

Copeland reciprocating condensing unit

*Reliable reciprocating compressor technology.
Ideal for QSR small cold room & food service applications.*





Sustainable and Innovative HVACR solutions for a greener future.

To achieve the goals of the Paris Agreement, countries and companies worldwide must have their greenhouse gas emissions by 2030 and reach net zero emissions by 2050. Fulfilling these decarbonization objectives requires innovative solutions, collaboration and commitment from all stakeholders. Sustainable infrastructure characterized by their superior energy efficiency and use of environmentally friendly refrigerants contribute to

decarbonization efforts by maximizing efficiency the air conditioning and heating requirements of green buildings.

Copeland solution packages enables best-in-class sustainable solutions to solve the toughest heating and air conditioning challenges in an evolving HVAC industry. We help customers determine what upcoming changes mean for their business while helping them prepare for tomorrow's challenges today.



Commercial Refrigeration

Copeland compressors and condensing unit help ensure food quality and safety is maintained, helping minimize wastage while maximizing profits.



Industrial Refrigeration

With over 150 years of refrigeration experience, Vilter compressors and units provide superior reliability with lowest life-cycle costs and are optimized for process cooling applications.



Cargo Tracking & Monitoring

Data loggers and trackers help monitor temperature and humidity of perishable goods in transit. The increased visibility help ensure shipments arrive safely and fresh at their destination.



Food Temperature Mgmt. & Monitoring

Cooper-Atkins monitoring solutions for food service industry help ensure proper food temperature are maintained and safety standards are kept.

	Page
Safety Information	4
Nomenclature & Scope of Supply	7
Features & Benefits	8
Technical Data	12
Installation	14
Start-up and Operations	17
Refrigerant Charging	19
Condensing Unit Maintenance	20
Application Tips	21
Electrical Tips	21
System Troubleshooting Guide	22
External Chassis Dimension	23
Piping and Instrument Diagram (P&ID)	25
Wiring Diagrams	30
Pressure - Temperature Chart	34

Disclaimer







Thank you for purchasing the Copeland Recip Condensing Unit. We hope that this product meets your refrigeration needs. Please read through this operation manual to familiarize yourself with the installation, commissioning and operation of this product. Please do read the following information in this page before proceeding with the rest of the manual.

The Recip Condensing Unit should only be installed by suitably qualified and experienced refrigeration technicians. No responsibility can be accepted for damage caused by inexperienced or inadequately trained site technicians or improper system design. All instructions and procedures described in this manual are based on good refrigeration trade practices as applicable to this product. The installation contractor may prefer to use variations to these recommendations. However, the methods described in this manual represent the minimum requirements to avoid any subsequent warranty claims for this equipment and its components. These instructions do not cover the fundamentals of good electrical or refrigeration practice and are therefore intended for use only by qualified and/or experienced personnel or technicians.

Please consult your local sales office, quoting unit model and serial number as shown on the nameplate. In case of ambiguity, the wiring diagram supplied with each unit takes precedence over the diagram in this manual.

1. Safety Information

- 1.1 Installation and commissioning work on Recip Condensing Unit shall be carried out only by qualified, accredited refrigeration personnel who have been trained and instructed.
- 1.2 Recip Condensing Unit is manufactured according to the latest safety standards. Emphasis has been placed on the user's safety. For relevant standards please refer to the manufacturer's declaration, available on request. These instructions should be retained throughout the lifetime of the unit. You are strongly advised to follow these safety instructions.
- 1.3 Icon Explanation

 WARNING This icon indicates instructions to avoid personal injury and material damage.	 CAUTION This icon indicates instructions to avoid property damage and possible personal injury.
 HIGH VOLTAGE This icon indicates operations with a danger of electric shock.	 IMPORTANT This icon indicates instructions to avoid malfunctions of the compressor.
 DANGER OF BURNING OR FROSTBITE This icon indicates operations with a danger of burning or frostbite.	NOTE This word indicates a recommendation for easier operation.
 EXPLOSION HAZARD This icon indicates operations with a danger of explosion	

1.4 Safety Statement

- a. Only qualified and authorized refrigeration personnel are permitted to install, commission and maintain this equipment
- b. Electrical connections must be made by qualified electrical personnel.
- c. All valid standards for connecting electrical and refrigeration equipment must be observed.
- d. The national legislation and regulations regarding personnel protection must be observed.



Use personal safety equipment. Safety goggles, gloves, protective clothing, safety boots and hard hats should be worn where necessary.

2. General Instructions



WARNING

System Breakdown! Personal Injuries! Never install a system in the field and **leave it unattended when it has no charge, a holding charge or with service valve closed without electrically locking out the system.**

Only approved refrigerants and refrigeration oils must be used.



WARNING

High shell temperature! Burning!

Do not touch the compressor until it has cooled down. Ensure that other material in the area, do not touch it. Lock and mark accessible sections



CAUTION

Overheating! Bearing damage!

Do not operate compressors without refrigerant charge without being connected to the system



CAUTION

Compressor contain oil & refrigerant under pressure.

Release pressure from both high & low side of compressor before servicing



CAUTION

Tube brazing & compressor operation can product hot surfaces. To avoid burns, allow surfaces to cool

2.1 Receiving your unit

All units are shipped with a holding charge of dry nitrogen inside at a low but positive pressure. It is very important to check that this holding pressure exists at the time you receive each unit from us or our authorized representatives. Please inform us or our authorized representative if the holding charge is non-existent. Failure to do so could void the claim for other related system faults at a later period

Transit damage is essentially an insurance claim and is not covered under manufacturing defect. It is also advisable to inspect the unit for obvious physical damage and inform us or our authorized representative in case any is discovered.

2.2 Condensing Unit (CDU) Handling

Transport, Handling and Storage:

- During transportation & storage, always keep the unit in vertical/upright position.
- Always move the CDU with boxes or pallet tightened properly with strapping tape. Because it may cause transit damage.
- Do not stack single boxes on top of each other without pallet in any case.
- Always move the units in fully closed container/vehicle to avoid from rain.
- Handle the unit with care. The packaging allows the use of a forklift or pallet jack for handling. Use appropriate and safe handling equipment.
- It is recommended not to open the packaging before the unit is at final place for installation.



Copeland is a new standalone company serving the global HVACR market, enhancing opportunities to support our customers as a focused company.



Condensing Unit Nomenclature

EAC - SE 015 AE - PFZ Q XXX

Family name

Code	Definition
EAC	E Series Air-cooled Condensing unit

Standard Model

POE Oil

Voltage Table A

Housing Table B

BOM Table C

Nominal horsepower

Code	Horsepower
015	1.5 HP
020	2 HP
050	5 HP

Compressor platform

Code	Compressor
S	CS platform
M	KCM platform
F	CF platform

Application

Code	Definition
E	Medium temp (-6.7°C ET)
L	Low temp. (-31.7°C ET)

Table A: Electrical

Code	Voltage rating
TFM	380V 3φ 50Hz
PFZ	220V 1φ 50Hz
TF5	220V 3φ 60Hz
TF7	380V 3φ 60Hz
PFV	220V 1φ 60Hz

Table B: Housing

Code	Housing type
A	Flat metal base
Q	Metal housing without door
R	Metal housing with door

Table C: BOM table

Number	Parts	Medium Temp Units BOM				Low Temp Unit			
		621	633	622	632	635	636	637	638
		TFM	PFZ	TFM	PFZ	PFZ	TFM	TFM	TFM
1	LP	Adj	Adj	Adj	Adj	Adj	Adj	Adj	Adj
2	Compressor	3 Phase Rotalock	1 Phase Rotalock	3 Phase Stub Tube	1 Phase Stub Tube	1 Phase Stub Tube	3 Phase Stub Tube	3 Phase Stub Tube	3 Phase Rotalock
3	HP	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Adj
4	Oil Separator	✓	✓	x	x	x	x	x	✓
5	Receiver (SANS Approved)	✓	✓	✓	✓	✓	✓	✓	✓
6	Filter Drier	✓	✓	✓	✓	✓	✓	✓	✓
7	Sight Glass	✓	✓	✓	✓	✓	✓	✓	✓
8	Service Valves	✓	✓	✓	✓	✓	✓	✓	✓
9	Terminal Rail	✓	✓	✓	✓	✓	✓	✓	✓
10	Crank Case Heater	✓	✓	✓	✓	✓	✓	✓	✓
11	Circuit Breaker	✓	✓	✓	✓	✓	✓	✓	✓
12	Contactors	✓	✓	✓	✓	✓	✓	✓	✓



Copeland EAC Reciprocating Condensing Unit

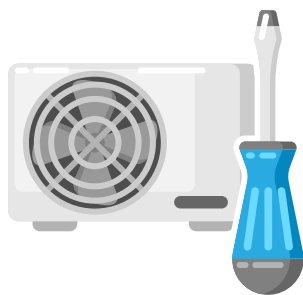
Quality condensing units

EAC Condensing Unit available in a compact & durable chassis with both medium temperature & low temperature applications



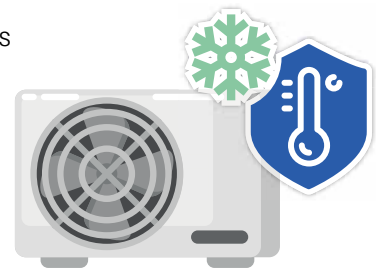
Ready for installation

Factory installed electrical box with contactor, terminal strip and circuit breaker; just plug in it!



Ease of service

Powder coated chassis for weather protection with service door for easy access



Flexible choice of compressor

CS*K7 for medium temperature application and KCM*LAL for low temp application



Copeland protection

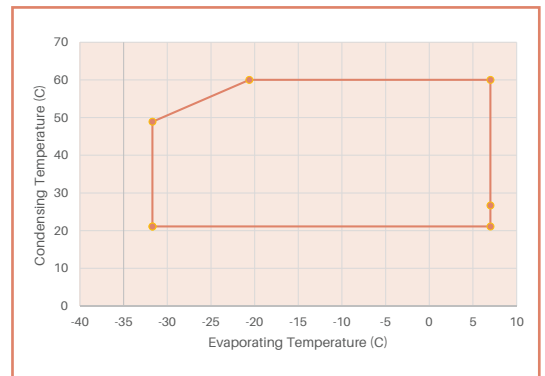
Factory fitted flow controls Filter Dryer, Sight glass, Crankcase Heater, Oil Separator and Receiver.





Medium temperature reciprocating condensing unit

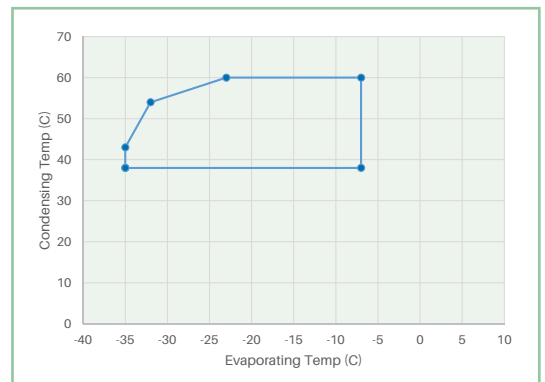
HP	SKU	Compressor	Capacity (kW) ¹	Chassis ²	
1.5	EAC-SE015AE-PFZQ632	CS10K7ME-PFZ	2.7	A1	
	EAC-SE015AE-TFMQ622	CS10K7ME-TFM			
2	EAC-SE020AE-PFZQ632	CS13K7ME-PFZ	3.7		
	EAC-SE020AE-TFMQ622	CS13K7ME-TFM			
2.5	EAC-SE025AE-PFZR633	CS17K7ME-PFZ	4.8		B
	EAC-SE025AE-TFMR621	CS17K7ME-TFM			
3	EAC-SE030AE-PFZR633	CS20K7ME-PFZ	5.4		
	EAC-SE030AE-TFMR621	CS20K7ME-TFM			
4	EAC-SE040AE-TFMR621	CS27K7ME-TFM	7.0		
5	EAC-SE050AE-TFMR621	CS33K7ME-TFM	8.9	C	



1. Capacity condition: Evaporating temp.-10C, Ambient temp 32C, R404A
2. See drawing pages 12-13
3. Rotalock compressor

Low temperature reciprocating condensing unit

HP	SKU	Compressor	Capacity (kW) ¹	Chassis ²
2	EAC-ML020AE-PFZQ635	KCM475LAL-C310H	2	A2
	EAC-ML020AE-TFMQ636	KCM475LAL-E511H	2	
2.5	EAC-ML025AE-TFMR637	KCM512LAL-E511H	3.5	B
3	EAC-ML030AE-TFMR637	KCM515LAL-E511H	4	
3.5	EAC-ML035AE-TFMR638	KCM517LAL-E513H	4.5	C
4	EAC-ML040AE-TFMR638	KCM520LAL-E513H	5	



1. Capacity condition: Evaporating temp.-23C, Ambient temp 32C, R404A
2. See drawing pages 12-13
3. Stub tube compressor

PFZ - 220V 1 ϕ 50 Hz

Model		Type	Medium Temperature			
		Electricals	220~230V/50Hz/1Ph			
		Type	PFZ			
		Horsepower	1.5 HP	2 HP	2.5 HP	3 HP
		Model	EAC-SE015AE-PFZQ632	EAC-SE020AE-PFZQ632	EAC-SE025AE-PFZR633	EAC-SE030AE-PFZR633
Compressor	Model		CS10K7ME-PFZ-13A	CS13K7ME-PFZ-13A	CS17K7ME-PFZ-13A	CS20K7ME-PFZ-13A
	Rated Load Ampere	R404A	7.27	9.65	11.28	12.7
		R22	6.55	8.69	10.17	11.4
	Locked Rotor Ampere	R404A	54	72	85	104
		R22	54	72	85	104
	Oil Type	-	POE	POE	POE	POE
Oil Recharge Volume	Litre	1.27	1.27	1.27	1.27	
Fan Motor	No. of Fans	PCS	1	1	1	1
	Diameter	mm	450	450	500	500
	Speed	RPM	890	890	920	920
	Power per Motor	Watts	65	65	160	160
	Air Flow	Ft ³ / Min.	1560	1560	2637	3082
Other	Crank Case Heater	Watts	40/49	40/49	40/49	40/49
	Receiver Volume	Litre	1.4	1.4	4.3	4.3
Unit Data	Gas Conenction Size	inch	5/8"	5/8"	5/8"	5/8"
	Liquid Connection Size	inch	3/8"	3/8"	3/8"	3/8"
	Dimention in Inch	LxWxH	34.2 x 15.1 x 24.5	34.2 x 15.1 x 24.5	41.1x17.3x31.7	41.1x17.3x31.7
	Weight	Kg	77	79	85	85



TFM - 380V 3 ϕ 50Hz

Model		Type	Medium Temperature			
		Electricals	380~420V/50Hz/3Ph			
		Type	TFM			
		Horsepower	1.5 HP	2 HP	2.5 HP	3 HP
		Model	EAC-SE015AE-TFMQ622	EAC-SE020AE-TFMQ622	EAC-SE025AE-TFMR621	EAC-SE030AE-TFMR621
Compressor	Model		CS10K7ME-TFM-13A	CS13K7ME-TFM-13A	CS17K7ME-TFM-13A	CS20K7ME-TFM-13A
	Rated Load Ampere	R404A	2.64	3.87	4.97	4.97
		R22	2.38	3.49	4.48	4.48
	Locked Rotor Ampere	R404A	20	28	41	45
		R22	20	28	41	45
	Oil Type	-	POE	POE	POE	POE
Oil Recharge Volume	Litre	1.27	1.27	1.27	1.27	
Fan Motor	No. of Fans	PCS	1	1	1	1
	Diameter	mm	500	500	500	500
	Speed	RPM	920	920	920	920
	Power per Motor	Watts	160	160	160	160
	Air Flow	Ft ³ / Min.	3000	3000	2637	3082
Other	Crank Case Heater	Watts	40/49	40/49	40/49	40/49
	Receiver Volume	Litre	4.6	4.6	4.6	4.6
Unit Data	Gas Conenction Size	inch	5/8"	5/8"	5/8"	5/8"
	Liquid Connection Size	inch	3/8"	3/8"	3/8"	3/8"
	Dimention in Inch	LxWxH	41.1 x 17.3x31.7	41.1 x 17.3x31.7	41.1x17.3x31.7	41.1x17.3x31.7
	Weight	Kg	77	79	85	85

Model		Type	Medium Temperature	
		Electricals	380~420V/50Hz/3Ph	
		Type	TFM	
		Horsepower	4 HP	5 HP
		Model	EAC-SE040AE-TFMR621	EAC-SE050AE-TFMR621
Compressor	Model		CS27K7ME-TFM-13A	CS33K7ME-TFM-13A
	Rated Load Ampere	R404A	6.58	7.46
		R22	5.93	6.73
	Locked Rotor Ampere	R404A	61	55
		R22	61	55
	Oil Type	-	POE	POE
Oil Recharge Volume	Litre	1.27	1.27	
Fan Motor	No. of Fans	PCS	1	2
	Diameter	mm	500	500
	Speed	RPM	920	1100
	Power per Motor	Watts	160	106
	Air Flow	Ft ³ / Min.	3000	4000
Other	Crank Case Heater	Watts	70	70
	Receiver Volume	Litre	4.6	5.8
Unit Data	Gas Conenction Size	inch	7/8"	7/8"
	Liquid Connection Size	inch	1/2"	1/2"
	Dimention in Inch	LxWxH	41.1 x 17.3x31.7	42.2 x 17.4 x 46.1
	Weight	Kg	85	140

PFZ - 220V 1ϕ 50 Hz

Model		Type	Low Temperature
		Electricals	220~230V/50Hz/1Ph
		Type	PFZ
		Horsepower	2 HP
		Model	EAC-ML020AE-PFZO635
Compressor	Model		KCM475LAL-C311H
	Rated Load Ampere	R404A	3.5
	Locked Rotor Ampere	R404A	28
	Oil Type	-	POE
	Oil Recharge Volume	Litre	1.27
Fan Motor	No. of Fans	PCS	1
	Diameter	mm	450
	Speed	RPM	900
	Power per Motor	Watts	54
	Air Flow	Ft3 / Min.	1767
Other	Crank Case Heater	Watts	58 @ 220~240V
	Receiver Volume	Litre	1.4
Unit Data	Gas Conenction Size	inch	1/2"
	Liquid Connection Size	inch	3/8"
	Dimention in Inch	LxWxH	33.3 x 13.7 x 23.7
	Weight	Kg	100



TFM - 380V 3 ϕ 50Hz

Model		Type	Low Temperature				
		Electricals	380~420V/50Hz/3Ph				
		Type	TFM				
		Horsepower	2 HP	2.5 HP	3 HP	3.5 HP	4 HP
		Model	EAC-ML020AE-TFMQ636	EAC-ML025AE-TFMR637	EAC-ML030AE-TFMR638	EAC-ML035AE-TFMR638	EAC-ML040AE-TFMR638
Com-pressor	Model		KCM-475LAL-E511H	KCM-512LAL-E511H	KCM-515LAL-E512H	KCM-517LAL-E513H	KCM-520LAL-E513H
	Rated Load Ampere	R404A	9.3	5.8	6.3	10.1	12.6
	Locked Rotor Ampere	R404A	7.3	45	45	61	65
	Oil Type	-	POE	POE	POE	POE	POE
	Oil Recharge Volume	Litre	1.27	1.27	1.27	1.3	1.3
Fan Motor	No. of Fans	PCS	1	1	1	2	2
	Diameter	mm	450	450	450	450	450
	Speed	RPM	900	920	920	1100	1100
	Power per Motor	Watts	54	160	160	106	106
	Air Flow	Ft3 / Min.	1767	2637	2637	4000	4000
Other	Crank Case Heater	Watts	35 @ 240V	40 @ 240V	58 @ 220~240V	40/@480V	40/@480V
	Receiver Volume	Litre	1.4	4.6	4.6	5.8	5.8
Unit Data	Gas Conenction Size	inch	1/2"	5/8"	5/8"	7/8"	7/8"
	Liquid Connection Size	inch	3/8"	3/8"	3/8"	1/2"	1/2"
	Dimention in Inch	LxWxH	33.3 x 13.7 x 23.7	41.1x17.3x31.7	41.1x17.3x31.7	42.2 x 17.4 x 46.1	42.2 x 17.4 x 46.1
	Weight	Kg	100	140	140	170	170

Installation

The condensing unit should be located in such a place to prevent any dirt, plastic bag, leaves or papers from covering the condenser and its fins. The unit must be installed without restricting the airflow. A clogged condenser will increase the condensing temperature, thus reduce the cooling capacity, and lead to a high-pressure switch tripping. Clean the condenser fins on a regular basis.

Before installation

- Check all the LOTO tags, Working Space, operative should have correct tools etc.
- Ensure the units received are the correct models for the intended application.
- Ensure the refrigerant, voltage and gauges are all suitable for the proposed application & unit.
- Check there is no damage to the units.
- Check that the proposed equipment locations are suitable and provide adequate support for the weight of the units.

During installation and subsequent maintenance

- Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations and experienced with these types of equipment.
- If lifting equipment is required, ensure that it is suitable for purpose, certified and that the operative are qualified to use it.
- Ensure safe working methods are identified, and operative have suitable PPE's.
- Ensure the working area has adequate ventilation during brazing procedures.
- Disconnect and shut off power before installation or service of the equipment
- Refrigerant release into the atmosphere is illegal. Proper evacuation, recovery, handling and leak testing procedures must always be observed.
- Units must be earthed, and no maintenance work should be attempted prior to disconnecting the electrical supply.
- The electrical covers and fan guards must always remain fitted.

Note: All Compressors are delivered with sufficient oil for normal operation. The optimum oil level or oil return should be checked by operating the compressor until the system is stable. It is not recommended to top up Oil unnecessary.

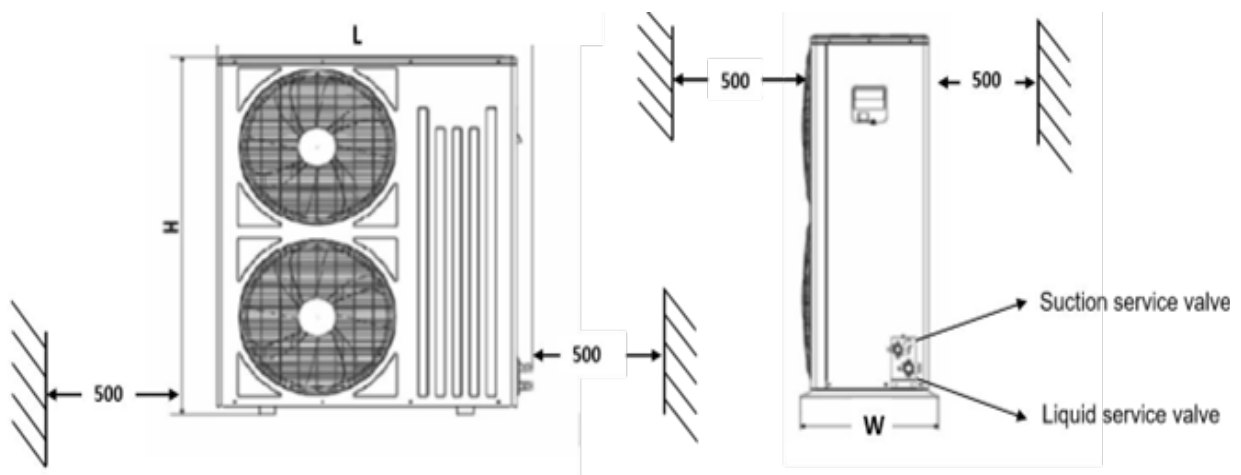
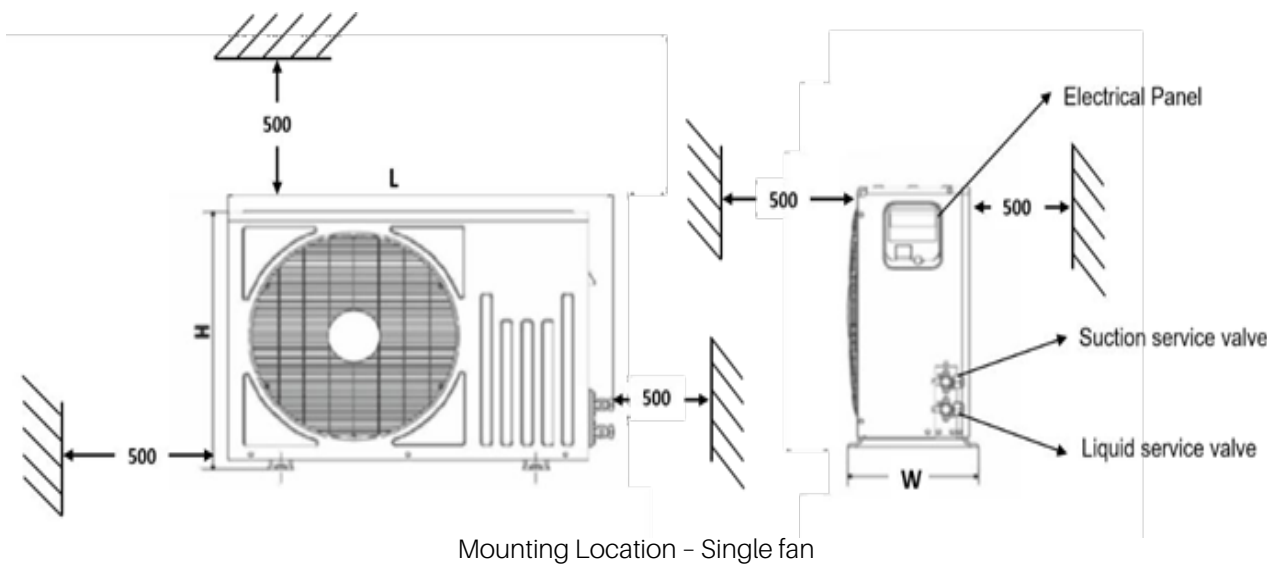
Qualified refrigerants	R404A, R407C, R134a, R22, R507, R407A
Copeland brand products standard oils	Emkarate RL 32 3MAF
Servicing oils	Emkarate RL 32 3MAF Mobil EAL Arctic 22 CC

If required additional charge of oil for top-up or oil change during maintenance or in case of leakage. kindly use our qualified oil as per below table recommended for these Condensing units. Oil Level should not exceed 1/3rd of the Compressor sight glass.

Location and fixing

- The unit should always be installed in a location that ensures clean air flow. Both service access and airflow have been considered in making these recommendations.
- Where multiple units are to be installed in the same location, the contractor needs to consider each individual case carefully.
- Ideally, the unit should be mounted on a solid concrete slab with anti-vibration pads between unit feet and concrete.
- Ensure that there is no obstruction to air flow into or out of the unit. Remove obstacles which block air intake or discharge.
- The location must be well ventilated, so the air can pass properly through condenser by maintaining the proper condensation in the system.

Installation clearance



Note: All dimensions are in mm

Refrigeration piping installation

All interconnecting pipes should be of refrigeration grade, clean, dehydrated and must remain capped at both ends until installation. Even during installation, if the system is left for any reasonable period (say two hours), pipes should be re-capped to prevent moisture and contaminants from entering the system.

Do not assume that the service connection sizes on the unit (at the service valves) are the correct size to run your interconnecting refrigeration pipes. The service valve sizes have been selected for convenience of installation and in some cases (larger units) these may be considered too small. However, for the very short pipe run within our units, these service connection sizes are adequate. All interconnecting pipes should be sized to satisfy the duty required.

The pipe should be sized to ensure optimum performance and good oil return. The sizing must also take into account the full capacity range through which this particular unit will need to operate.

Pipe runs should be kept as short as possible, using the minimum number of directional changes. Use large radius bends and avoid trapping of oil and refrigerant. This is particularly important for the suction line. The suction line should ideally slope gently towards the unit. Recommendation slope is 1/200~1/250. P traps, double risers and reduced pipe diameters may be required for suction lines where long vertical risers cannot be avoided. All pipes should be adequately supported to prevent sagging which can create oil traps.

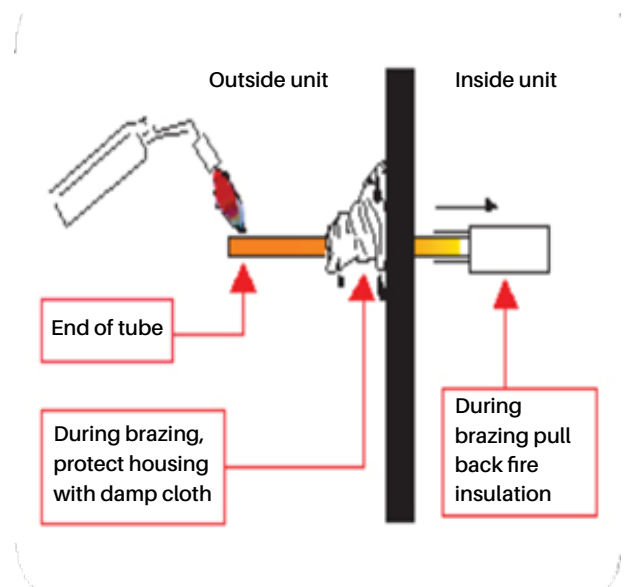
The recommended pipe clamp support distance is shown in the table.

Tube size	Max. distance between 2 clamp support
12.7mm (1/2 inch)	1.20 m
16.0mm (5/8 inch)	1.50 m
22.0mm (7/8 inch)	1.85 m
28.5mm (1 1/8 inch)	2.20 m

Brazing Recommendations

Maintain a flow of oxygen-free nitrogen through the system at a very low-pressure during brazing. Nitrogen displaces the air and prevents the formation of copper oxides in the system. If copper oxidization is allowed to form, the copper oxide material can later be swept through the system and block screens such as those protecting capillary tubes, thermal expansion valves, and accumulator oil return holes. This minimizes any entry of contaminants and moisture.

- Remove the liquid line connection cap.
- Then remove the suction connection cap.
- Open both valves midway. Care should be taken to avoid the holding charge from releasing too quickly.
- Be sure tube fitting inner diameter and tube outer diameter are clean prior to assembly.
- Since both tubes are extended from the condensing unit housing, we recommend insulating the housing by using a wet cloth on the copper tubing.
- Recommended brazing materials: a copper / phosphorous or copper/ phosphorous / silver alloy rod should be used for joining copper to copper whereas to join dissimilar or ferric metals, use a silver alloy rod, either flux coated or with a separate.
- Use a double tip torch



Start up and operation

Leak check

The unit has been leak tested and QA approved from the factory. However, due to handling and shipping the entire refrigeration system must be tested for leaks. Failure to carry out leak test can result to undesirable system performance.

Step-by-step:

1. Open both the liquid and suction service valves.
2. Ensure the solenoid valve is energized and open, if available.
3. Pressurize the system to 300 psig/21 Bar maximum with dry nitrogen.
4. Allow dry nitrogen to reach all parts of the system.
5. Check all joints and components using soap/bubble test or with an electronic leak detector.
6. Wait for atleast an hour to ensure the system is holding the pressure and is found to be leaked-proof, if the system loses any pressure over the course of 30 minutes to 1 hour, then it is a sure indication that the system is leaking.

If leak has been detected somewhere on the system, relief the pressure and repair the leak. For an effective installation, the system must be leak tight.

System evacuation

Evacuating a refrigeration system serves two primary objectives: (1) remove non-condensable and (2) remove water vapor or dehydrate the system.

Air and moisture are detrimental to system operation. The successful long-term operation of the system depends on thoroughly conditioning them before charging with refrigerant and the losses associated with improper evacuation erodes system efficiency as well as costly for the installers.

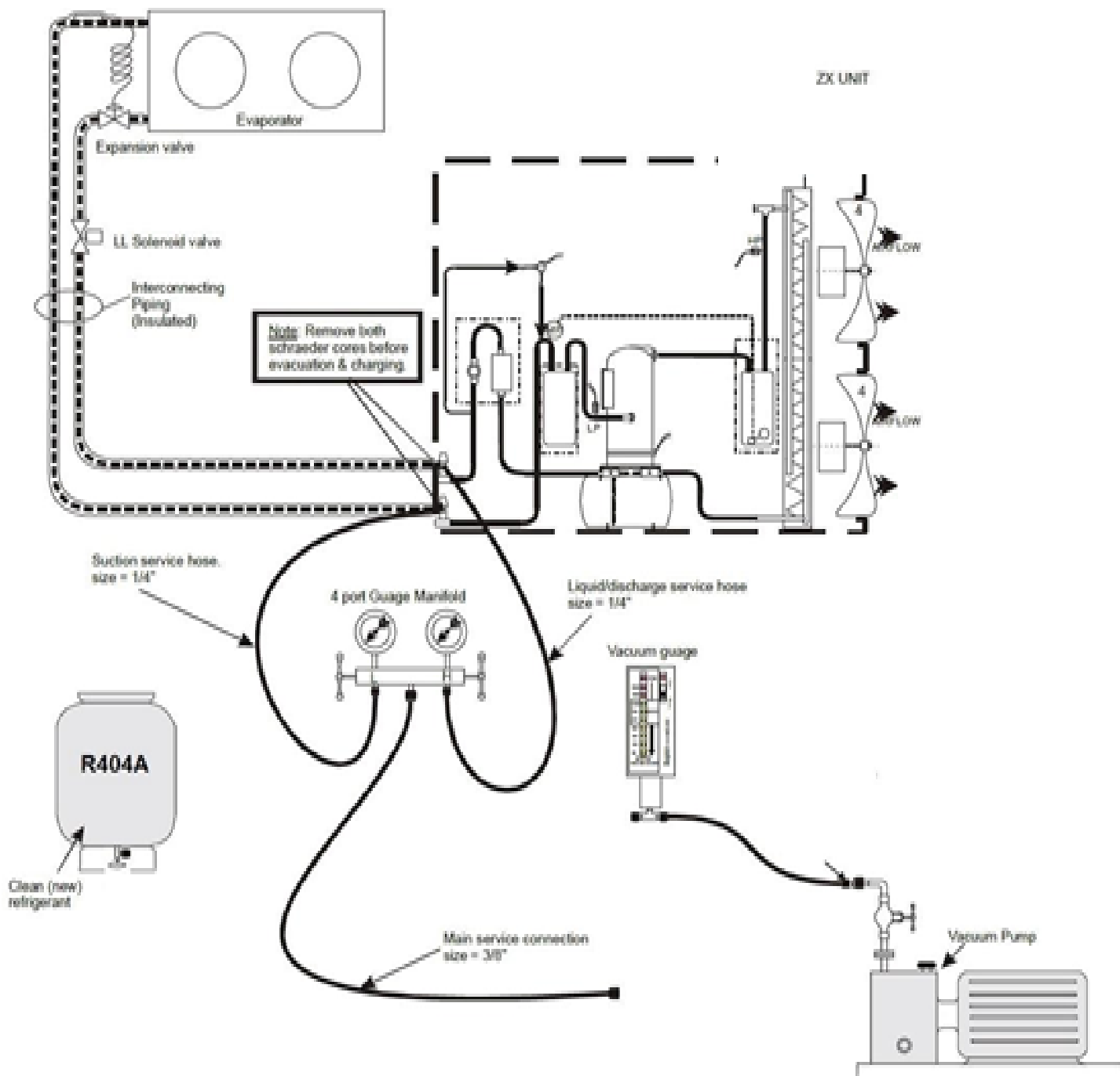
A 2-stage vacuum pump along with a micron gauge is recommended in performing evacuation. The quality of vacuum is not determined by time – a micron gauge must be used since it is the only device that accurately reads the vacuum pressure during the evacuation process.

REMINDER: Do not use the system compressor as a vacuum pump and do not operate the compressor while the system is in vacuum. Emerson Climate Technologies recommends Triple Evacuation Process (best practice) to be implemented on all our installations.

Note: that the following procedure is based upon achieving an actual system vacuum standard and it is **NOT TIME DEPENDENT!**

Step-by-step:

1. Open both the liquid and suction service valves.
2. Ensure the solenoid valve is energized and open, if available.
3. Connect vacuum pump to the liquid and suction service valves.
4. Start the vacuum pump and then open the service valves.
5. Perform triple evacuation process as follows:
 - a. Vacuum until a pressure of 1,500 microns is reached — at which time the vacuum should be broken with the refrigerant to be used in the system through a drier until the system pressure rises to 2 psig
 - b. Repeat this process again
 - c. Evacuate the entire system to 500 microns (minimum recommended). Evacuate the system below 500 microns may enhance the reliability of system.



Refrigerant charging

After ensuring the system is vacuumed properly and all valves are opened, only then start the refrigerant charging process. Below mentioned procedure is applicable for both Scroll & Reciprocating Compressors.

Step-by-step:

1. Ensure that there is no power supply to the CDU unit. The Liquid Line solenoid needs to be kept open for the charging process, if available and this may require a temporary power feed to it.
2. Connect the refrigerant cylinder to main service hose and purge line at the manifold end.
3. Ensure correct orientation of the refrigerant cylinder.
4. Follow cylinder labeling/instructions so that liquid refrigerant can be charged into the high side of the system using high-pressure side of the manifold.
5. The refrigerant cylinder should be weighed at this point to be able to record the final refrigerant charge.
6. Now open the liquid service valve (off the back seat). With a good vacuum in the system, system will in-take 60- 70 % of the refrigerant required in the system without running the compressor.
7. The compressor can then be started, and the unit continued to be charged (with liquid refrigerant through the suction service valve).
8. The quantity of charge should always be measured. See note.
9. The system needs to be operated down to its design evaporating temperature before you can be sure the charge is correct. It is at this point that the normal refrigeration operational checks can be carried out - such as checking the liquid line sight glass for violent bubbles and the operating pressures.

In the event that the system is still short of refrigerant, repeat from step #7 onwards.

Refrigerant charging is said to be complete when the operating temperature of the system has been stable for some time and the liquid line sight glass is clear ensuring Suction & Discharge pressure, Superheat and subcooling.

Note: Do not Charge the refrigerant by measuring the current drawn by compressor.
Never run the compressor before charging some enough amount of refrigerant into the system

CDU maintenance

Condenser fins

- Condenser fins become dirty over time as ambient air is induced to the condenser. Dirty coil surfaces result in high condensing temperatures and poor unit performance. Regular cleaning is recommended with frequency depending on the installation and the surrounding environment. As a general guide, it is advisable to do this at least once every two months.
- Fins should be cleaned with proper cleaning agent. Before washing, a light brush downward (in the direction of the fins) should be brushed to remove heavy deposits.

Compressor

- No corrosion is deposited at compressor body over the period of time.
- Ensure compressor superheat and all system parameters as per designed conditions.

Condenser fan(s) and motor(s)

- An annual inspection of these items is recommended. Fastenings may loosen, bearings may wear, and fans may require cleaning of solid deposits which can cause imbalance.

Regular checks

On a regular basis, check the below check point for their proper operation & to keep the system healthy. Do not operate any mechanical/Electrical maintenance work before switching off the Electrical Supply.

Compressor

- Check the oil level if sight glass is available.
- Current drawn by compressor should be with-in the specified range as mentioned on nameplate.

Routine leak test & visual inspection

- All joints should be checked for leaks during site visits. All joints should be leak tested once-a-year.
- Moisture indicator – check the moisture indicator dial for level of moisture content in system.
- Check HP-LP settings at in place as per recommended values.
- Check all sensors are in place.

Electrical connections

- Check if any loose electrical connection.
- Ensure no chattering in Electrical accessories, connections & safety devices.
- Check that the ampere drawn by CDU or compressor doesn't exceed the value specified on the nameplate.

WARNING: TURN OFF OR DISCONNECT THE ELECTRICAL POWER SOURCE BEFORE CLEANING THE CONDENSER COIL OR DOING MAINTENANCE.

Application tips for compressors (reciprocating)

- Please do Vacuum break with pure liquid refrigerant charge on high side and top-up by liquid bleed in suction.
- Always ensure the LP/HP Setting before starting the compressor.
- Don't use refrigeration compressor for self-evacuation.
- Never use the compressor to suck oil into the system.
- Do not test compressor by closing suction valve or in open air.
- Do not use compressor to pull vacuum from the system.
- After vacuuming, never run the compressor before charged with refrigerant.
- Never use the compressor to suck the oil in to/from the system.
- Do not bypass LP & HP controls.
- Vacuum break with pure liquid refrigerant charge on high side and top-up by liquid bleed in suction.
- To avoid the refrigerant flood back during off- Cycle, kindly use Solenoid valve in liquid line.
- Don't allow short- cycling of compressor.
- If compressor is tripping on safety device, do not assume that compressor is faulty.

Electrical tips

Kindly verify before any Electrical installation if the voltage, frequency, and phase of supply satisfy those required of the unit. Ensure that Operative is following all safety guideline & procedure as mentioned above while performing Electrical Installation.

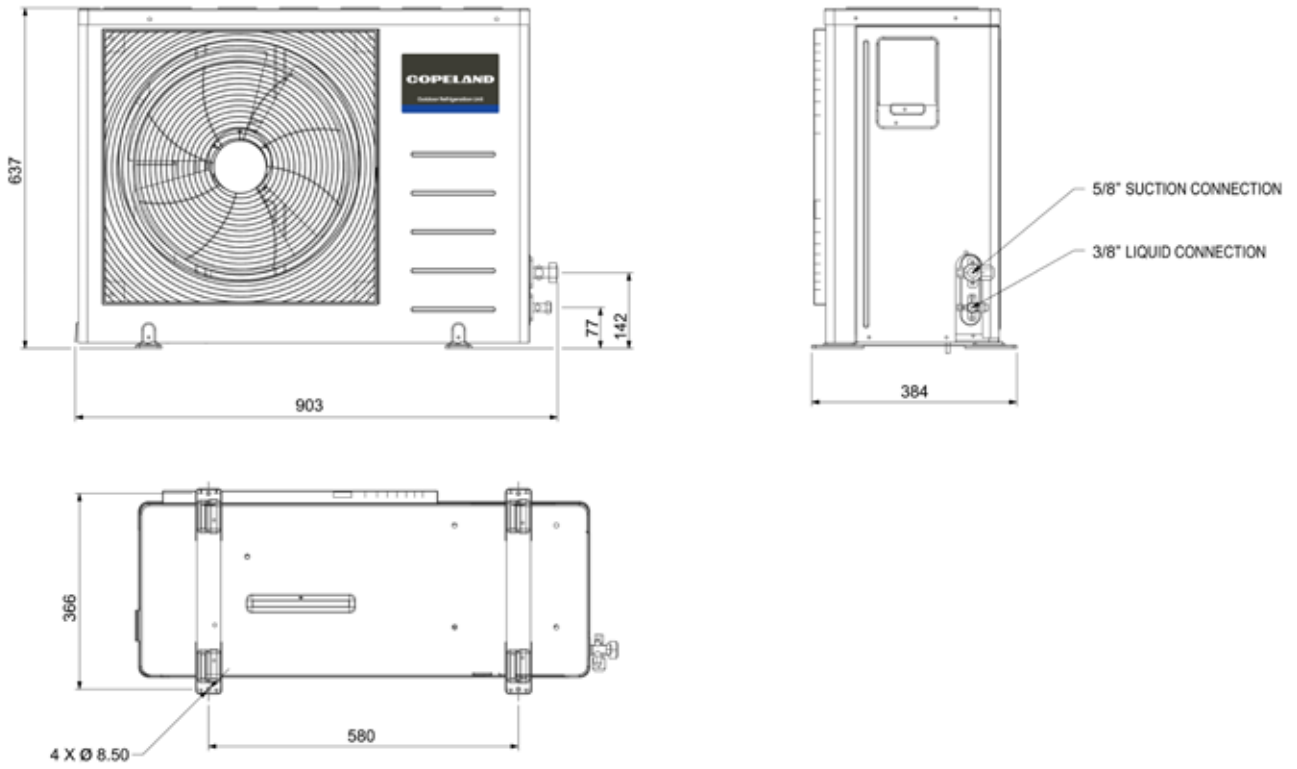
- All wiring should be carefully checked & refer wiring diagram (attached inside of the electrical cabinet) to complete unit control circuit.
- Do not handle high-voltage electrical wiring unless properly trained.
- Check if the Voltage deviation of 10 % is within the specified range mentioned on unit name plate.
- Do not by -pass any electrical safety equipment like MCCB, SPP, Contactor, Overload Relay, timer & other safety devices.
- Use genuine specified electrical accessories for CDU/Compressor model recommended by Company.
- Check the electrical connections if they are properly attached, secured and properly tightened.
- Make sure all panels are secure and panel screws are properly tightened.
- Check that the ampere draw doesn't exceed the amperage specified on the nameplate.
- Check the phase unbalance if there is a three-phase connection.
- In single phase compressor. Check for neutral connection. It is better to connect Common (C) terminal to the neutral supply.
- Check for Earth/ground. Ensure each component is getting proper supply, No indication of Connection point burnt or chattering in Connection and is working as intended.
- Do not bypass the crankcase heater connection and its operation sequence (low ambient/During off cycle) If you do not fully understand how to install your product after reading the manufacturer's instructions, contact our local authorized dealer or technical team for help and do not attempt to install it yourself.

System troubleshooting guide

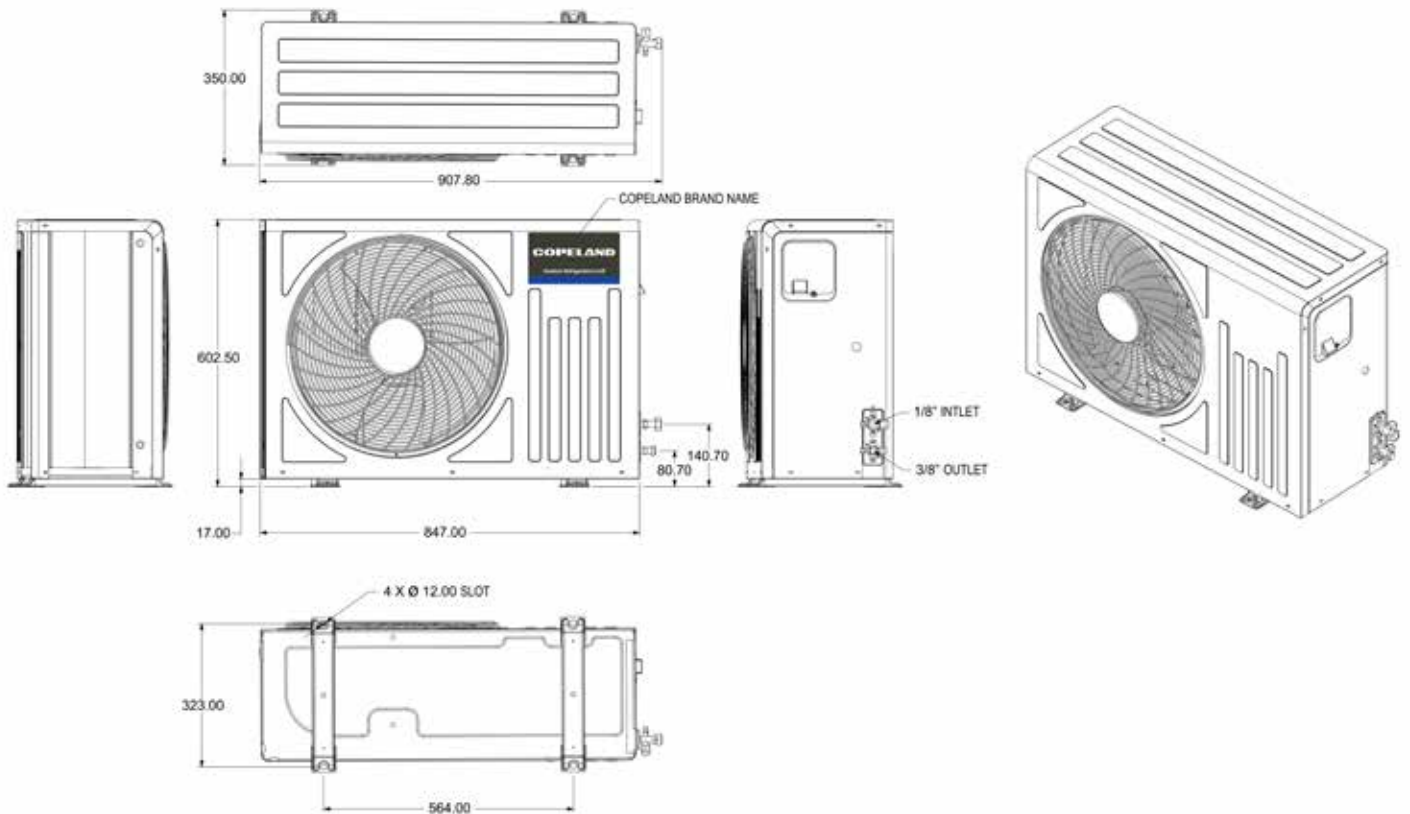
Symptom	Possible Cause	Correction
Unit is not starting	Power disconnected or loose connection	Check voltage at contactor in condensing unit
	Blown fuse / breaker tripped	Replace fuses / reset breaker
	Thermostat out of calibration - set too high	Reset
	Contactor defective	Check & replace if open
	High pressure Switch open (if provided)	Reset - see high pressure correction (high pressure control opens at 450 psig)
Outdoor fan on; Compressor off	Run or start capacitor defective	Replace
	Start relay defective	Replace
	Loose wire & low voltage	Check for correct voltage at compressor - check and tighten all connections
	Compressor stuck, grounded or open motor winding, open internal overload	Wait at least 2 hours for overload to reset; if still open, Check the compressor & replace.
Too little cooling	Improperly sized unit	Recalculate load
	Improper indoor airflow	Check as per desired conditions
	Incorrect refrigerant charge	Charge per procedure in installation manual
	Air, non-condensable or moisture in system	Recover refrigerant, evacuate and recharge, replace filter drier
Compressor operates in short cycles	Incorrect voltage	At compressor terminals, voltage must be +/- 10% of nameplate marking when unit is operating
	Defective overload protector	Replace - check for correct voltage
	Refrigerant undercharge	Add refrigerant
High head pressure; Low suction pressure	Restriction in liquid line, expansion device or filter drier	Remove or replace defective component
	Lack of sufficient indoor airflow	Clean/check filters, registers, or evaporator coil that may cause a restriction.
High head pressure; Normal suction pressure	Dirty outdoor coil	Clean coil
	Refrigerant overcharge	Correct system charge
	Outdoor fan not running	Repair or replace
	Air or non-condensable gas in system	Recover refrigerant, evacuate and recharge
Low head pressure; High suction pressure	Expansion device stuck in open position	Replace expansion device
	Defective compressor valves	Replace compressor
Low suction pressure; Compressor cool; Ice on indoor coil	Low indoor airflow	Increase speed of blower or reduce restriction - replace air filter
	Operating in very low ambient	Add low ambient kit
	Moisture in system	Recover refrigerant - evacuate and recharge - replace filter drier
High suction pressure; Or fluctuating head and suction pressures	Excessive load	Recheck load calculation
	Defective compressor	Replace
	TXV hunting	Check TXV bulb clamp - check air distribution on coil - replace TXV
	Air or non-condensable gas in system	Recover refrigerant, evacuate and recharge
Suction & Discharge pressure balanced	Compressor may loss pumping	Replace
	If cooling achieve, gauges may faulty	Gauges replace
	Compressor may trip on IPRV	Check for high side restriction in the system
Unit /Compressor Draw high Amps	Run or start capacitor defective	Replace
	Start relay defective	Replace
	Loose wire	Check for correct voltage at compressor -
	Low voltage or voltage fluctuation	Check for correct voltage at compressor - check and tighten all connections
	Moisture in the system	Replace filter drier
	Liquid flood back in the compressor	Ensure proper load
	Any contamination/ oil dilute	Check oil quality, replace with new oil & do the commissioning as per procedure
Compressor trip on IOLP	Leakage in the System	Repair
	Compressor Stuck/JAM	Replace
	Compressor getting hot & Motor temperature Shooting - up	Maintain proper suction superheat & check oil level/ return to compressor
	Reverse rotation of compressor	Check voltage & connection of comp. terminal

External chassis dimension

Chassis A1

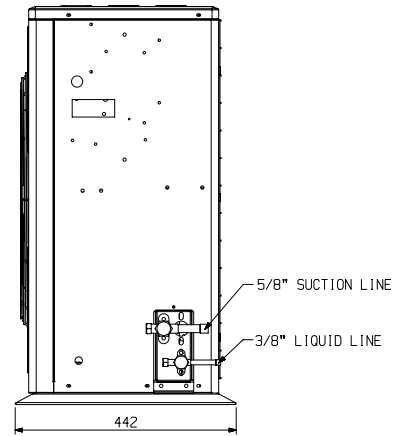
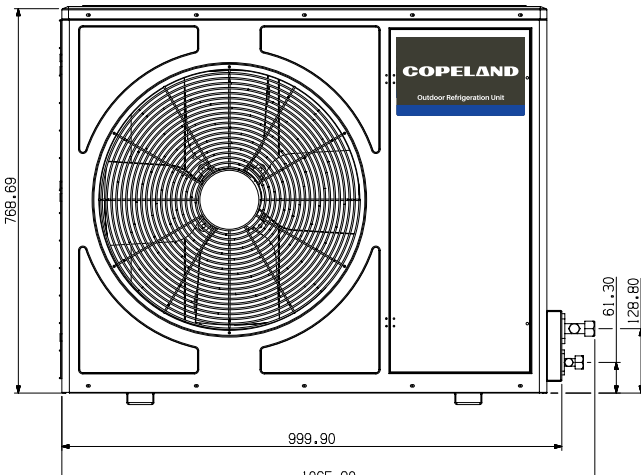
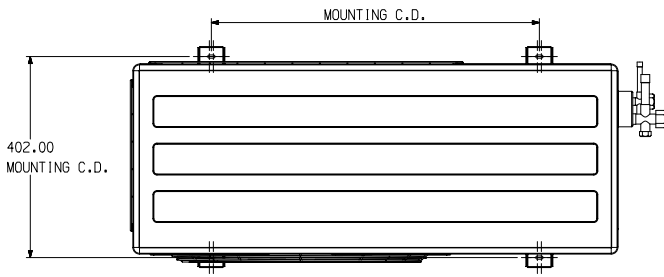


Chassis A2

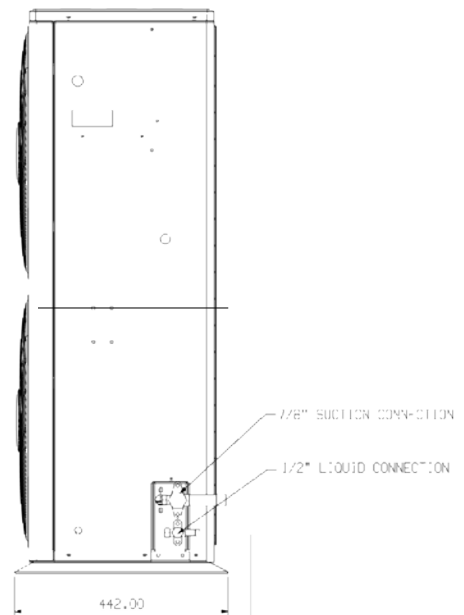
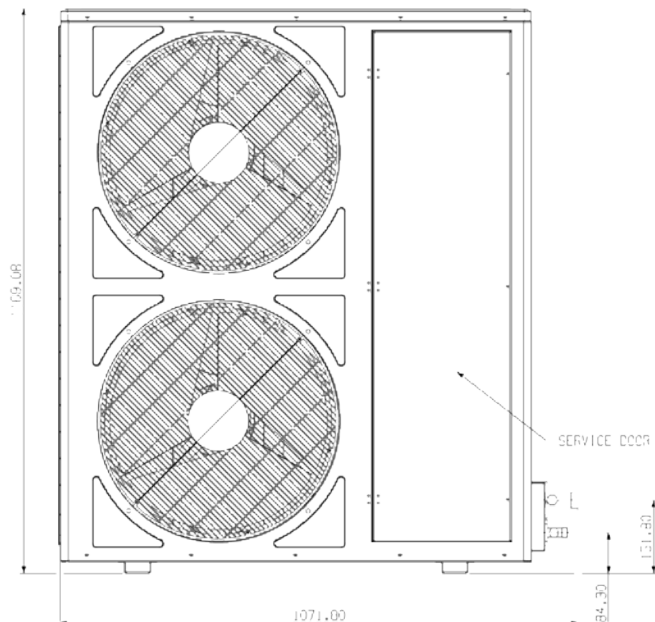
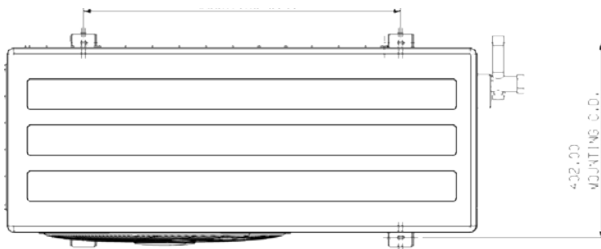


External chassis dimension

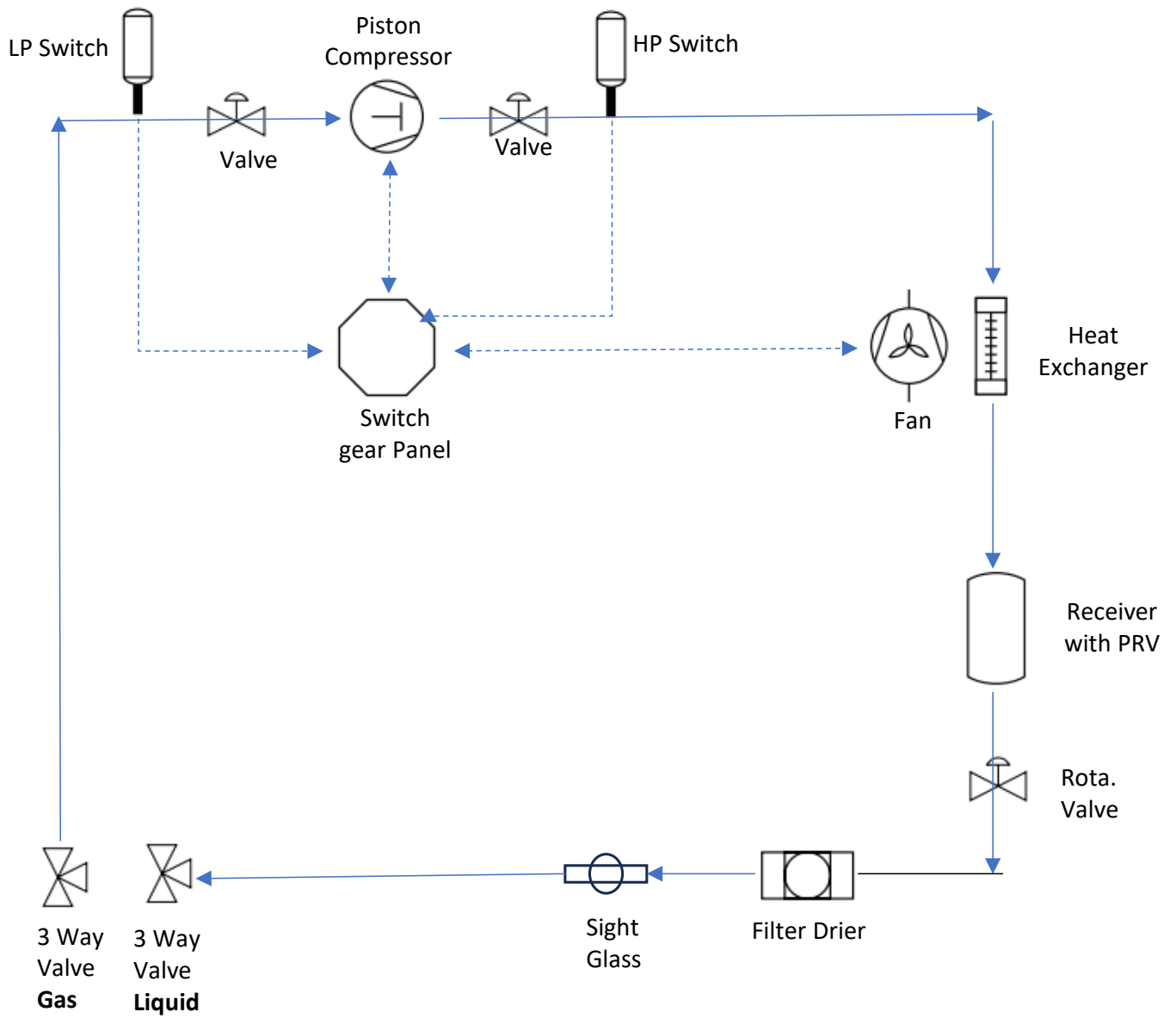
Chassis B



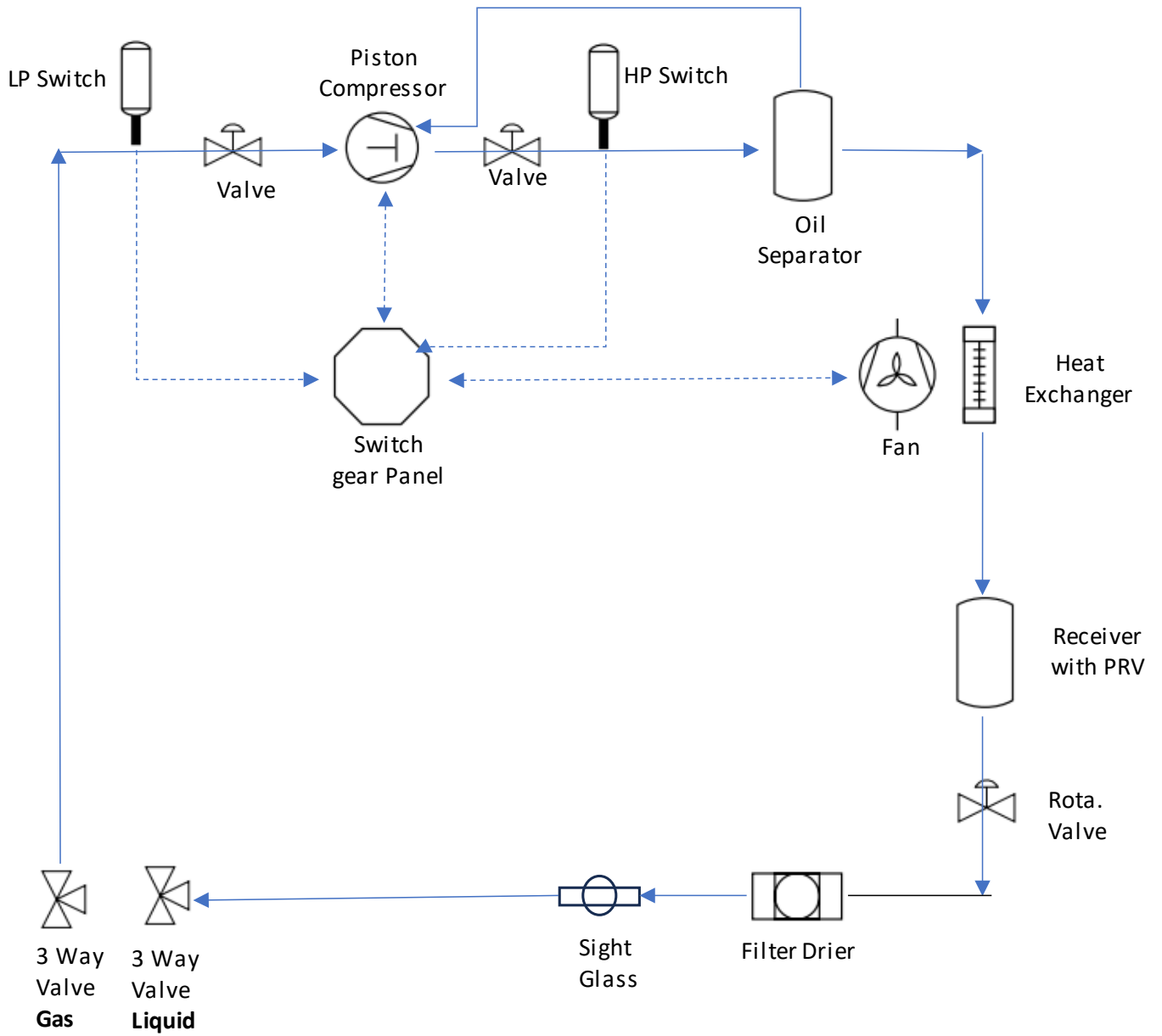
Chassis C



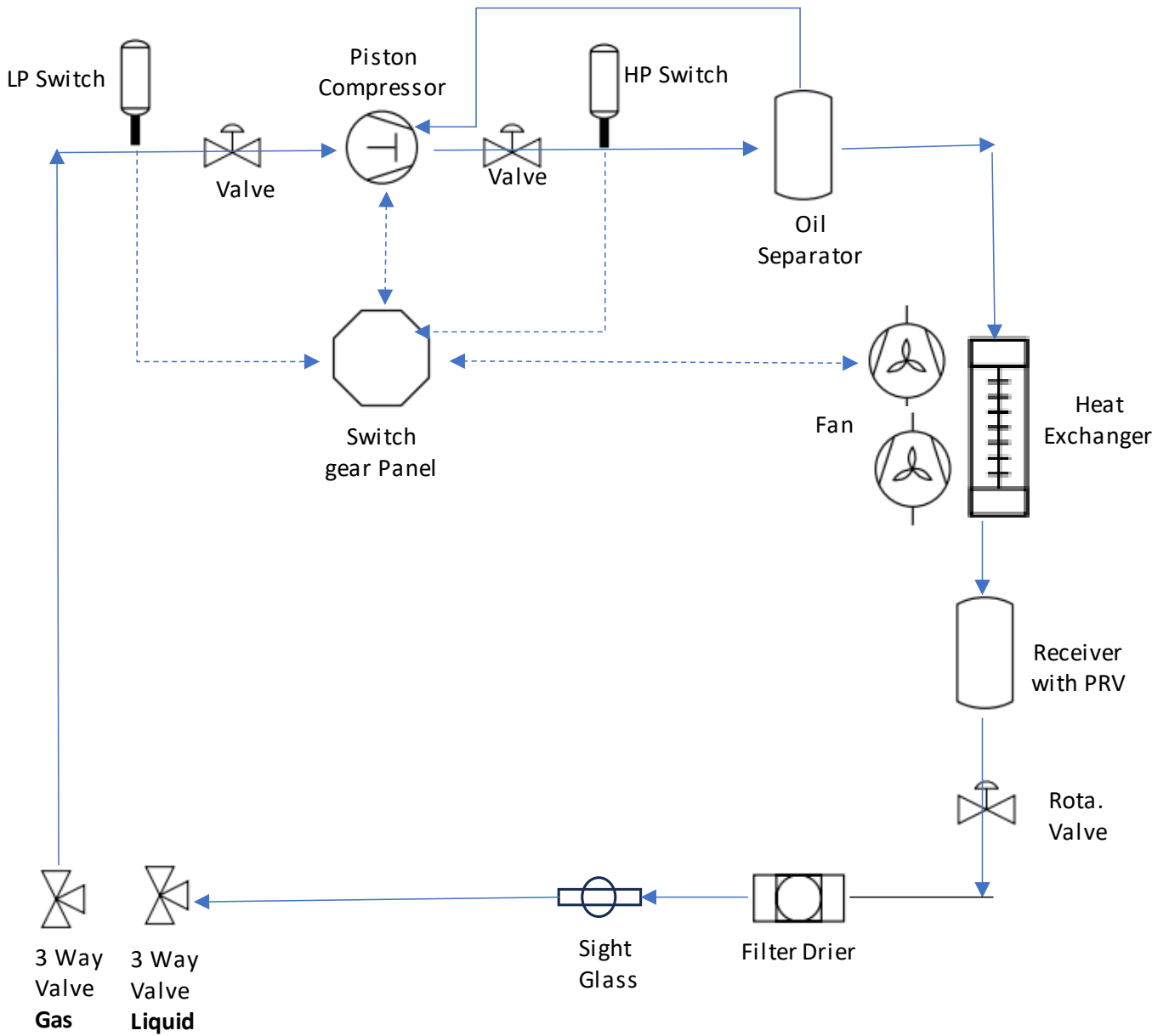
EAC-SE015X/SE020X



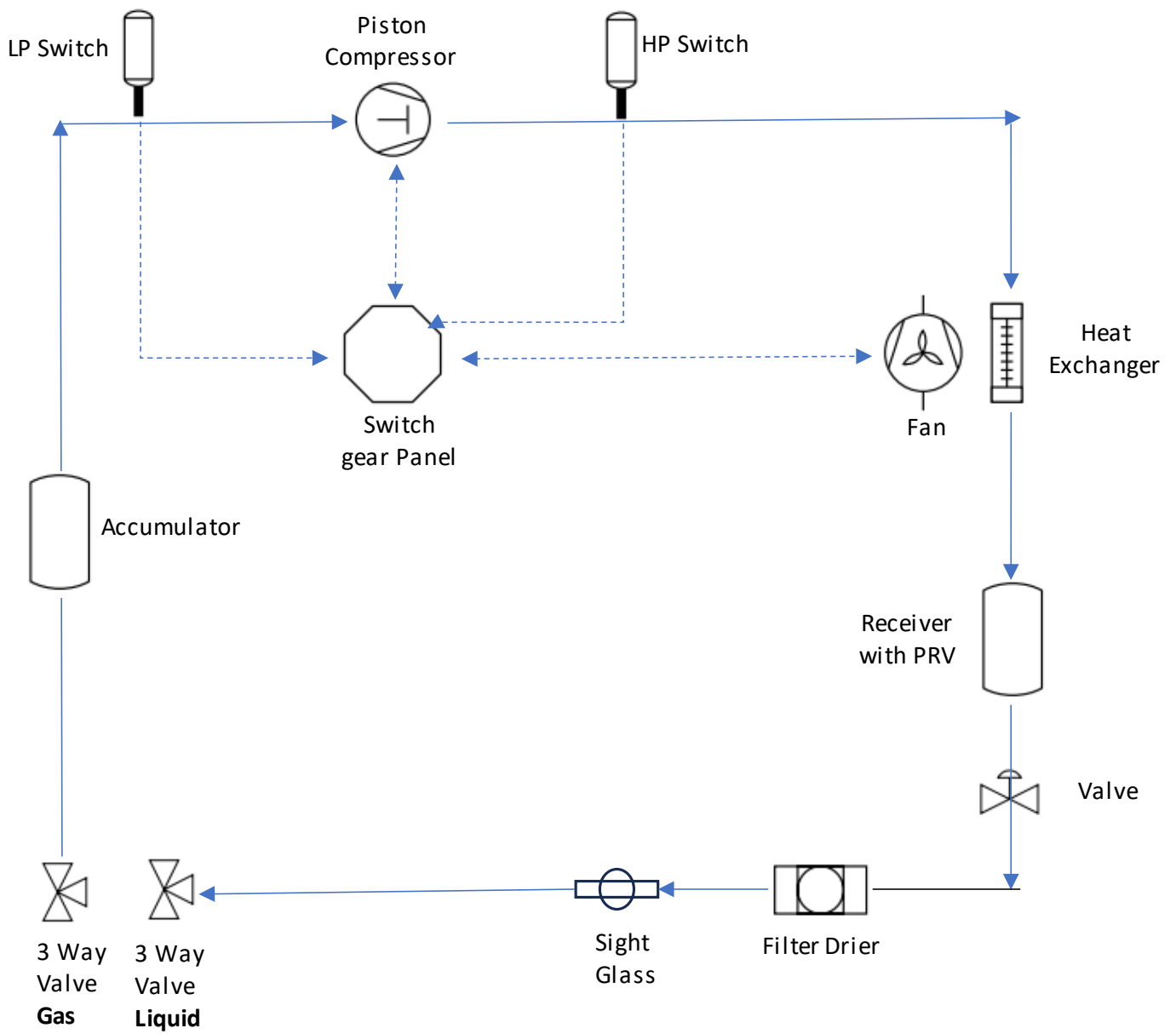
EAC-SE025X/ SE030X/ SE035X/ SE040X



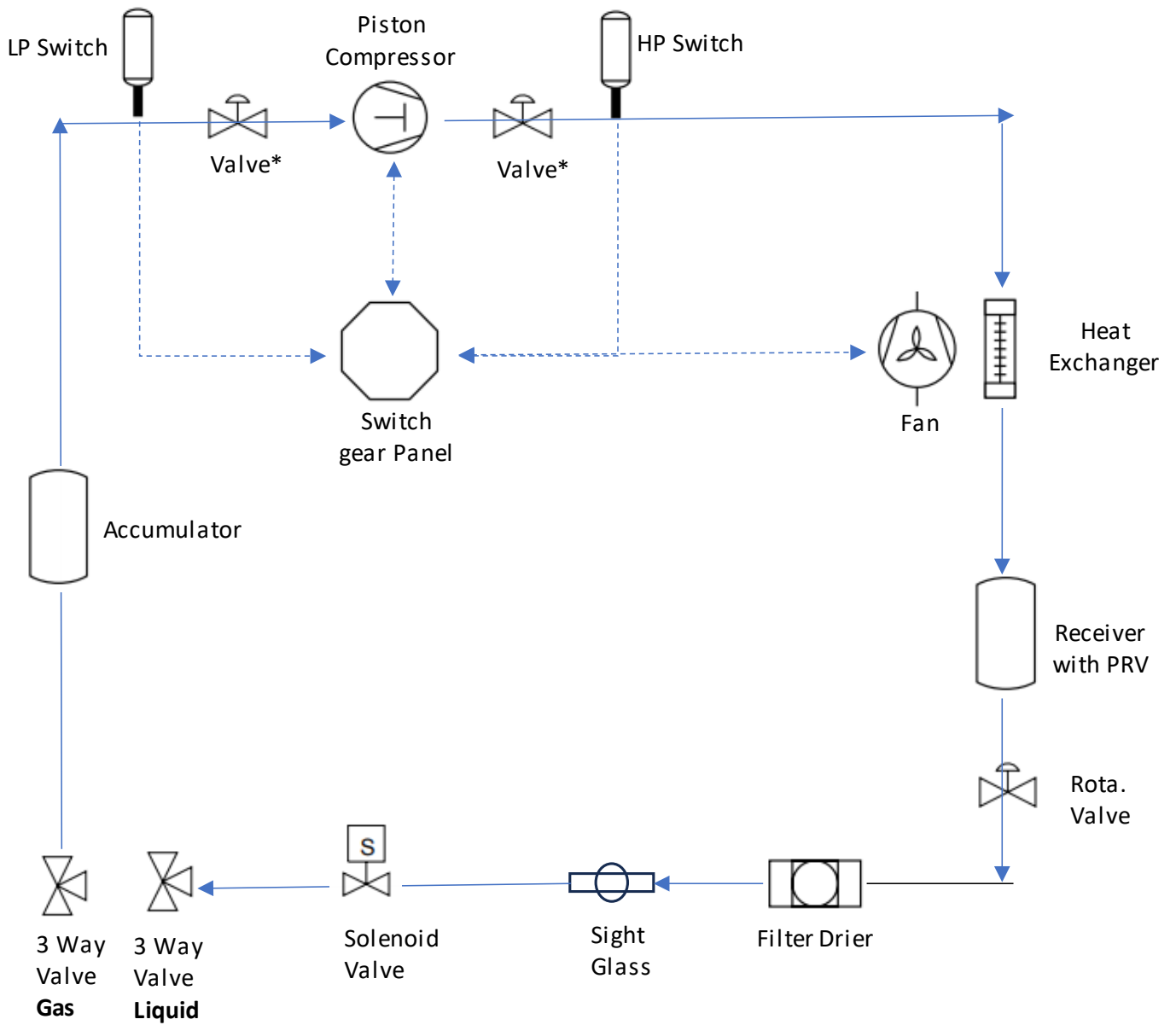
EAC-SE045X/SE050X



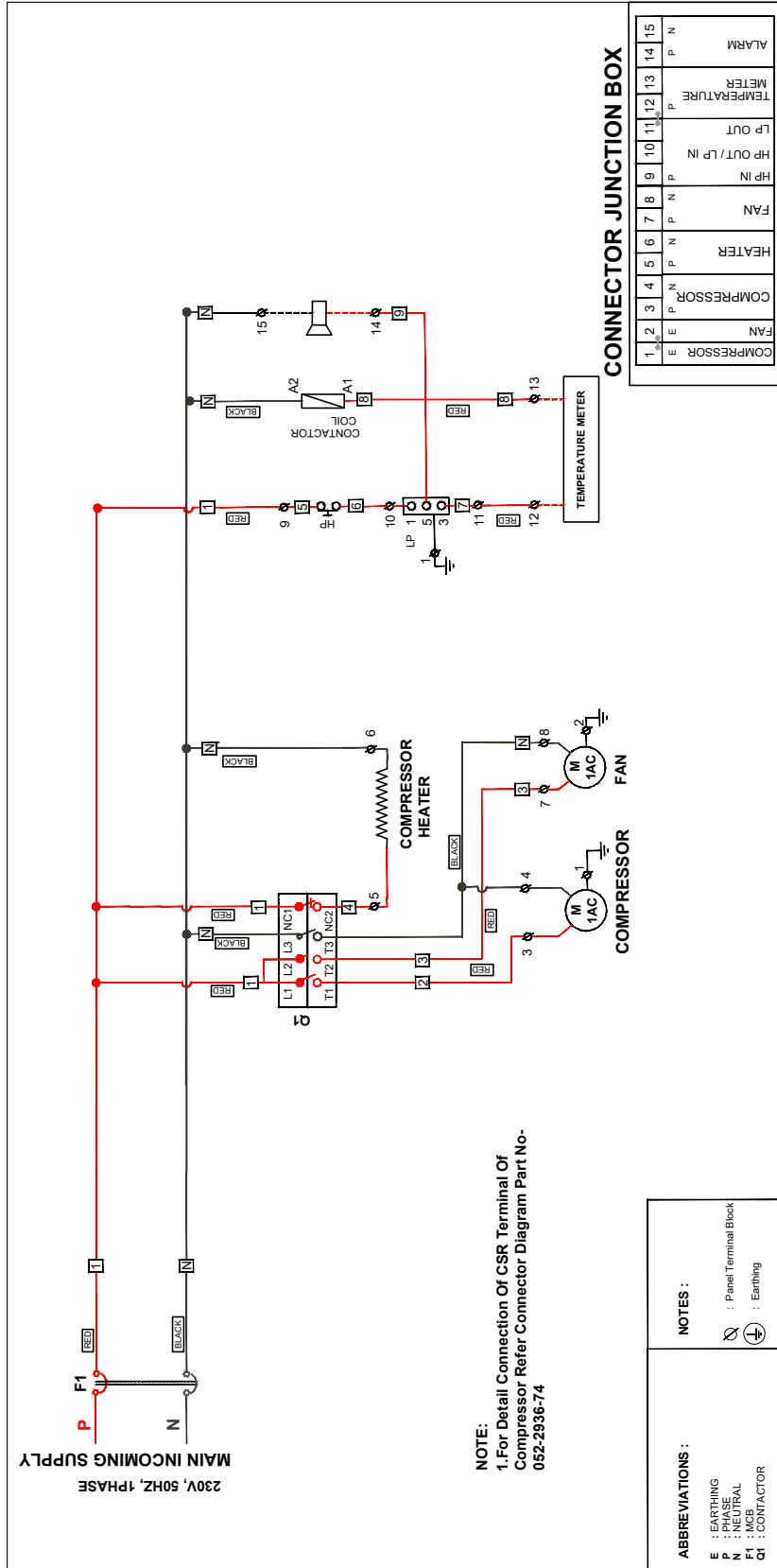
EAC-ML020XAE-PFZ/ML020XAE-TFM



EAC-ML025X/ML030X/ML035X/ML040X



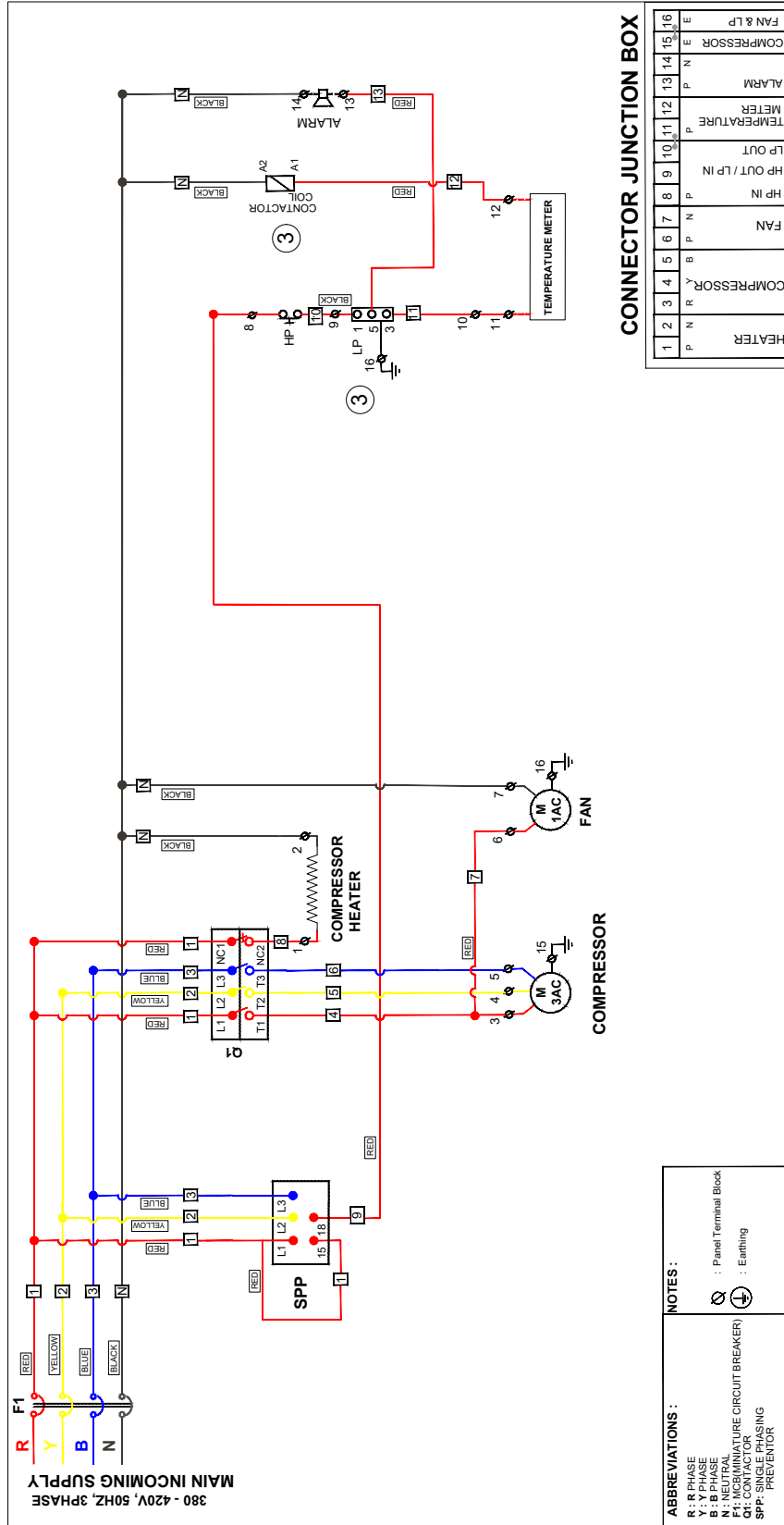
Wiring diagram



Applicable model:

- EAC-SE015AE-PFZQ632
- EAC-SE020AE-PFZQ632
- EAC-SE030AEPFZR633
- EAC-SE040AE-PFZR633
- EAC-ML020AE-PFZQ635

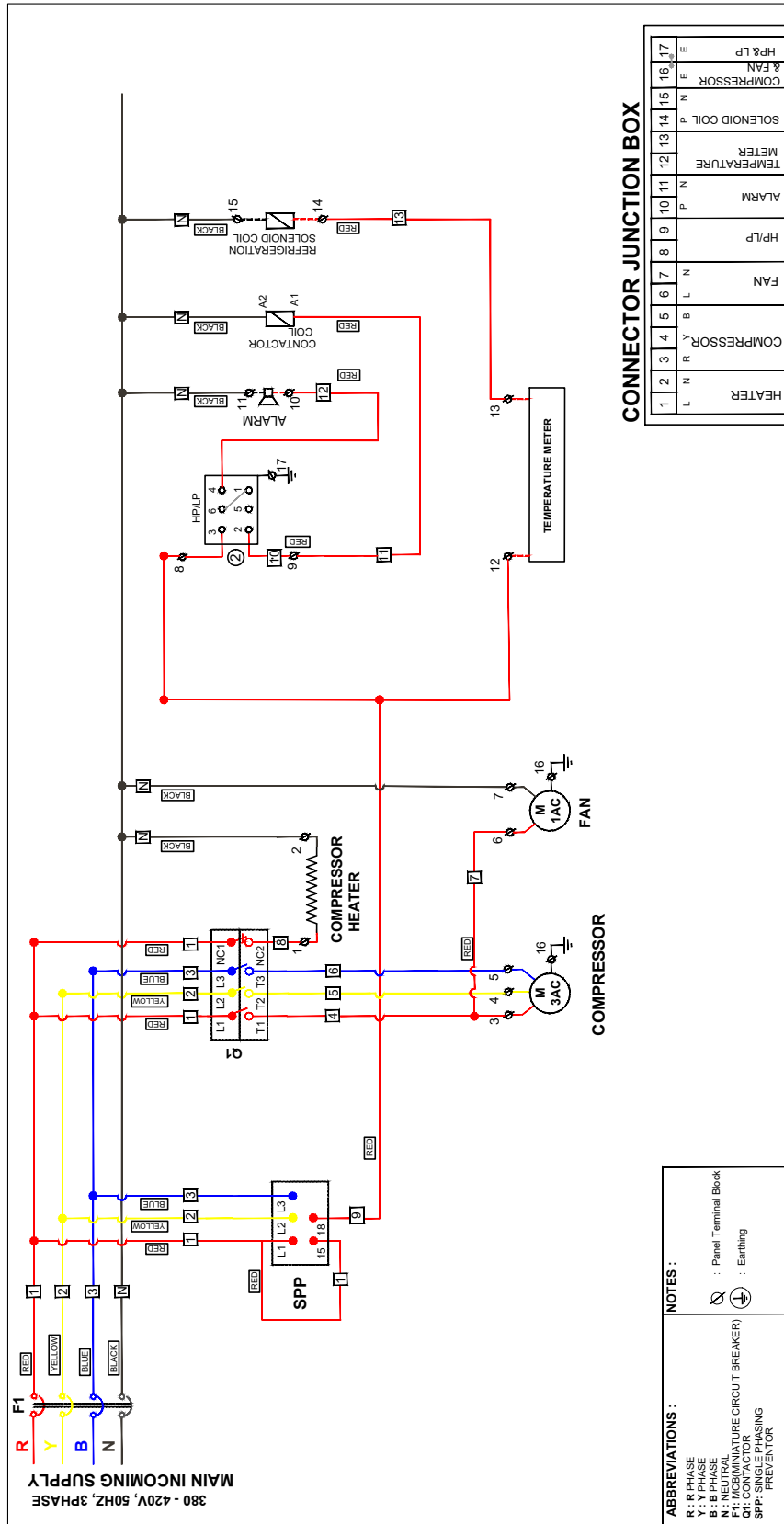
Wiring diagram



Applicable Model:

- EAC-SE015AE-TFMO622
- EAC-SE020AE-TFMO622
- EAC-ML020AE-TFMO636

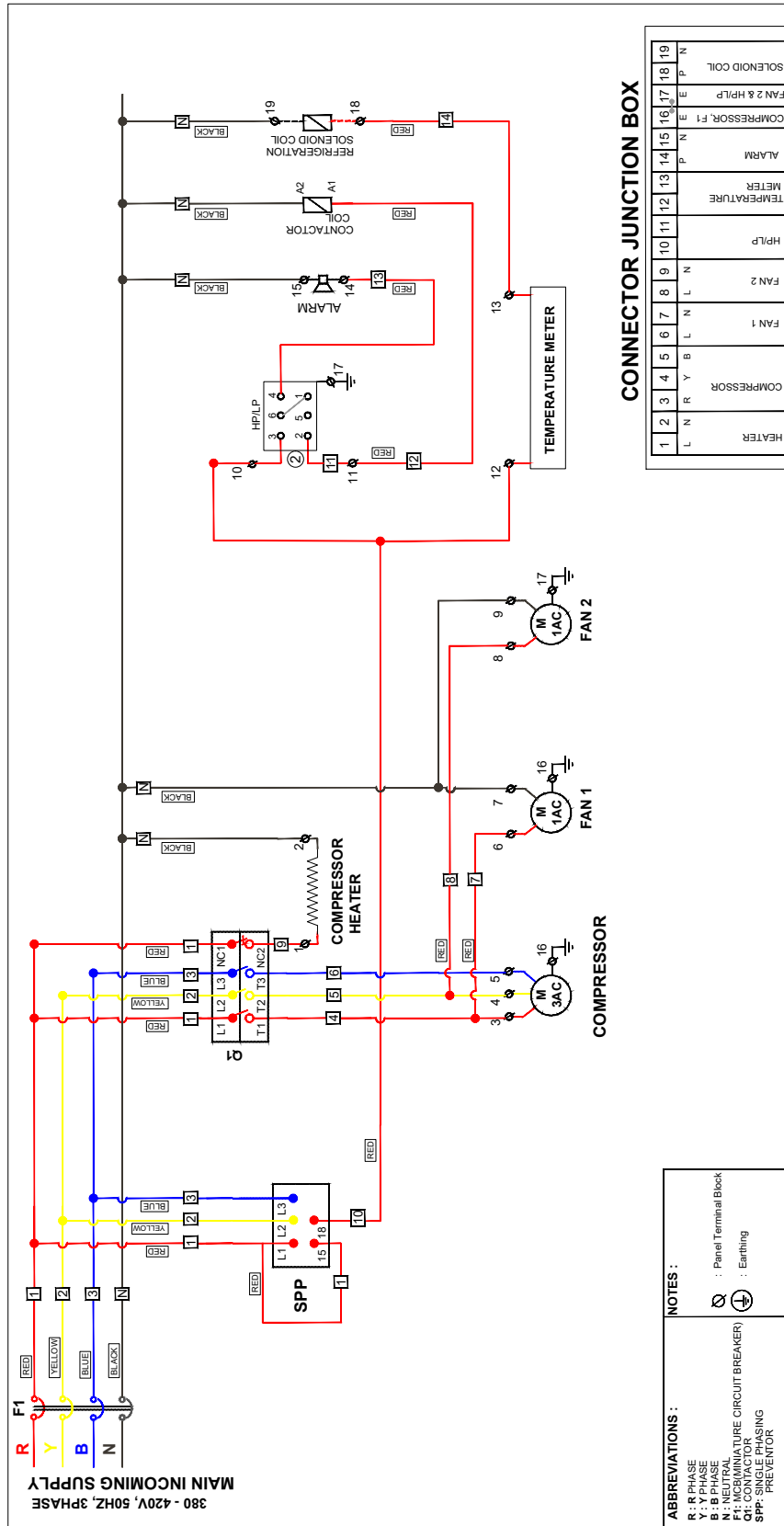
Wiring diagram



Applicable Model:

- EAC-SE025AE-TFMR621
- EAC-SE030AE-TFMR621
- EAC-SE040AE-TFMR621
- EAC-ML025AE-TFMR637
- EAC-ML030AE-TFMR637

Wiring diagram



Applicable model:

- EAC-SE050AE-TFMR621
- EAC-ML035AE-TFMR638
- EAC-ML040AE-TFMR638

Pressure - Temperature Chart

Temperature		Refrigerant				
°F	°C	R-22	R-410a	R-407c	R-134a	R-404a
-60	-51.1	<i>11.9</i>	<i>0.9</i>	<i>16.0</i>	<i>21.6</i>	-
-55	-48.3	<i>9.2</i>	1.8	<i>13.7</i>	<i>20.2</i>	-
-50	-45.6	<i>6.1</i>	4.3	<i>11.1</i>	<i>18.6</i>	-
-45	-42.8	<i>2.7</i>	7.0	<i>8.1</i>	<i>16.7</i>	-
-40	-40.0	0.6	10.1	<i>4.8</i>	<i>14.7</i>	4.9
-35	-37.2	2.6	13.5	<i>1.1</i>	<i>12.3</i>	7.5
-30	-34.4	4.9	17.2	1.5	<i>9.7</i>	10.3
-25	-31.7	7.5	21.4	3.7	<i>6.8</i>	13.5
-20	-28.9	10.2	25.9	6.2	<i>3.6</i>	16.8
-18	-27.8	11.4	27.8	7.2	<i>2.2</i>	18.3
-16	-26.7	12.6	29.7	8.4	<i>0.7</i>	19.8
-14	-25.6	13.9	31.8	9.5	0.4	21.3
-12	-24.4	15.2	33.9	10.7	1.2	22.9
-10	-23.3	16.5	36.1	11.9	2.0	24.6
-8	-22.2	17.9	38.4	13.2	2.8	26.3
-6	-21.1	19.4	40.7	14.6	3.7	28.0
-4	-20.0	20.9	43.1	15.9	4.6	29.8
-2	-18.9	22.4	45.6	17.4	5.5	31.7
0	-17.8	24.0	48.2	18.9	6.5	33.7
1	-17.2	24.8	49.5	19.6	7.0	34.7
2	-16.7	25.7	50.9	20.4	7.5	35.7
3	-16.1	26.5	52.2	21.2	8.0	36.7
4	-15.6	27.4	53.6	22.0	8.6	37.7
5	-15.0	28.3	55.0	22.8	9.1	38.8
6	-14.4	29.1	56.4	23.7	9.7	39.8
7	-13.9	30.0	57.9	24.5	10.2	40.9
8	-13.3	31.0	59.3	25.4	10.8	42.0
9	-12.8	31.9	60.8	26.2	11.4	43.1
10	-12.2	32.8	62.3	27.1	12.0	44.3
11	-11.7	33.8	63.9	28.0	12.6	45.4
12	-11.1	34.8	65.4	29.0	13.2	46.6
13	-10.6	35.8	67.0	29.9	13.8	47.8
14	-10.0	36.8	68.6	30.9	14.4	49.0
15	-9.4	37.8	70.2	31.8	15.1	50.2
16	-8.9	38.8	71.9	32.8	15.7	51.5
17	-8.3	39.9	73.5	33.8	16.4	52.7
18	-7.8	40.9	75.2	34.8	17.1	54.0
19	-7.2	42.0	77.0	35.9	17.7	55.3
20	-6.7	43.1	78.7	36.9	18.4	56.6
21	-6.1	44.2	80.5	38.0	19.2	57.9
22	-5.6	45.3	82.3	39.1	19.9	59.3
23	-5.0	46.5	84.1	40.2	20.6	60.6
24	-4.4	47.6	85.9	41.3	21.4	62.0
25	-3.9	48.8	87.8	42.4	22.1	63.4
26	-3.3	50.0	89.7	43.6	22.9	64.8

Temperature		Refrigerant				
°F	°C	R-22	R-410a	R-407c	R-134a	R-404a
27	-2.8	51.2	91.6	44.7	23.7	66.2
28	-2.2	52.4	93.5	45.9	24.5	67.7
29	-1.7	53.7	95.5	47.1	25.3	69.2
30	-1.1	54.9	97.5	48.4	26.1	70.7
31	-0.6	56.2	99.5	49.6	26.9	72.1
32	0.0	57.5	101.6	50.9	27.8	73.8
33	0.6	58.8	103.6	52.1	28.6	75.3
34	1.1	60.2	105.7	53.4	29.5	76.9
35	1.7	61.5	107.9	54.8	30.4	78.5
36	2.2	62.9	110.0	56.1	31.3	80.2
37	2.8	64.3	112.2	57.5	32.2	81.7
38	3.3	65.7	114.4	58.9	33.1	83.5
39	3.9	67.1	116.7	60.3	34.1	85.2
40	4.4	68.6	118.9	61.7	35.0	86.9
41	5.0	70.0	121.2	63.1	36.0	88.6
42	5.6	71.5	123.6	64.6	37.0	90.4
43	6.1	73.0	125.9	66.1	38.0	92.2
44	6.7	74.5	128.3	67.6	39.0	94.0
45	7.2	76.1	130.7	69.1	40.0	95.8
46	7.8	77.6	133.2	70.6	41.1	97.6
47	8.3	79.2	135.6	72.2	42.2	99.5
48	8.9	80.8	138.2	73.8	43.2	101.4
49	9.4	82.4	140.7	75.4	44.3	103.3
50	10.0	84.1	143.3	77.1	45.4	105.3
55	12.8	92.6	156.6	106.0	51.2	115.3
60	15.6	101.6	170.7	116.2	57.4	126.0
65	18.3	111.3	185.7	127.0	64.0	137.4
70	21.1	121.5	201.5	138.5	71.1	149.3
75	23.9	132.2	218.2	150.6	78.6	161.9
80	26.7	143.7	235.9	163.5	86.7	175.4
85	29.4	155.7	254.6	177.0	95.2	189.6
90	32.2	168.4	274.3	191.3	104.3	204.5
95	35.0	181.9	295.0	206.4	113.9	220.2
100	37.8	196.0	316.9	222.3	124.1	236.8
105	40.6	210.8	339.9	239.0	134.9	254.2
110	43.3	226.4	364.1	256.5	146.3	272.5
115	46.1	242.8	289.6	274.9	158.4	291.9
120	48.9	260.0	416.4	294.2	171.1	312.1
125	51.7	278.1	444.5	314.5	184.5	333.4
130	54.4	297.0	474.0	335.7	198.7	355.6
135	57.2	316.7	505.0	357.8	213.5	379.1
140	60.0	337.4	537.6	380.9	229.2	403.7
145	62.8	359.1	571.7	405.1	245.6	429.6
150	65.6	381.7	607.6	430.3	262.8	456.8
155	68.3	405.4	645.2	456.6	281.0	484.8

Italics indicates vacuum (inches of mercury)

Standard font indicates pressure (pounds per inch gauge)

How to read Pressure - Temperature Chart

Before start/during the running system, how to check the pressure corresponding to temperature.

For example - Kindly refer to above mentioned reading in red circle & pointed with arrow.

Refrigerant = R22, Temperature = 35°C Pressure (PSI) = 181.9

Consider the ambient 35°C, so your system standing pressure should be 181.9 psi in R22 system.

System start-up and operational check sheet

After the installation has been completed, below check list points should be covered before/during the system is placed in operation. The below check list is also applicable for the long time shut- down system.

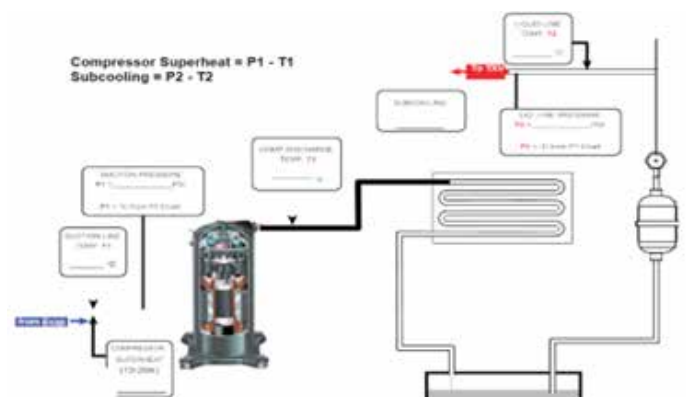
- Ensure all the visual inspection of Electrical connection, Shut-off valve, Safety Equipment connection, Wiring & earthing etc.
- All the brazing joint, Flare connection, pipe clamp support, Electrical panel etc are leak proof/tighten.
- Proper amount of refrigerant charge in the system.

Condensing unit info	
Customer name & contact :	
CDU model & serial number :	
Installation date:	
CDU location :	
Indoor unit make/model :	

System details	
Room/Case ID :	
Pipe Length (approx.) :	
OAT @ Start-Up/Check :	
PSI Leak Test :	PSIG
Duration :	Hours
System is Leak Tight :	Y / N
Triple Evacuation :	Y / N
Micron Gauge Reading:	microns
Total Evacuation :	PSIG @ # of Hrs
Refrigerant :	
Total Charge :	Kg.
Sight Glass Clear :	Y / N
Evap. Fans Running :	Y / N
Liquid Line Insulation :	Y / N
Sound and Vibration :	

System details	
COMP Voltage :	V
COMP Current :	A
Standing Pressure	PSIG/Bar
Suction Pressure :	PSIG/Bar
Liquid Line Pressure :	PSIG/Bar
COMP Suction Temp :	°C
COMP Disch. Temp :	°C
Liquid Line Temp :	°C
Compressor SH :	K
Subcooling :	K
Adjustable LP Setpoint :	PSIG
Design/Operating Temp:	°C
Actual Room/Case Temp :	°C

Comments



A photograph of a modern office interior. The main feature is a wall with vertical wooden slats. The word "COPELAND" is mounted on this wall in large, dark, bold, sans-serif capital letters. To the right, a blue wall features the text "ENGINEERED FOR SUSTAINABILITY" in white, slanted, sans-serif capital letters. The floor is a light-colored tile with a dark grey mat in the foreground.

COPELAND

ENGINEERED FOR
SUSTAINABILITY

About Copeland

Copeland, a global provider of sustainable climate solutions, combines category-leading brands in compression, controls, software and monitoring for heating, cooling and refrigeration. With best-in-class engineering and design and the broadest portfolio of modulated solutions, we're not just setting the standard for compressor leadership; we're pioneering its evolution. Combining our technology with our smart energy management solutions, we can regulate, track and optimize conditions to help protect temperature-sensitive goods over land and sea, while delivering comfort in any space. Through energy-efficient products, regulation-ready solutions and expertise, we're revolutionizing the next generation of climate technology for the better.

To learn more visit copeland.com

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