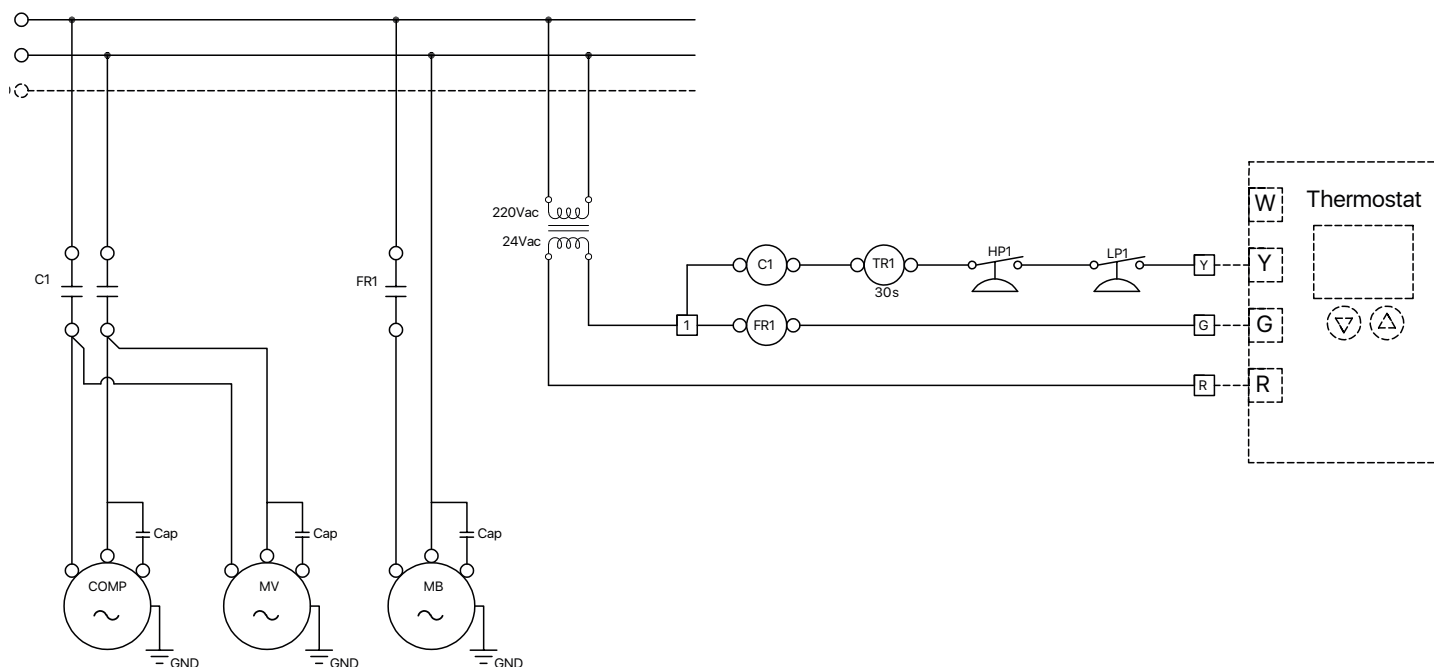
- 1. Scroll Compressor:** Compresses the refrigerant vapor, increasing its pressure and temperature to drive the cycle. It provides high efficiency, low noise levels, and reduced maintenance requirements.
- 2. Condenser Coil and Axial Fan:** The refrigerant rejects heat as it passes through the coil. The fan enhances heat transfer by moving air across the condenser surface.

- 3. Access Valve for Charging and Monitoring:** Facilitates refrigerant charging, pressure monitoring, and system maintenance.
- 4. High Pressure Switch:** Disconnects the compressor if pressure exceeds safe limits, preventing damage due to overpressure.
- 5. Filter Drier:** Removes moisture and impurities from the refrigerant, protecting the system against corrosion and blockages.
- 6. Thermostatic Expansion Valve (TXV):** Regulates refrigerant flow to the evaporator based on return temperature, enabling proper heat absorption.
- 7. Evaporator Coil and Fan:** The refrigerant evaporates while absorbing heat. The fan distributes cooled air into the conditioned space.
- 8. Access Valve for Charging and Monitoring:** Same as above, strategically located to facilitate diagnostics and maintenance.
- 9. Low Pressure Switch:** Stops the compressor in case of low pressure, preventing damage due to refrigerant loss or system restrictions.



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
 MV: Fan Motor
 L: AC Power Supply Line
 FR: Auxiliary Relay
 G: Fan Signal
 Y: Condenser Signal
 W: Dehumidifier Signal (N/A)
 R: 24Vac Common Line
 C: 24Vac Auxiliary Line
 HP: High Pressure Switch

LP: Low Pressure Switch
 TR: Timer
 C1: Contactor
 GND: Ground

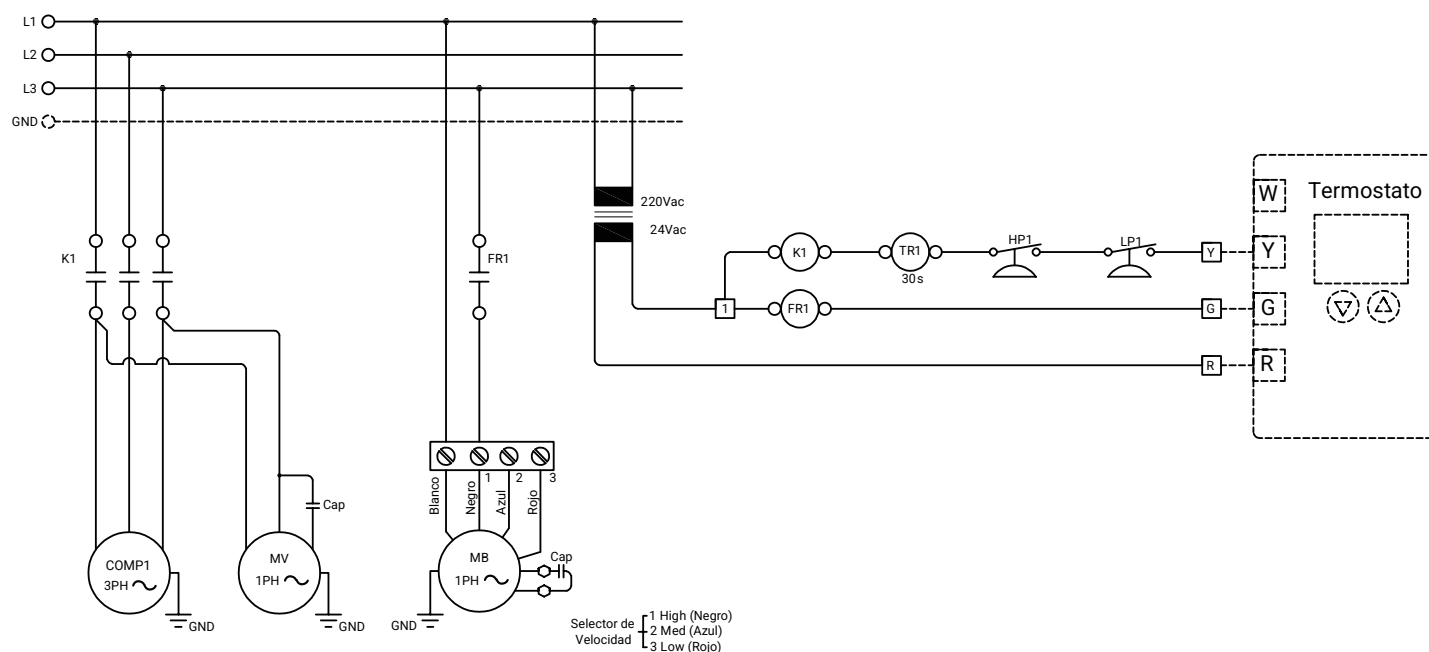
Wiring

Field:
 - - - High Voltage
 - - - Low Voltage

Factory:
 — 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
MV: Fan Motor
L: AC Power Supply Line
FR: Auxiliary Relay
Y: Condenser Signal
W: Dehumidifier Signal (N/A)
R: 24Vac Common Line
C: 24Vac Auxiliary Line
HP: High Pressure Switch

LP: Low Pressure Switch
TR: Timer
C1: Contactor
GND: Ground

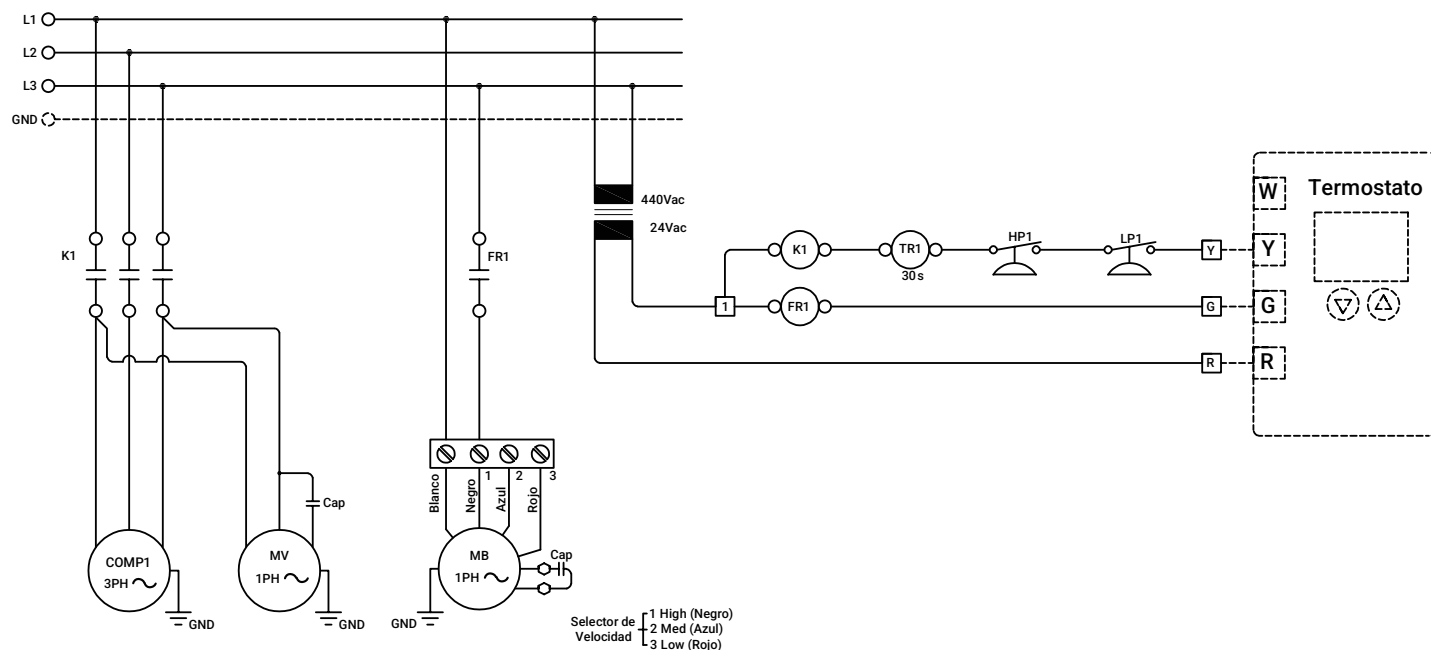
Wiring

Field:
- - - High Voltage
- - - Low Voltage

Factory:
— 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
 MV: Fan Motor
 L: AC Power Supply Line
 FR: Auxiliary Relay
 G: Fan Signal
 Y: Condenser Signal
 W: Dehumidifier Signal (N/A)
 R: 24Vac Common Line
 C: 24Vac Auxiliary Line
 HP: High Pressure Switch

LP: Low Pressure Switch
 TR: Timer
 C1: Contactor
 GND: Ground

Wiring

Field:
 - - - High Voltage
 - - - Low Voltage

Factory:
 — 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 shall be performed by qualified personnel in accordance with applicable local and national codes.
2. Grounding: Follow NEC requirements or applicable local regulations for grounding to ensure safety and protection against faults.
3. Power supply: Verify that the electrical supply complies with the manufacturer's specifications, including voltage stability and adequate current capacity.
4. Safe environment: Select a location away from gases, flammable vapors, or combustible materials that could pose risks during operation or maintenance.
5. Structural support: Ensure the supporting structure is capable of withstanding the total unit weight, including vibration and long-term structural stress.
6. Weight Distribution: Most of the weight is concentrated in the refrigerant condensing section; therefore, the base must be properly reinforced.
7. Drain location: Select 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, efficient drainage, and to prevent operational issues or vibration-related wear.
9. Seismic restraints (if applicable): In seismic zones, secure the unit with anchors or restraint systems compliant with local codes
10. Vibration isolation: Install vibration isolators between the unit and its base to minimize noise transmission and structural vibration.
11. Maintenance clearance: Maintain the minimum recommended clearances for service access, filter replacement, and maintenance operations.
12. External visual inspection: Inspect the exterior — top panel, access panels, and hardware — for shipping or handling damage.
13. Internal inspection: Perform a visual inspection of internal components for bent fins, loose wiring, or misaligned fans.
14. Equipment verification: Confirm that model number, options, and voltage match the unit nameplate to avoid compatibility or warranty issues.
15. Pest protection: Seal cable entries, piping penetrations, and duct openings to prevent the ingress of rodents or insects.
16. Pipe insulation: Insulate refrigerant lines and drain piping to prevent condensation, energy loss, and thermal degradation.
17. Outdoor Electrical Connections: Use weatherproof enclosures and sealants on exterior electrical connections to prevent corrosion or failures.
18. Air discharge separation: For direct-drive units, do not combine discharge outlets into a common duct before a minimum distance of 1.5 meters (2 meters recommended).
19. Unrestricted airflow: Ensure there are no obstructions in the supply and return air paths to maintain proper circulation and temperature control.
20. Duct connections: Use airtight flexible duct connectors to prevent transmission of noise, vibration, or thermal stress.
21. Airflow verification: Confirm proper fan and duct airflow before sealing connections to avoid rework.
22. Labeling and documentation: Label all wiring and piping. Keep wiring diagrams and manuals accessible near the unit.
23. Surge Protection: Install surge protection devices to prevent damage from lightning-induced voltage spikes or electrical fluctuations.

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 connection: Confirm that the grounding connection is reliable and that the conductor is properly connected to the building's grounding system. Never connect the grounding conductor to gas piping, water piping, telephone lines, or other non-dedicated systems, as this may compromise equipment safety.
2. Ensure adequate electrical capacity: Verify that sufficient electrical capacity is available for proper equipment operation. Confirm that the conductor size complies with the specified current consumption indicated in the technical specifications.
3. Provide power from the breaker panel: Connect the electrical supply to the unit from the main breaker panel. Ensure that the circuit breaker rating is adequate to protect the equipment and prevent overload or internal component damage.
4. Connect power supply lines: Connect the supply conductors to the corresponding terminals. For single-phase units, use terminals labeled L1 and L2. For three-phase units, ensure that phases L1, L2, and L3 are correctly connected within the electrical panel.
5. Tighten all electrical terminals: During transportation or over time, terminals may loosen. Retighten all terminal screws to prevent arcing or electrical faults.
6. Inspect for visible damage or debris: Examine the unit for physical damage, loose panels, or foreign objects inside the cabinet before energizing. Remove any obstruction that may interfere with moving parts or airflow.
7. Inspect drain lines: Ensure that the condensate drain line is free of obstructions and properly routed to prevent overflow or water damage to the unit or building.
8. Connect control wiring: From the unit, connect the control conductors (R, G, Y, and O*, if applicable) as indicated in the electrical panel to the corresponding thermostat terminals to ensure proper system control.
9. Verify all electrical connections: Confirm that all electrical connections are properly made and secured in accordance with the wiring diagrams supplied with the equipment to ensure safe and reliable operation.
10. Verify fan rotation (three-phase units): For three-phase equipment, confirm that the fan or blower motor rotates in the correct direction. If incorrect, interchange any two phases (e.g., L1 and L2) to correct rotation.
11. Inspect air filters and ductwork prior to start-up: Ensure filters are clean and properly installed. Inspect ductwork for blockages, leaks, or disconnections that could affect airflow and system efficiency.
12. Energize the unit: After completing all connections, switch on the field-installed disconnects or breakers to energize the unit. Verify correct connections before proceeding.
13. Verify refrigerant levels: Before operating the unit, confirm that refrigerant levels are within the manufacturer's recommended range. Low refrigerant levels may affect performance, efficiency, and compressor reliability. If levels are incorrect, contact a certified technician.
14. Measure voltage and current at start-up: After energizing, measure supply voltage and operating current to confirm they are within acceptable limits according to the unit nameplate. This helps identify issues such as undervoltage or overcurrent conditions.
15. Test system operation: Once all connections are verified and the unit is energized, test system operation. Set the thermostat to the desired temperature and confirm that the unit cools properly without unusual noise or vibration.
16. Operate unit under observation: Allow the system to operate for at least 15–20 minutes while monitoring pressures, temperatures, and overall performance to detect any early signs of malfunction.
17. Thermostat adjustment: System operation is controlled by the indoor thermostat. Ensure it is set to the desired temperature to maintain indoor comfort conditions.
18. Program thermostat (if applicable): If a programmable thermostat is used, ensure it is properly configured with operating 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 Power Supply Inspection:** Periodically check the unit's power supply to ensure proper operation. Monitor the current of the main components according to the equipment's nameplate.
2. **Tighten Electrical Connections:** Inspect and tighten all terminals and electrical connections to prevent arcing, voltage drops, or overheating due to loose or corroded connections.
3. **Inspection and Testing of Capacitors and Contactors:** Check capacitors for bulging or leakage and test contactors to ensure proper operation. Faulty components may cause start-up failures.
4. **Inspection of Safety Controls and Sensors:** Test the operation of safety switches, pressure sensors, and other automatic shutdown systems to ensure proper functioning under emergency or overload conditions.
5. **Operating Pressure Inspection:** Periodically check the system's operating pressures (high and low). Make sure they do not exceed the established ranges for normal operation.
6. **Drain Line Inspection:** Ensure that the unit's drain line is free of blockages 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 manufacturer recommendations to prevent overheating or failures.
8. **Air filter cleaning:** Clean the air filter to prevent airflow restriction, which may reduce unit efficiency and shorten its service life.
9. **Evaporator coil inspection:** Verify the condition of the evaporator coil to ensure it is free of obstructions, allowing unrestricted airflow and proper 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. Be careful not to damage the fins.
11. **Inspection of Refrigerant Line Insulation Wear:** Check whether refrigerant line insulation is deteriorated, which may cause energy loss or reduced cooling performance.
12. **Blower inspection:** Regularly inspect the blower to prevent dirt accumulation or friction between the blades, which could negatively impact system performance.
13. **Avoid Debris Accumulation:** Do not allow debris to accumulate around or on top of the unit, as this may reduce cooling capacity.
14. **Check for Unusual Noises or Vibrations:** Listen for abnormal noises (knocking, humming, squealing) that may indicate loose components or imminent failures.
15. **Controller Calibration:** Periodically check and calibrate the controller to ensure accuracy in water return temperature and achieve optimal comfort.
16. **Exhaust Air Grille Cleaning:** Remove dust and debris from the exhaust air grilles or replace them if damaged.
17. **System Shutdown and Restart Test:** Verify that the system shuts down and restarts correctly after a power outage, sensor activation, or controller adjustment.
18. **Annual comprehensive maintenance:** After one year of operation, perform a complete maintenance inspection of the unit, including verification of the motor, bearings, and shaft condition.



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