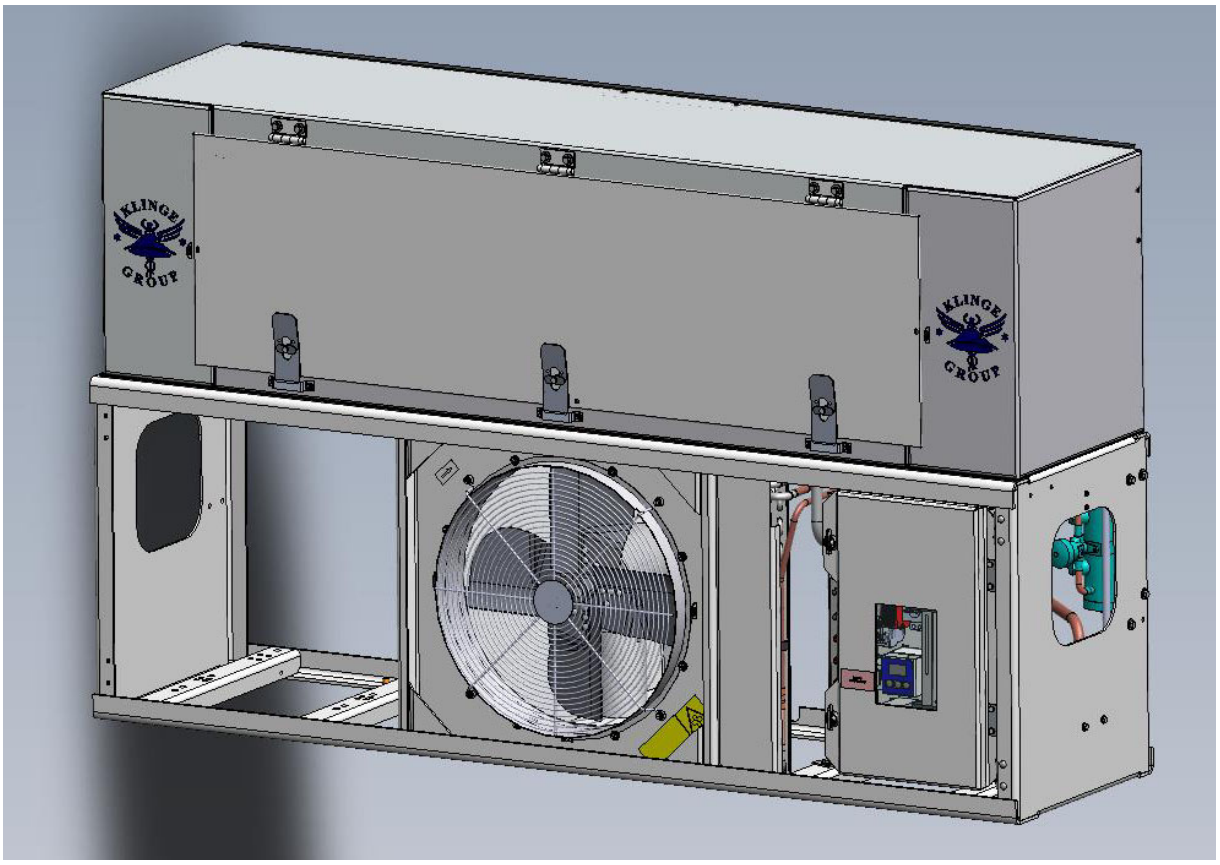
MODEL NMR-171A-10

OPERATION, SERVICE AND PARTS MANUAL



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MANUFACTURED BY KLINGE CORPORATION

REVISION RECORD

Rev	Description	Date	Approved

Contents

Service Request

Requests for Service should be directed to the Klinge Service Team. The below link should be used to place all requests for service and will afford the quickest response time.

https://klingecorp.com/request-service/

This form will help us determine model and age of the equipment, location, basic details about the issue, who to contact and how to best handle the issues with the equipment. A service ticket number will be provided in a response email once the form is received and processed. If the equipment is out of warranty, charges may apply for extensive technical support.

Additionally, our Service Department can be reached via email at technical@klingecorp.com.

Spare Parts Request

Requests for Spare Parts should be directed to our Parts Department via email at spares@klingecorp.com. Please have available at the time of the request the Serial Number of the equipment to ensure that the proper part is provided.

Use of this Manual

The use of this manual is intended for the safe operation of the equipment described. It is therefore reasoned that persons who have the occasion to use this manual have a knowledge of mechanical and electrical systems and components addressed by its' contents. However, efforts have been made to enable persons less familiar with these systems to use this manual.

The equipment may be installed in a number of configurations. Each may have optional items and differing external details provided by third parties. The specific electrical circuit and pipe diagram are posted on the unit as decals.

Most external and internal pipework parts are standard commercially available pipe fittings and not covered here. For external pipe fitting, replace like for like, taking care to replace stainless steel with stainless steel.

Suggestions as to improvement in content and format are welcome and should be addressed to engineering@klingecorp.com. Corrections and improvements will be included on dated revisions – the latest of which will be available upon request.

SECTION ONE GENERAL DESCRIPTION

The KLINGE NMR-171A Series of refrigeration units are specially designed for the handling of organic goods in ambient temperatures found throughout the world.

These units are designed to maintain temperatures from -29°C (-20°F) to +29°C (+84°F) automatically, using cooling, heating and defrost cycles during its operation. Main power is 380/480 volts 3 phase, 50/60 Hz electrical power. Control circuit voltage is reduced to 20/24VAC.

The KLINGE NMR-171A units have a scroll compressor, evaporator motor and condenser motor. The refrigeration system uses R404A and operates with 4.99 kg (11.0 lbs) of refrigerant charge.

The electrical system is housed in the control box on the right-hand side.

The electronic microprocessor thermostat controls the temperature of the cargo space.

Defrost is automatically activated by the primary system thermostat; when the temperature of the defrost probe rises to a preset limit the thermostat automatically stops the defrost cycle.

Alarm signals occur under the following conditions.

- High pressure shutdown.
- Cargo temperature pull down rate less than 0.14°C (0.25°F) / hour.
- Cargo temperature is more than +3°C above set point for more than 120 minutes.

The alarms remain activated until an operator RESETS the thermostat by switching the ON/OFF switch.

SECTION TWO OPERATION

2.1 GENERAL INFORMATION

The unit may be powered by an external source or from the generator set associated with the unit.

The thermostat is equipped with an automatic function test. (See section 2.5)

There are two circuit breakers protecting each electric system. One protects the main line 480 volts 3 phase power; the other protects the 24 volt control circuit.

High-pressure switch is located on the compressor and resets automatically.

2.2 PRE-STARTING CHECK

The following inspections should be made before the container is loaded or the unit started.

- Check unit visually for physical damage.
- Check of major hold-down bolts etc. visual.
- Check that control box is properly secured in the locked positions.

There should be no power to unit for this check.

1. Open control box cover and check that all electric components are secured and that the terminal connections are tight.
2. Check the gasket on control box cover. Be sure the draw latches will hold the cover tightly closed.
3. Check cleanliness of the condenser coils and clean if necessary.
4. Check all refrigerant joints and connections thoroughly for traces of oil, which could be caused by a small refrigerant leak.

2.3 OPERATIONAL CHECK

1. Connect main power to unit.
2. Be sure that the circuit breakers (CB1 and CB2) are in the **ON** position.
3. Hold the "**Manual Defrost**" switch in the **ON** position, and switch the unit **ON/OFF** switch to the **ON** position. This will start the automatic function test. (See section 2.5)
   During the test check that all indicator LEDs on thermostat are working.
4. After completion of function test adjust set point to 2-3°C below container temperature. Allow the unit to go through all cycles.
5. Check amperage of the compressor motor, the condenser motor and the evaporator motor.
6. Check the rotation of the fans.
7. Adjust set point to -18°C.
8. After temperature reaches -5°C put unit on manual defrost. (Hold defrost switch in on position for 5 seconds). During defrost, the compressor will continue to run. Condenser motor and

evaporator motor will not be running.

9. When defrost cycle is completed let unit run for approximately 15 minutes. Then check refrigerant level in receiver sight glass.

2.4 RUNNING UNIT

1. Turn the ON/OFF switch to the ON position.
2. Set the thermostat to the desired setting.

PHASE SELECTION

The phase sensor monitors the phase sequence of the 3-phase power for proper rotation of mechanical components.
When the unit's main circuit breaker (CB1) is in the **ON** position, power feeds into the phase sensor. When the phase sensor is energized, it scans the phase sequence of the input power and will in turn energize the appropriate phase changing contactor, PC1 or PC2. This ensures the correct rotation of the compressor and fans.

COOLING CYCLE

The return air probe is mounted though the evaporator coil and protrudes into the return air, thereby monitoring the return air. This probe sends a signal to the thermostat which controls the cooling cycle. When the cargo space temperature requires maximum cooling, the compressor, condenser and evaporator fan motors will operate. The cargo space temperature will continue to pull down until it reaches set point, then the compressor motor and condenser fan motor will stop, while the evaporator fans continue to run.

HEATING CYCLE

The heating cycle is also controlled by the return air probe. When the cargo space temperature requires heating, the hot gas solenoid will activate, sending hot vapor from the compressor directly the evaporator coil. The compressor and evaporator fan motors will run. The cargo space temperature will rise until it reaches set point, then the compressor motor and will stop.

DEFROST CYCLE

The defrost cycle is controlled by a defrost probe mounted in the evaporator coil, which will activate the defrost cycle automatically. If the compressor has been **on** for at least two minutes, when the temperature difference between the return air temperature probe and the defrost probe reaches a predetermined value, the thermostat will automatically initiate a defrost cycle.
When the unit is on defrost, the hot gas solenoid valve activates so that the hot vapor from the high-pressure side of the compressor goes directly to the evaporator coil.
The hot gas solenoid is deactivated by the defrost probe when the temperature in the evaporator coil rises to approximately 35°C (95°F). Then a five minute delay period is initiated, during which **only** the evaporator fans run. At the end of the delay the unit returns to normal operation.
If the defrost cycle is not finished within 1 hour, the thermostat will stop the defrost cycle and go to normal operation.

NOTES:

When the defrost probe is "out of range" (open or shorted) defrost will be initiated every 18 hours.
When the defrost probe is "out of range" the maximum time for defrost will be 1 hour.
If the defrost probe is "out of range" the defrost light will start flashing.
If the defrost is initiated twice within the same hour, the defrost light will start flashing.
The defrost cycle can also be manually activated. Hold the manual defrost switch on for a minimum of 5 seconds. Manual defrost overrides the minimum two minute compressor run time requirement for defrost.

2.5 FUNCTION TEST

The thermostat is provided with an automatic function test, which energizes the compressor motor, condenser motor, evaporator motor, alarm horn and tests the probes, for open or shorted circuits.
To start function test, hold the "Manual Defrost" switch in **ON** position, and switch the units “ON/OFF” switch to **ON** position.

The thermostat will automatically, step by step pass through different stages, the label on the side of the thermostat with LED designations is for FUNCTION TEST ONLY. Each step should last about 8 seconds.

NOTE : Refer to Section 4.6 for details of LED indications.

2.6 LIGHTING (Optional)

The container lighting system consists of two LED lighting assemblies mounted in the ceiling. Each assembly has one white LED and one red LED.

The activation switch for the internal container lighting is a 3 position mode switch inside the control box of the Refrigeration Unit.

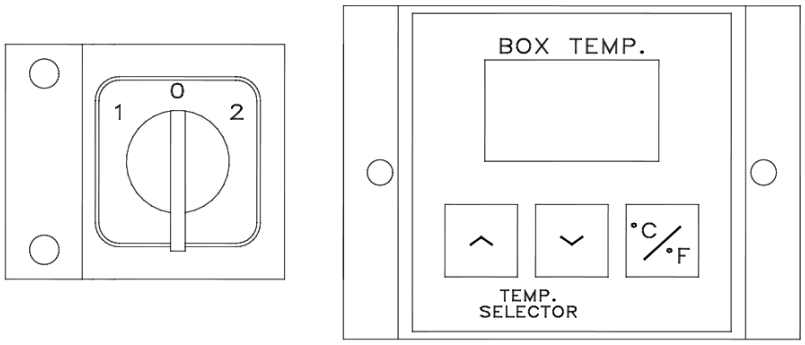
This light mode switch is mounted on a bracket beside the thermostat display. To operate the light mode switch unlatch the anti-loose fasteners to open the control box door.

The light mode switch has three settings:

a) "0" – Off
b) "1" – Tactical operation, or red light
c) "2" – Normal operation, or white light

The operator uses this switch to select the setting of lighting required.

See sketch of inside of refrigeration control box below.



SECTION THREE ELECTRICAL AND ELECTRONIC FUNCTIONS

3.1 GENERAL INFORMATION

When high voltage is connected to the unit and circuit breaker CB1 is in the **ON** position, power will pass along L1, L2 and L3 to the phase changing contactors, the phase sensor and the transformer.

NOTE: Beware of high voltage (380-480 volt) in various parts of the unit, especially when CB1 is in the ON position. It is recommended that a thorough study of the wiring diagram be made to determine where high voltage may be encountered when electric power is fed to the unit.

3.2 ELECTRIC BOX

CIRCUIT BREAKERS

A. Circuit Breaker (CB1).
The 19 amp circuit breaker has three poles. It is reset manually and protects the entire unit against overload. It may be used as a switch.

B. Circuit Breaker (CB2).
An 8 amp circuit breaker (CB2) protects the 24 VAC control circuit and the 12 VAC thermostat power circuit in case of possible overload.

C. Circuit Breaker (CB3)
A 4 amp circuit breaker (CB3) protects the 12 VDC alarm circuit.

CONTACTORS

A. Compressor Motor Contactor (C).
This is a 3 pole, 480 volt, contactor with a 24 volt operating coil. It operates the compressor motor and is energized by the thermostat.

B. Condenser fan contactor (CF).
This is a 3 pole, 480 volt, contactor with a 24 volt operating coil. It operates the condenser motor and is energized by the thermostat.

C. Phase Changing Contactors (PC1 - PC2)
These are 3 pole, 480 volt, contactors with a 24 volt operating coil. They operate the evaporator motor and are energized by the phase sensor (terminals 6 or 8 on the phase sensor). They have a mechanical interlock to prevent accidental energizing of both at the same time.

MOTOR PROTECTION

The compressor motor, evaporator fan motor, and condenser fan motor each have an internal thermal line braking overheat switch, which will automatically reset after cooling.

PHASE SENSOR (PS)

The phase sensor serves to correct fan rotation. By putting the unit **ON/OFF** switch in the **ON** position, 24 volts will pass to the phase sensor's changing device. The phase sensor has an incorporated switch, which can be used to test the function of the phase sensor.

TRANSFORMER

Control circuit transformer (T1) is located in the control box. The primary windings are connected onto the 480 VAC line after CB1. The secondary windings supply the 24 VAC for the control circuit, the 12 VAC for thermostat logic, and the120

VAC to the battery charger.

HIGH PRESSURE SWITCH (HP)

This switch is in located in the discharge line and will remove power to the compressor contactor coil if the discharge pressure rises to 31 bar (450 psi). As the discharge pressure falls the switch will close at 20.7 bar (300 psi), allowing the compressor contactor to re-energize and start the compressor.The switch is Normally Closed when pressure is in range and is automatically reset. Compressor stops immediately if failure occurs. Failure signal to alarm horn will have 12 minutes delay.

Discharge Temperature Switch (DTS)

This switch protects the scroll compressor. It will remove power to the compressor contactor coil if the discharge temperature rises to 104.4 ± 2.8°C (220 ± 5°F). As the discharge temperature drops the switch will close at 76.7 ± 3.9°C(170 ± 7°F), allowing the compressor contactor to re-energize and start the compressor.

BATTERY CHARGING SYSTEM

This is located in the electrical box. In case of a malfunction in the unit, it is necessary to keep the battery optimally charged. The battery charging system works when the unit is connected to the power supply. The battery charger has an LED to indicate power on (GREEN light) and one to indicate that the battery is charging (RED light).
When the genset is active a relay in the engine compartment will disconnect this battery charger.

Charger Operation:
If the green LED is on, the battery is near of fully charged. (Voltage of 12.9 to 13.5).
If the green LED is slowly blinking, battery is fully charged (Voltage is 13.5).
If the green LED blinks rapidly, the charger is not connected to the battery.
When the red LED is on, the battery is discharged and is being charged.

3.3 COMPRESSOR

This scroll compressor is designed around two intermeshed and offset scrolls. One of these scrolls is orbital and the other one is fixed. The center of the orbiting scroll travels a circular path around the fixed scroll. This movement creates crescent shaped pockets between the two scroll elements (The phase sensor ensures the motor rotates the compressor scrolls in the proper direction). Low-pressure suction gas is trapped as each pocket is formed. Continued motion of the orbital scroll moves the gas pocket towards the center where maximum compression is reached and the discharge port is located.
The scroll compressor is hard-mounted to the frame. This is to prevent excessive external vibration in our ‘transport’ application, reducing maintenance of the system piping end connections.

Discharge Temperature Control Valve (DTC valve)

A liquid injection system has been added to provide cooling to the compressor. An injection port is internally connected to an inner pocket of the scroll mechanism for liquid refrigerant injection. This pocket is separated from the suction inlet, so no loss of capacity or mass flow results from injecting at this point.
The DTC valve monitors the flow of liquid refrigerant into the injection port, based on the temperature of the thermal element located in the top cap thermal well of the compressor.

Internal Pressure Relief Valve (IPR valve)

The scroll compressor is also equipped with an IPR valve, which opens when the differential pressure from suction to outlet reaches an unacceptable limit. Opening this valve causes the motor protection to open and stop the compressor. This IPR valve prevents compressor over pressurization.

Compressor Lubrication

The compressor has an internal design which facilitates circulation of lubricant within the compressor. The oil level in the scroll compressor should be maintained at the midpoint of the sight glass. Immediately after start-up of the compressor the oil level in the reservoir will fluctuate. It is advisable to monitor the oil level a few minutes after start-up to ensure that there is enough oil in the compressor. If the oil level is low, below the center of the sight glass, it will be necessary to add oil to the compressor. Normal oil level should be maintained at the mid-level of the sight glass.

Adding Oil

CAUTION: The NMR-171A uses R-404A refrigerant. Mineral oil lubricant cannot be used.

The only oil approved by the compressor manufacturer is Polyolester (POE) lubricant, Klinge part # K11-00416-00, Copeland Ultra 22 CC, Mobil EAL Arctic 22 CC, or ICI EMKARATE RL 32CF. Use of any lubricant not recommended will render the warranty void. The initial oil charge is 1.92L (64 oz.) and the recharge is 1.8L (60 oz.).

If the compressor is charged and the system can be run, oil should be added thru the suction service valve. Although this procedure is relatively simple, some preparations and care **MUST** be taken as follows:

1. Connect manifold gauge to suction service valve port and start unit. Front seat suction service valve partially until a suction pressure of approximately 0.1 bar (1.45 psi) is maintained.

2. With a can of oil opened, measured, and ready, carefully open the manifold suction gauge valve until a positive pressure can be felt at the outlet of the center charging hose.

3. Now place the end of the charging hose into the can of oil and control the bubbling with the manifold valve. Continue to front seat the case pressure a mild vacuum (10" water vacuum -0.5Bar) and pull the oil into the crankcase. By opening the manifold valve a little more, the oil can be sucked into the crankcase faster.

4. As soon as enough oil has been transferred to the compressor, shut off the manifold valve. If the can being used is almost empty, be careful that air is not sucked in with the oil.

5. Backseat the compressor suction service valve. Remove gauge, manifold hoses, and replace caps securely. Allow the unit to run 30 minutes before rechecking the oil level in the compressor sight glass, immediately after the compressor has been shut off.

Note:

Always keep commercial oil stored in sealed containers. Oil exposed to the atmosphere will absorb moisture, which can cause trouble when introduced into the system. Use only the grades of oil, which are suitable and recommended for compressor lubrication and have been especially processed to have the necessary low moisture content.

SECTION FIVE MAINTENANCE AND SERVICE INSTRUCTIONS

5.1 GENERAL

This section provides procedures for establishing preventative maintenance and systematic servicing schedules, which are the keys to successful operation.

All service and maintenance procedures should be performed in accordance with Section 608 of the Clean Air Act (CAA), prohibiting the venting of refrigerants into the atmosphere and providing for the use of refrigerant recycling and recovering equipment to be used whenever a system is opened.

5.2 SAFETY

a. When any work is to be done on the components of the refrigeration system be sure that the unit cannot be started automatically or accidentally. If valves are closed and/or circuits interrupted during service procedures, the control switches should be suitably tagged with such notations.

b. Beware of high voltage in various parts of the unit, especially when main CB1 is on. It is recommended that a thorough study of the wiring schematic be made to determine where high voltage will be encountered before electric power is applied to the unit.

c. Do not exert excessive pressure when tightening flare nuts, as it may result in a rupture of the flare or stripped threads.

d. Always wear approved goggles or eye shields when working with refrigerant to prevent eye injury if refrigerant is accidentally discharged into the face of the service engineer.

e. Never, under any circumstances, apply heat to a refrigerant cylinder by using a naked flame. Should it be considered necessary to apply heat to a cylinder to create a refrigerant flow when recharging a system, place the cylinder in a container of hot or warm water to a point about 3/4 of the height of the cylinder.

   Even this method requires that a pressure gauge is in use in the charging line to indicate the pressure in the cylinder at all times.

   Also, never close the shut-off valve in the cylinder while the cylinder is being heated.

   The use of a manifold gauge set will permit compliance with CAA regulations by having a gauge in the line and a shut-off valve on the manifold to stop the flow of refrigerant into the system and allow the gauge to read cylinder pressure.

f. Always replace refrigerant cylinder valve and connection caps after using the cylinder, and do not permit a cylinder to be dropped or hit severely by another object.

g. Due to the height at which the refrigeration unit is placed in the container, always use safe and secure means to service the unit and to allow a platform for tools and a refrigerant cylinder.

CAUTION:
A gauge manifold should always be used when charging unit with refrigerant.

Refrigerant R404A is heavier than air. Therefore it settles in the lowest places and will expel air (oxygen) from a small confined space, resulting in dizziness or suffocation to an occupant.

5.3 CHECKING REFRIGERANT CHARGE

The receiver sight glasses are equipped with a ball, which floats when the liquid level is in the sight glass, or above.

It should be noted and remembered that the only requirement of liquid level is that a seal be maintained at the outlet of the receiver. At low ambient temperatures, approximately 50ºF and below, the liquid refrigerant may not accumulate in the receiver to a point where a liquid level will show on the sight glass. Many times the liquid will hang up in the condenser. Therefore, caution should be taken before adding refrigerant. Air in the receiver may also prevent the level from coming up into the sight glass. This can be rectified by purging the air from the system.

If the ball is not floating, it is recommended that the suction and discharge pressure be checked before determining that the charge is low. It is just as possible to do harm to the system by overcharging as it is to run it under charged.

It is important to have the correct amount of refrigerant in the system. The charge required is 3.06 kg (6.75 lbs). If there is too little, the expansion valve will pass vapor and reduce the capacity of the evaporator. Too much refrigerant will result in higher head pressures and reduced capacity.

Before adding refrigerant, always determine the reason for the low charge and remedy the cause. Leak test thoroughly with an electronic leak detector and also check for traces of oil.

5.4 PROCEDURE FOR ADDING REFRIGERANT

To add small quantities of refrigerant to the system, it is preferable to add gas to the low or suction side of the system. This will allow the system to operate with little or no disturbance of the refrigeration cycle while the refrigerant is being added.

Care should be taken to ensure that only gas is extracted from the refrigerant cylinder when charging into the low side.

A. Remove the compressor suction service valve cap and back seat the valve. This closes the charging port. Loosely attach the suction gauge line of a manifold set. Connect the center charging line to a refrigerant cylinder and tighten the connection.

B. Crack open the refrigerant cylinder valve and the manifold suction gauge valve and purge the air from the line. Then tighten the connection at the compressor suction service valve.

C. With the system still operating and the suction pressure being 2.07 bar (30 psig) or below, and the cylinder pressure at 11.7 bar (170 psig) (dependent upon ambient temperature), open the refrigerant cylinder valve and the manifold suction gauge valve completely. Open the compressor suction service valve 1 to 2 turns.

D. Allow refrigerant into the system and observe the receiver sight glass.

E. If the pressure in the refrigerant cylinder equalizes the suction pressure of the system, charging will cease until the cylinder pressure is raised by heating it. To do this, a container of hot water or an electric blanket (made for this purpose) can safely be used.

F. If the pressures equalize and no heating is available, partially front seat the compressor suction service valve and allow the system to pump down to a pressure slightly below the one of the cylinder pressure. This will create a pressure difference between the system and the cylinder, allowing refrigerant to flow again. However, remember to close the cylinder or manifold valve before opening the compressor service valve, or R404A will be forced back into the cylinder. Also, the system should be allowed to cycle for at least 5 minutes after each shot of refrigerant to allow it to settle down so that an accurate reading can be taken at the receiver sight glass.

G. When it is determined that the system has an adequate refrigerant charge, close the refrigerant cylinder valve (if not already closed), and the manifold suction gauge valve, and back seat the suction service valve, in that order. Remove the manifold lines and replace caps securely.

5.5 NON-CONDENSABLE GASES

Air and non-condensable gases in any system gather in the receiver above the liquid. This will result in above normal discharge pressures. These gases can be removed during operation by purging through the receiver valve. To purge, use recycle equipment and open valve a small amount. Note any significant difference from the initial pressure when the valve is again closed. Repeat the operation until the discharge pressure is normal.

5.6 OPENING THE SYSTEM

Whenever it is necessary to open a charged or functioning system to make repairs or replacements, it is necessary to comply with CAA by using recovery and recycle equipment.

The use of "**EASY FLOW**" silver solder and flux, or equivalent, is recommended in the refrigerant system piping. Do not use soft solder.

Prior to disturbing any connections, the type of solder originally used should first be verified then continue. By taking this precaution, the contamination of the joint will be avoided.

5.7 TESTING FOR LEAKS

The preferred method for finding leaks is by use of an electronic leak detector. There are several different makes available, and they all use the same method of detecting a leak through an exploring tube which will detect from large to extremely small leaks depending on the setting used on the detector.

Leak testing with soapsuds will reveal only the large leaks and is therefore ineffective in determining the tightness of a system.

5.8 EVACUATING THE SYSTEM

Caution:
Do not use the compressor as a vacuum pump or as an air compressor. It is not designed to handle air and will not pull down to as low a vacuum as a pump designed for that purpose. Similarly, if used to compress air, serious overheating and consequent damage may be the result.

Connect a pump capable of drawing a vacuum of 0.15 mm Hg or better to that part of the system which has been opened. Continue until all air and moisture has been removed.

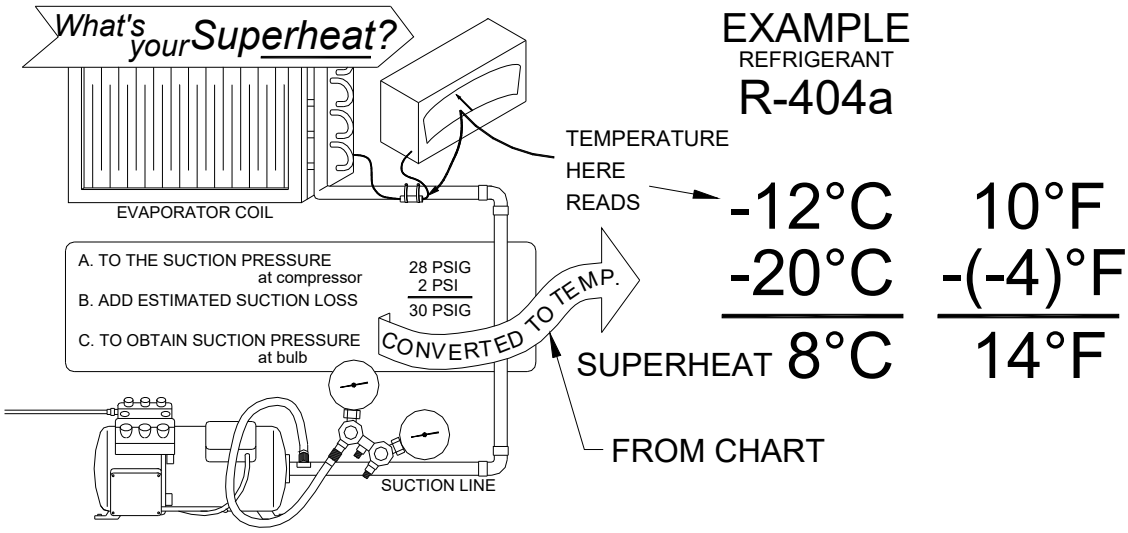
The final evacuation may be accelerated, however, by manifolding the connections to the vacuum pump and evacuating simultaneously the high and the low sides of the system; the vacuum should be broken by introducing refrigerant.

Too much emphasis cannot be placed on the importance of keeping the system free of moisture. Slight amounts of water in the system will inevitably lead to trouble in the following forms:

a. Corrosion of steel parts.
b. Copper plating of the shaft and bearing.
c. Slugging or gumming of the oil.
d. Plugging of the strainers and dryers.
e. Freezing and plugging of expansion valve

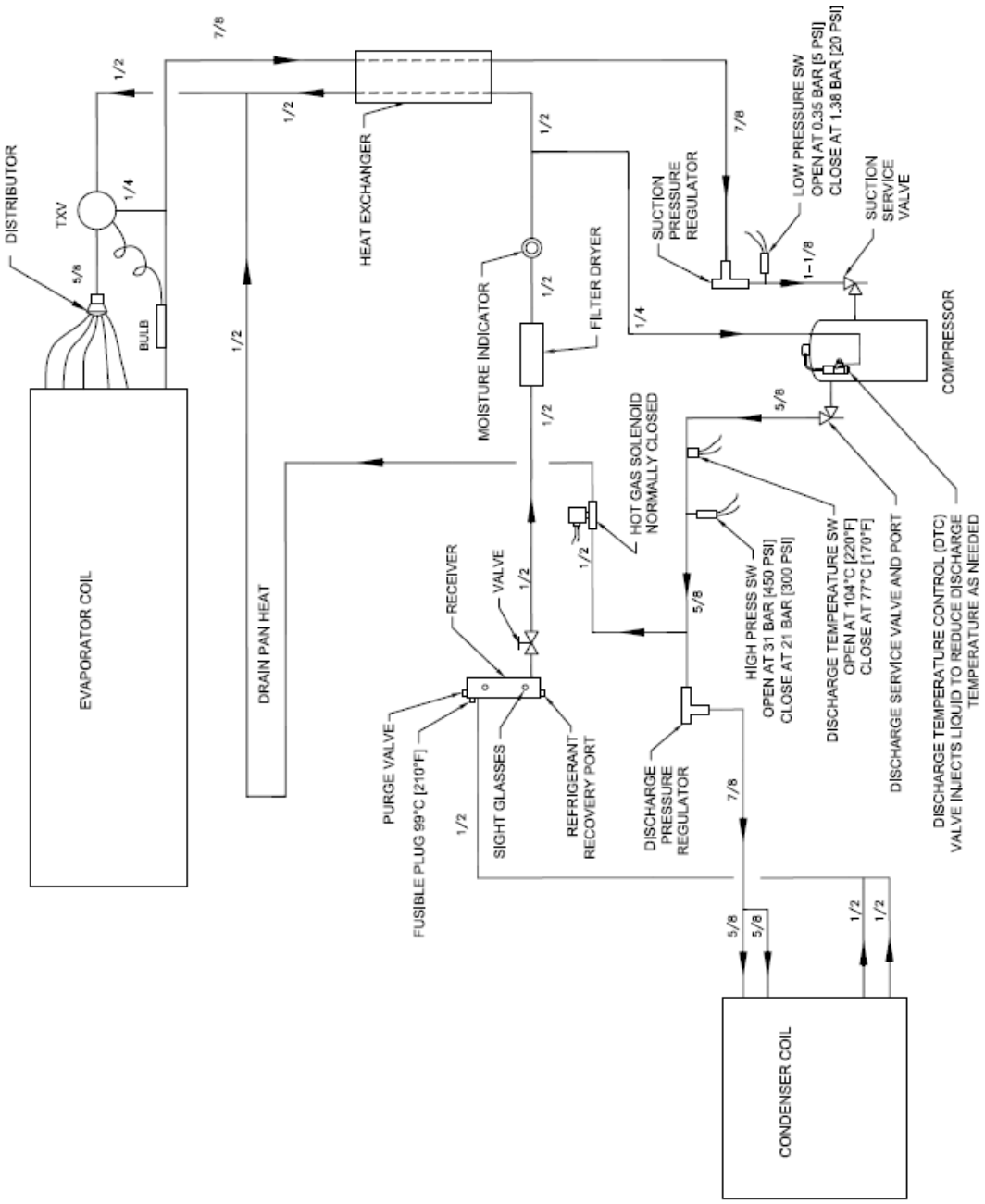
Whenever it is necessary to open the system for any reason, always take precautions to prevent the entrance of air into the system, as air always contains some water vapor. Isolate as much of the system as possible from the portion to be opened by closing suitable valves.

5.9 MEASURING THE SUPERHEAT



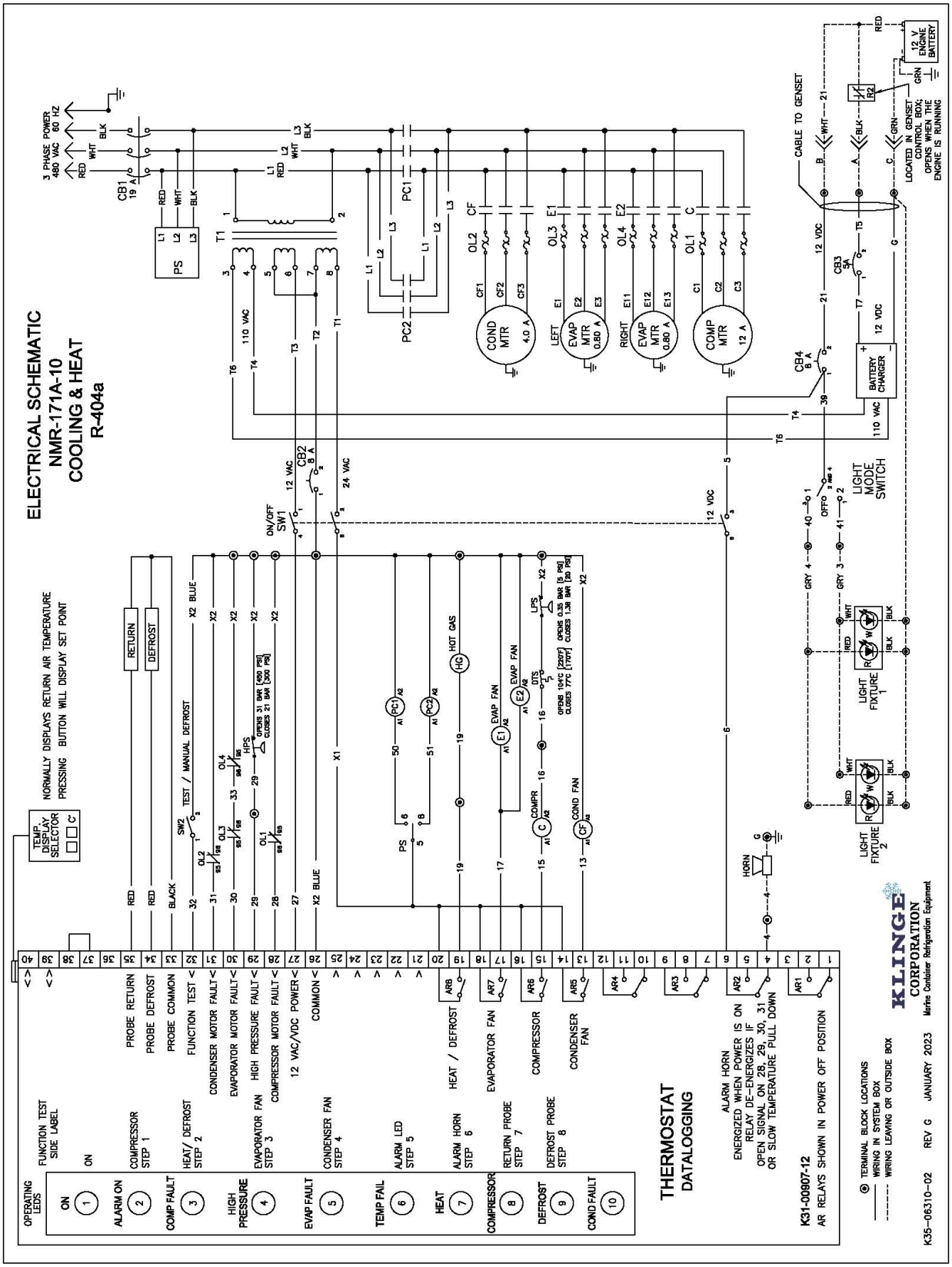
1. Measure the temperature of suction line at the point the TXV bulb is clamped.
2. Obtain the suction pressure that exists in the suction line at the bulb as follows:
   Read the gauge at the suction valve of the compressor. To the pressure add the estimated pressure drop through the suction line between bulb location and compressor suction valve. The sum of the gauge reading and the estimated pressure drop will equal the approximate suction line pressure at the bulb.
3. Convert the pressure obtained in 2 to saturated evaporator by using the temperature /pressure chart provided in this manual.
4. Subtract the two temperatures obtained in 1 and 3 – The difference is the superheat.

5.10 PIPING DIAGRAM



REFRIGERATION PIPING DIAGRAM
NMR-171A-10
REFRIGERANT R-404A

5.11 ELECTRICAL SCHEMATICS



SECTION SIX TROUBLE SHOOTING

6.1 GENERAL INFORMATION

Several components are incorporated into the unit to assist the serviceman in finding the cause of problems concerning the operation of the unit.
LEDs are located on the front edge of the thermostat to indicate functions and modes that should be operating.

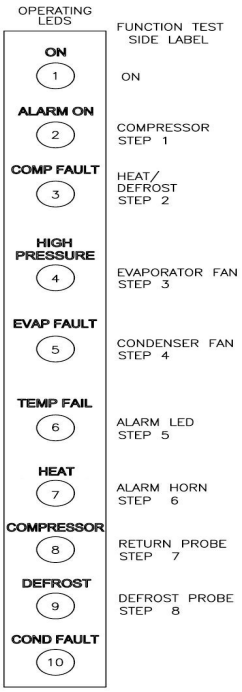
On the side of the thermostat and adjacent to each output relay are red LED indicators to show which output relay (AR1 through AR8) is energized.

These indicators along with discharge and suction pressure gauges attached by the serviceman can be used to determine if certain cycles are operating. Compressor and fan operation can be determined by sound. Defrost hot gas solenoid operation normally is audible, but feel may be required if there is too much background noise.

6.2 THERMOSTAT LED INDICATIONS

(refer to Section 4)

DURING FUNCTION TEST - Use label on the side of the thermostat
DURING NORMAL OPERATION - Use label on the front of the thermostat



Thermostat Front (Operational) and Side (Function Test) Labels

6.3 RELAY LEDs

A small red LED is placed adjacent to each of the 8 thermostat relays. An illuminated LED indicates its associated relay is energized.

AR1 - not used in this application

AR2 - ALARM HORN RELAY
T6 is common.
The relay is energized during normal operation (continuity from T5 to T6), and will de-energize, if an alarm occurs (continuity from T6 to T4).
There will be momentary continuity from T6 toT4 when unit is started.

AR3 - not used in this application
AR3 - not used in this application

AR5 - CONDENSER FAN RELAY
Normally open
The relay will be energized 2 seconds after (AR6) is energized when the thermostat logic is calling for cooling. The relay energizes the condenser motor starter.

AR6 - COMPRESSOR RELAY
Normally open
The relay will be energized when the thermostat logic is calling for cooling.
The relay energizes the compressor motor starter. high-pressure failure will de-energize AR6 and stop the compressor.

AR 7 - EVAPORATOR FAN RELAY
Normally open. This relay will be energized at all times except during defrost.

AR 8 - DEFROST RELAY
Normally open. The relay will be energized, when the thermostat logic calls for defrost.
This relay energizes the solenoid of the hot gas valve.

6.4 SERVICE COMPONENTS

a. Sight glasses are mounted in the liquid receiver to determine if the refrigerant charge is correct. Check the container at 0°C (32°F) container temperature. (See Section 5.2, 5.3 & 5.4).

b. Filter drier, use the moisture indicator located in the liquid line after the filter drier to determine if moisture is in the system. A dirty clogged filter can be detected by a noticeable temperature change between the filter inlet tube and its' outlet tube.

6.5 TROUBLE SHOOTING CHART

The following trouble shooting chart is by no means complete, but covers the more general type of problems, which would be most likely if a breakdown is experienced.

PROBLEM	
POSSIBLE CAUSE	CORRECTIVE ACTION SUGGESTED
Power to Unit But Will Not Start	
CB2 Tripped	Reset
CB1 Tripped	Reset
No Control Circuit Voltage at T1	Check Primary Side for 480BV at T1 Check for Proper Connections at T1 Replace T1 if Defective
No Control Circuit Voltage at Thermostat T27 to T26 (12V), T20 to T26 (24V)	Faulty SW1, Replace SW1

Thermostat Will Not Function Test	
No Voltage (12V) between T27, T32 When SW2 is Depressed	Fault SW2, Replace SW2
Faulty Thermostat	Replace
Compressor Will Not Run	
Compressor Contactor “C” Coil Faulty, or Mechanical Failure of Contactor	Replace Contactor
High Pressure Switch (HP) Open, Discharge Pressure Too High	Remedy Reason for High Discharge Pressure
Defective HP Switch	Replace
Open Compressor Windings Due to Thermal Protection Switch Being Open	Remedy Cause of Overheating
Open Compressor Windings When Compressor is Cool	Replace Compressor
Evaporator Fan Does Not Run	
Faulty Phase Sensor “PS”	Replace
“PC1” or “PC@” Phase Changing Contactor Faulty	Replace Contactor
Motor Internal Thermal Protection Open or Windings Open	Replace Motor
Condenser Fan and Evaporator Fans Do Not Run	
See – Evaporator Fan Does Not Run	
Condenser Fan Only Will Not Run	
“CF” Condenser Fan Contactor Faulty	Replace
Motor Internal Thermal Protection Open or Motor Windings Open	Replace Motor
Both Fans Run Backwards	
Phase Sensor “PS” Faulty Does Not Change Phase. Check With Test Button	Replace “PS”
Circuits 50 & 51 From PS to PC1 and PC2 Cross Wired	Correct Wiring
One of the 2 Fans Runs Backwards	
Motor or Condenser Fan “CF: Contactors May be Mis-wired	Correct Wiring
No Hot Gas for Defrosting/Heating	
Coil of Hot Gas Valve Faulty	Replace Coil
Mechanical Fault in Valve Body	Replace Valve
Compressor Not Running	See – Compressor Will Not Run
Box Temperature Too High	
Return Air Probe Circuit Open	Check Wiring, Replace Probe
Faulty Thermostat	Replace Thermostat
Box Temperature Too Low	
Return Air Probe Circuit Shorted	Check Wiring, Replace Probe
Faulty Thermostat	Replace Thermostat
Defrost Too Often	
Air Flow Too Low or No Air Flow	Check Evaporator Fan for Operation and Rotation
Defrost Duration Too Long	
Too Little Hot Gas	See – No Hot Gas for Defrosting/Heating
Defrost Probe Not in Proper Location	Locate Probe Properly
Cooling Capacity Problem	
Refrigerant Level Too Low	Check & Add Refrigerant if Required
Low Air Flow, Fans Not Running or Running in the Proper Direction	Check & Correct
Non-condensable (air) in Refrigerant System	Purge Condenser Coil and Receiver

Faulty TXV	Replace TXV
One or Both Kazoos Missing From Condensate Hose	Install Where Required
Hot Gas Leaking Through the Valve	Replace Valve
Severe Lube Oil Overcharge	Remove Excess Oil. Check Oil Level (allow oil level to be within sight glass when compressor is hot and has been running for 10 to 15 minutes)
Compressor Mechanical Problem Reducing Pumping Capacity	Replace Defective Compressor
Alarm Horn Fails to Sound	
No 12 VDC Battery Power	Check Battery & Correct Problem
Faulty Horn	Replace
Faulty SW1	Replace Switch
Battery Does Not Get Charged While Operating On House Power	
Battery Charger in Electrical Box Failed	Replace
Transformer T1 in Electrical Box Failed or is Misplaced	Replace T1 or correct Wiring
Circuit Breaker CB3 is Tripped	Reset

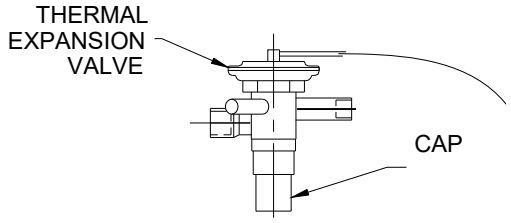
TXV Adjustment

The expansion valve is set and tested at the factory before shipping. Klinge DOES NOT recommend adjusting the super heat setting of the TVX. However, in very rare situations when the TXV is faulty, the super heat can be adjusted.

The expansion valve adjustment is capped for protection. Remove the protective cap. To reduce the superheat, turn the adjustment stem counterclockwise or to the left. To increase, turn the adjustment stem clockwise or to the right.

Only make one full turn at a time, it may take approximately 30 minutes after each adjustment before a new balance can be acquired.

To properly check the super heat, set the thermostat to -23˚C (-10˚F). After waiting 5 minutes observe the suction line, it should be frosted back to the suction service valve without frost on the compressor. The bottom of the compressor should be warm to the touch.



KLINGE CORPORATION

TEMPERATURE – PRESSURE CHART

FOR USE WHEN CONVERTING PRESSURE TO TEMPERATURE WHEN CALCULATING THE SUPERHEAT. **R-12** ADDED FOR REFERENCE ONLY.

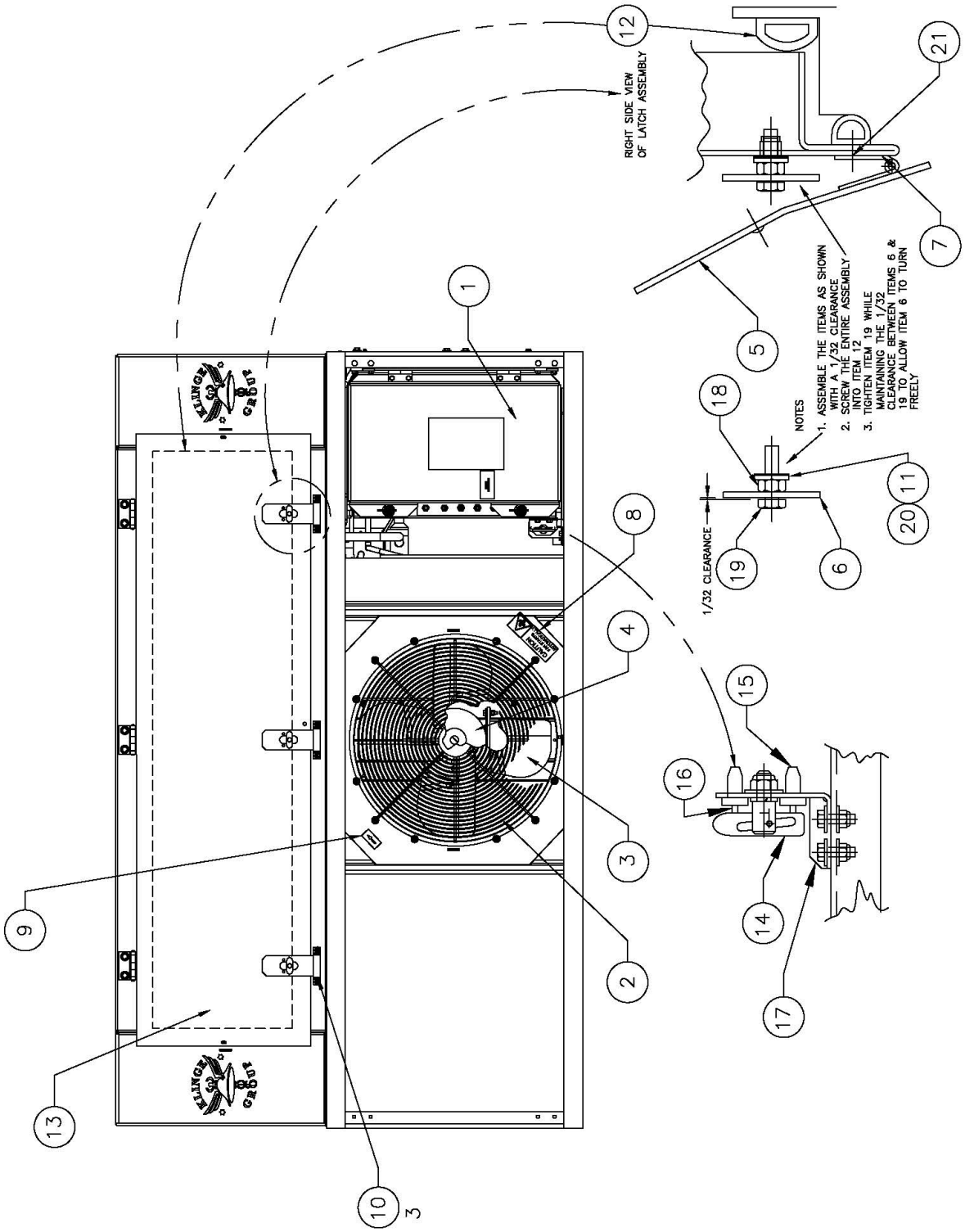
DEGREES FAHRENHEIT	DEGREES CENTIGRADE	R-12 PSIG	R-22 PSIG	R-502 PSIG	R-134A PSIG	R-404A (HP-62) PSIG
-50	-45.6	15.4	6.2	0.2	18.4	0
-48	-44.4	14.6	4.8	0.7	17.7	0.8
-46	-43.3	13.8	3.4	1.5	17	1.6
-44	-42.2	12.9	2	2.3	16.2	2.5
-42	-41.1	11.9	0.5	3.2	15.4	3.4
-40	-40.0	11	0.5	4.1	14.5	5.5
-38	-38.9	10	1.3	5	13.7	6.5
-36	-37.8	8.9	2.2	6	12.8	7.5
-34	-36.7	7.8	3	7	11.8	8.6
-32	-35.6	6.7	4	8.1	10.8	9.7
-30	-34.4	5.5	4.9	9.2	9.7	10.8
-28	-33.3	4.3	5.9	10.3	8.6	12
-26	-32.2	3	6.9	11.5	7.7	13.2
-24	-31.1	1.6	7.9	12.7	6.2	14.5
-22	-30.0	0.3	9	14	4.9	15.8
-20	-28.9	0.6	10.1	15.3	3.6	17.1
-18	-27.8	1.3	11.3	16.7	2.3	18.5
-16	-26.7	2.1	12.5	18.1	0.8	20
-14	-25.6	2.8	13.8	19.5	0.3	21.5
-12	-24.4	3.7	15.1	21	1.1	23
-10	-23.3	4.5	16.5	22.6	1.9	24.6
-8	-22.2	5.4	17.9	24.2	2.8	26.3
-6	-21.1	6.3	19.3	25.8	3.6	28
-4	-20.0	7.2	20.8	27.5	4.5	29.8
-2	-18.9	8.2	22.4	29.3	5.5	31.6
0	-17.8	9.2	24	31.1	6.5	33.5
2	-16.7	10.2	25.6	32.9	7.5	34.8
4	-15.6	11.2	27.3	34.9	8.5	37.4
6	-14.4	12.3	29.1	36.9	9.6	39.4
8	-13.3	13.5	30.9	38.9	10.8	41.6
10	-12.2	14.6	32.8	41	12	43.7
12	-11.1	15.8	34.7	43.2	13.1	46
14	-10.0	17.1	36.7	45.4	14.4	48.3
16	-8.9	18.4	38.7	47.7	15.7	50.7
18	-7.8	19.7	40.9	50	17	53.1
20	-6.7	21	43	52.5	18.4	55.6
22	-5.6	22.4	45.3	54.9	19.9	58.2
24	-4.4	23.9	47.6	57.5	21.4	60.9
26	-3.3	25.4	49.9	60.1	22.9	63.6
28	-2.2	26.9	52.4	62.8	24.5	66.5
30	-1.1	28.5	54.9	65.6	26.1	69.4
32	0.0	30.1	57.5	68.4	27.8	72.3
34	1.1	31.7	60.1	71.3	29.5	75.4
36	2.2	33.4	62.8	74.3	31.3	78.5
38	3.3	35.2	65.6	77.4	33.2	81.8
40	4.4	36.9	68.4	80.5	35.1	85.1
42	5.6	38.8	71.3	83.8	37	88.5
44	6.7	40.7	74.5	87	39.1	91.9
46	7.8	42.7	77.6	90.4	41.1	95.5
48	8.9	44.7	80.7	93.9	43.3	99.2
50	10.0	46.7	84	97.4	45.5	102.9

DEGREES FAHRENHEIT	DEGREES CENTIGRADE	R-12 PSIG	R-22 PSIG	R-502 PSIG	R-134A PSIG	R-404A (HP-62) PSIG
52	11.1	48.8	87.3	101	47.7	109
54	12.2	51	90.8	104.8	50.1	113
56	13.3	53.2	94.3	108.6	52.3	117
58	14.4	55.4	97.9	112.4	55	121
60	15.6	57.7	101.6	116.4	57.5	125
62	16.7	60.1	105.4	120.4	60.1	130
64	17.8	62.5	109.3	124.6	62.7	134
66	18.9	65	113.2	128.8	65.5	139
72	22.2	72.9	125.7	142.2	74.2	153
74	23.3	75.6	130	146.8	77.2	158
76	24.4	78.4	134.5	151.5	80.3	164
78	25.6	81.3	139	156.3	83.5	169
80	26.7	84.2	143.6	161.2	86.8	174
82	27.8	87.2	148.4	166.2	90.2	180
84	28.9	90.2	153.2	171.4	93.6	185
86	30.0	93.3	158.2	176.6	97.1	191
88	31.1	96.5	163.2	181.9	100.7	197
90	32.2	99.8	168.4	187.4	104.4	203
92	33.3	103.1	173.7	192.9	108.2	209.9
94	34.4	106.5	179.1	198.6	112.1	215
96	35.6	110	184.6	204.3	116.1	222
98	36.7	113.5	190.2	210.2	120.1	229
100	37.8	117.2	195.9	216.2	124.3	235
102	38.9	120.9	201.8	222.3	128.5	242
104	40.0	124.7	207.7	228.5	132.9	249
106	41.1	128.5	213.8	234.9	137.3	256
108	42.2	132.4	220	241.3	142.8	264
110	43.3	136.4	226.4	247.9	146.5	271
112	44.4	140.5	232.8	254.6	151.3	279
114	45.6	144.7	239.4	261.5	156.1	286
116	46.7	148.9	246.1	268.4	161.1	294
118	47.8	153.2	252.9	275.5	166.1	302
120	48.9	157.7	259.9	282.7	171.3	311
122	50.0	162.2	267	290.1	176.6	319
124	51.1	166.7	274.3	297.6	182	328
126	52.2	171.4	281.6	305.2	187.5	336
128	53.3	176.2	289.1	312.9	193.1	345
130	54.4	181	296.8	320.8	198.9	354
132	55.6	185.9	304.6	328.9	204.7	364
134	56.7	191	312.5	337.1	210.7	373
136	57.8	196.1	320.6	345.4	216.8	383
138	58.9	201.3	328.9	353.9	223	392
140	60.0	206.6	337.3	362.6	229.4	402
142	61.1	212	345.8	371.4	235.8	413
144	62.2	217.5	354.5	380.4	242.4	423
146	63.3	223.1	363.3	389.5	249.2	434
148	64.4	228.8	372.3	398.9	256	444
150	65.6	234.6	381.5	408.4	263	449

NOTE: THE USE OF ANY REFRIGERANT NOT SPECIFICALLY DESIGNATED BY THE MANUFACTURER MAY VOID THE WARRANTY.

SECTION SEVEN SERVICE PARTS

SECTION 7.1 UNIT FRONT VIEW

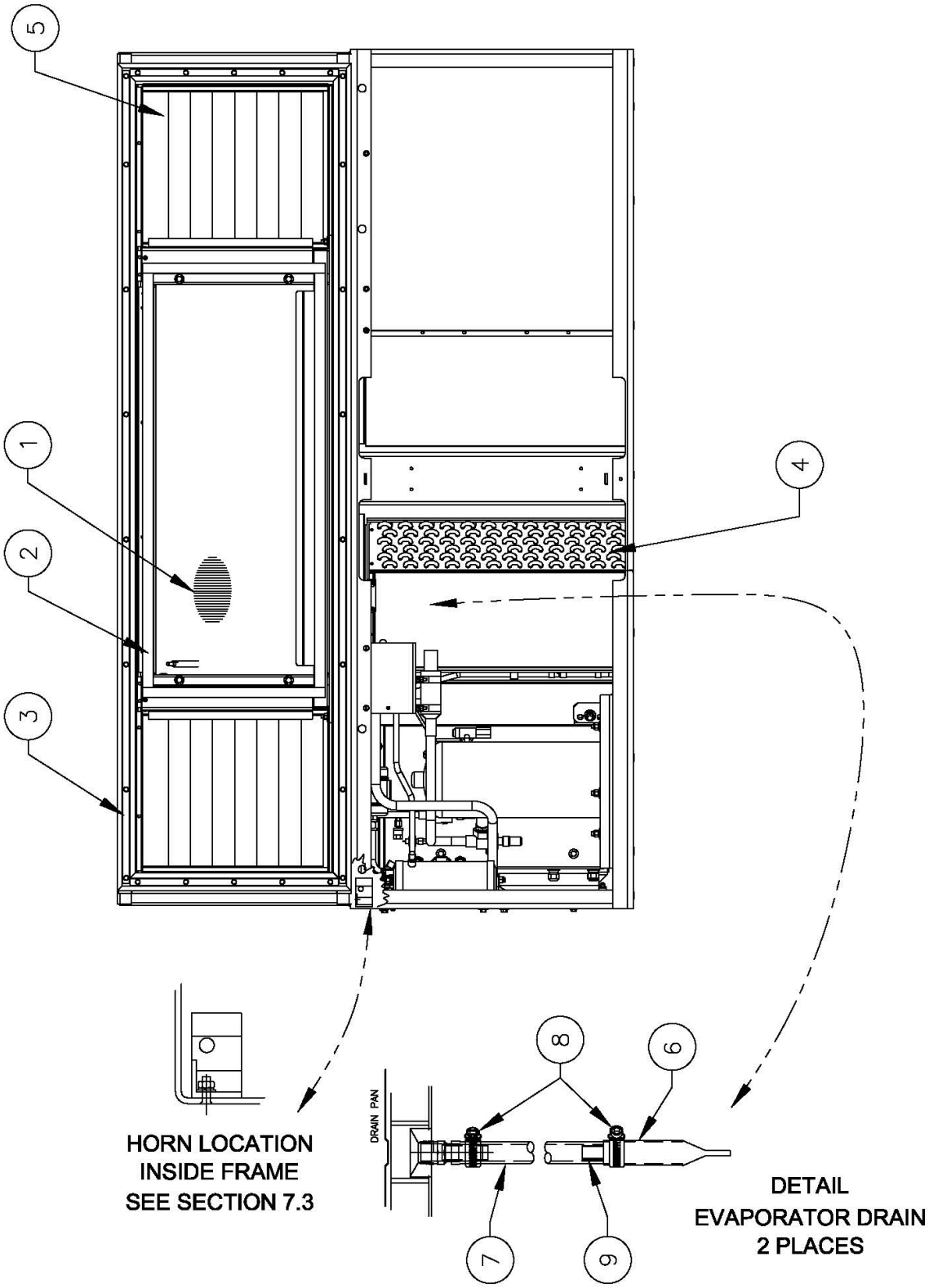


SECTION 7.1
UNIT FRONT VIEW

SECTION 7.1 UNIT FRONT VIEW

ITEM	PART NO.	DESCRIPTION	QTY.
1	360-14754-10	R.H. ELECTRICAL BOX COMPLETE NMR-171A-10	1
2	K26-24897-00	GUARD 20.75 DIA FAN	1
3	K26-24874-00	FAN 20.75 DIA 7/8 BORE 4 BLADE	1
4	K24-21158-00	MOTOR CONDENSER 2 HP 1800 RPM	1
5	360-07969-00	LATCH WELDED PASS & POLISH	3
6	060-07971-00	KNOB PASS & POLISH	3
7	K28-10873-00	INSULATOR	3
8	K35-04602-01	LABEL CAUTION FAN STARTS AUTOMATICALLY	1
9	K35-05606-00	LABEL ARROW 1” x 2”	1
10	060-07964-00	KEEPER DOOR LATCH PASS & POLISH	3
11	K21-18510-06	WASHER INSULATED PVC M6	3
12	K28-10232-00	SEAL INSIDE DOOR	1
13	360-10817-00	DOOR EVAPORATOR HINGED FOAMED	1
		(INCLUDES ITEMS 5, 6, 7, 18 THRU 21)	
14	K21-16315-00	FASTENER M12-1.75 SS ANTILUCE	2
15	K28-10848-03	PLUG BUMPER .5 DIA x 1.25 LONG	4
16	060-12494-00	PIN NYLON BLACK 3/16 DIA.	4
17	060-10833-00	SUPPORT ELECTRICAL BOX RETAINER R.H.	1
18	K21-50103-06	NUT HEX SS M6 X 1.0	3
19	K21-50224-25	SCREW HEX SS M6 x 1.0 x 25	3
20	K21-16547-06	WASHER FLAT SS M6	3
21	K21-15910-04	RIVET SS 3/16 (15-25)	3

SECTION 7.2 UNIT REAR VIEW

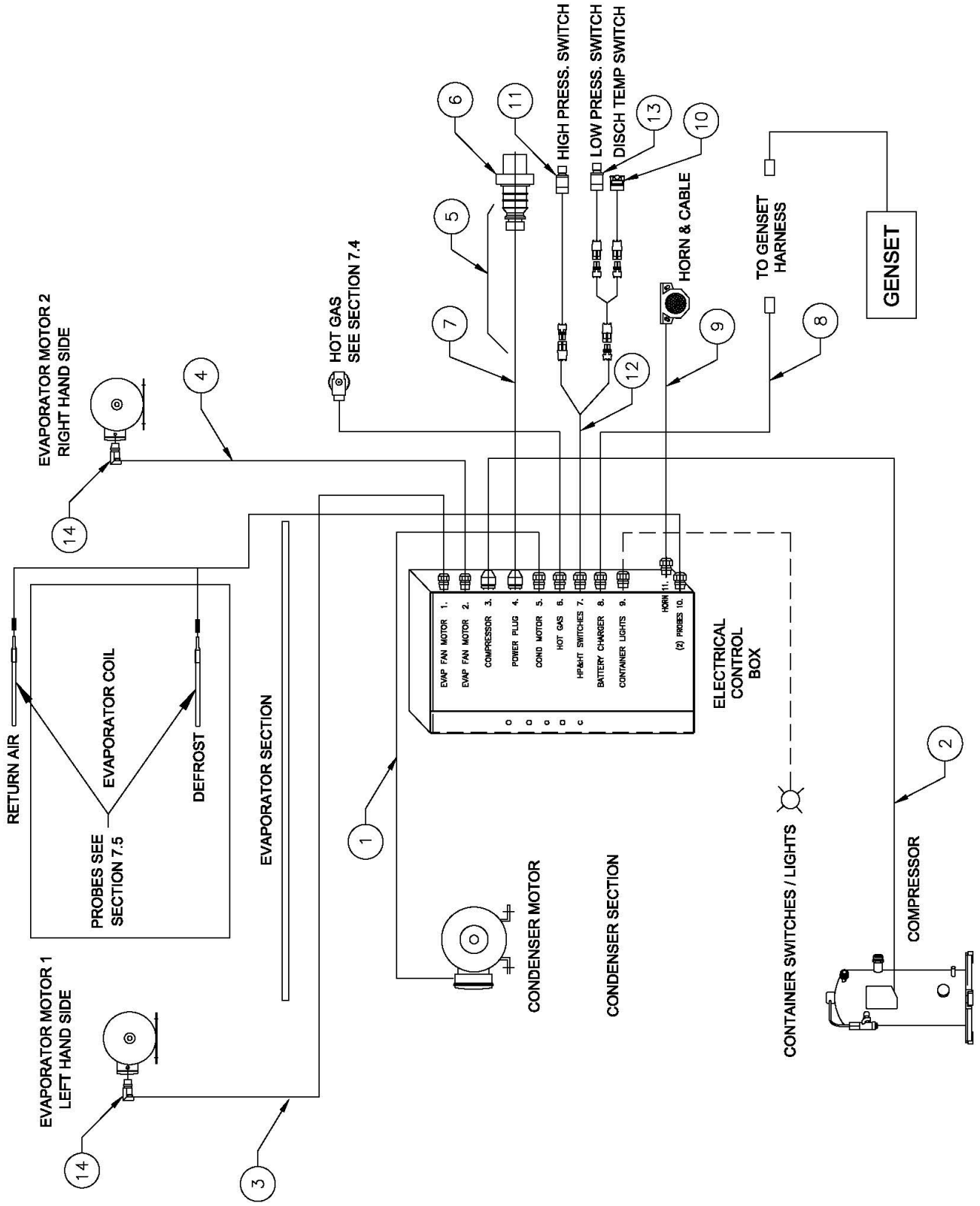


SECTION 7.2
UNIT REAR VIEW

SECTION 7.2 UNIT REAR VIEW

ITEM	PART NO.	DESCRIPTION	QTY.
1	K26-24888-00	COIL EVAPORATOR 1/2” TUBE	1
2	060-07422-04	STRIP SPONGE 3/4 x 1 x CUT 120”	1
3	K28-10913-00	GASKET EVAPORATOR D/D 19-1/8” X 76”	1
4	K26-24866-00	COIL CONDENSER 3/8” TUBE RH	1
5	360-11138-00	LOUVER EVAPORATOR DISCHARGE	16
6	060-02709-00	TUBE KAZOO EPDM 1.5” X 9” LG	1
7	060-02708-00	TUBE PLASTIC PVC 3/4” X 1” X 78” LG	1
8	K21-16231-00	CLAMP HOSE .73”-1.5” DIA	4
9	060-01417-00	TUBE CU 5/8” X .035 WALL X 2.06”	2

SECTION 7.3 CABLE DIAGRAM

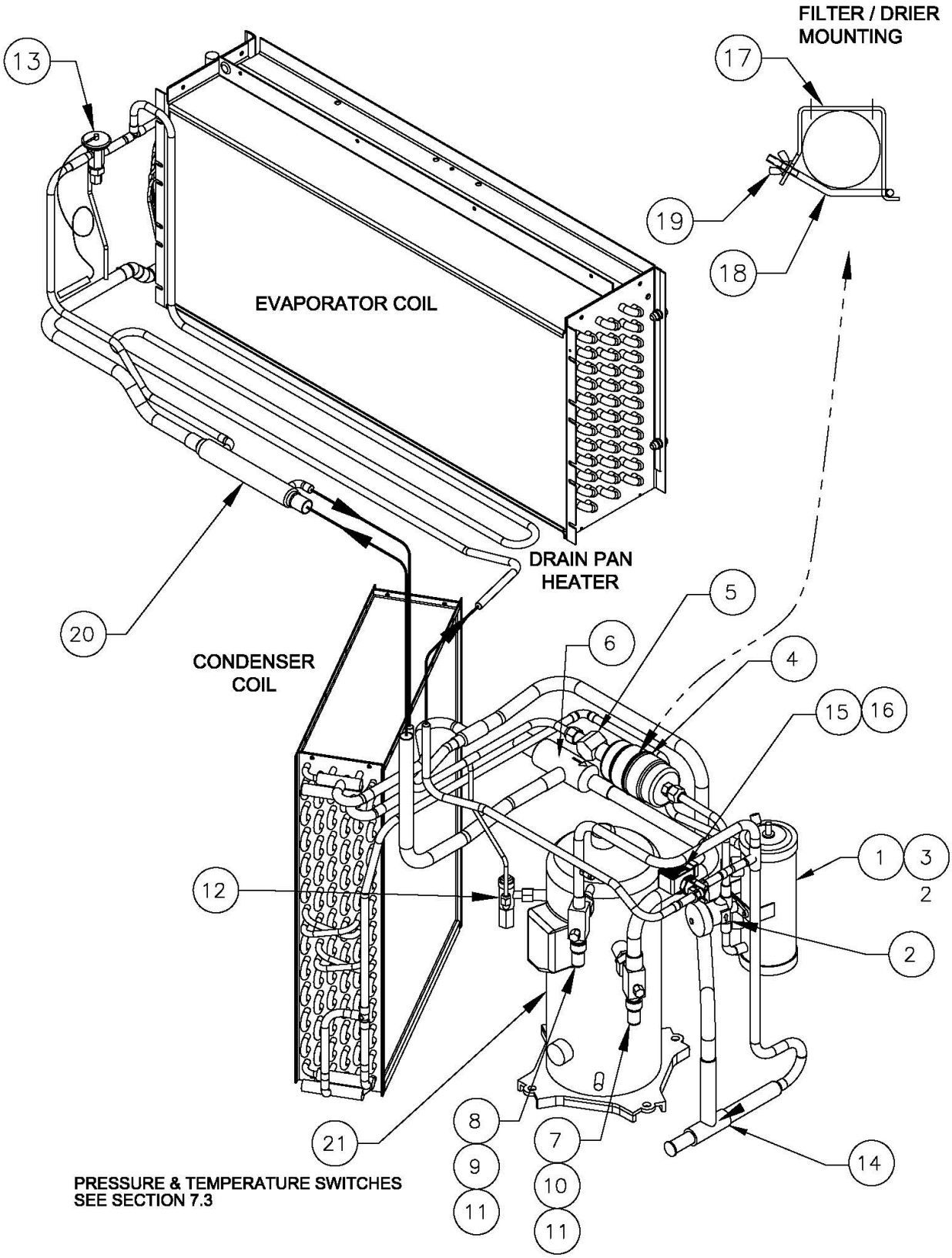


SECTION 7.3
CABLE DIAGRAM

SECTION 7.3 CABLE DIAGRAM

ITEM	PART NO.	DESCRIPTION	QTY.
1	360-14781-02	CABLE ELECTRICAL BOX TO CONDENSER MOTOR	1
2	360-15455-00	CABLE ELECTRICAL BOX TO COMPRESSOR	1
3	360-14779-02	CABLE ELECTRICAL BOX TO EVAP MOTOR 1 LH	1
4	360-14780-02	CABLE ELECTRICAL BOX TO EVAP MOTOR 2 RH	1
5	360-11846-02	CABLE MAIN POWER 460 VAC 64 FT	1
		(CONTAINS ITEMS 6 & 7)	
6	K25-20474-00	PLUG POWER 32A 380/440V 3P+G	1
7	060-11114-01	CORD ELECTRICAL SO 10/4 CUT 64 FT LG	1
8	360-13648-20	CABLE BATTERY CHARGER DISCONNECT NMR	1
9	360-13349-04	HORN ASSEMBLY PULSATING WITH CABLE	1
10	360-13234-01	SWITCH DISCHARGE TEMP NC OPEN 104^{O}C CLOSE 77^{O}C	1
11	360-13232-01	SWITCH HIGH PRESS NC OPEN 31 BAR CLOSE 21 BAR	1
12	360-14787-00	HARNESS HP & TEMP SWITCH PLUGS TO BOX	1
13	360-18155-01	SWITCH LOW PRESSURE NC 5-20 PSI	1
14	K25-26633-01	CONNECTOR NYLON 1/2 NPT 90 DEG	2

SECTION 7.4 REFRIGERANT PIPING

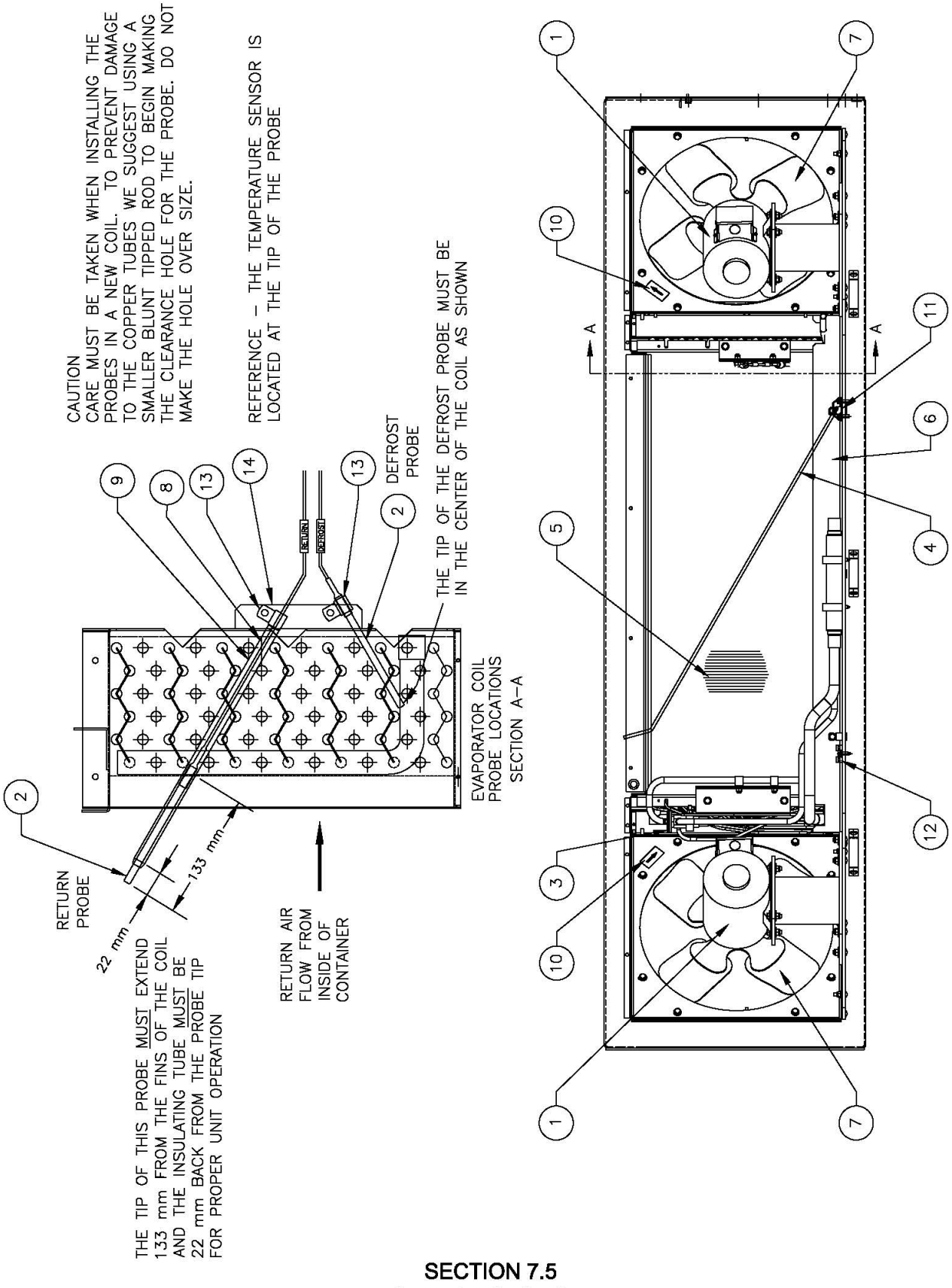


SECTION 7.4
REFRIGERANT PIPING

SECTION 7.4 REFRIGERANT PIPING

ITEM	PART NO.	DESCRIPTION	QTY.
1	360-10738-00	RECEIVER RH WITH HAND VALVE	1
		(INCLUDES ITEMS 2 AND 3)	
2	K22-01672-00	VALVE HAND SHUT OFF 1/2" C BRASS (PART OF ITEM #1)	1
3	K26-25031-00	SIGHT GLASS (PART OF ITEM #1)	2
4	K26-10795-00	FILTER / DRIER 1/2 SAE MALE FLARE	1
5	K22-22196-00	INDICATOR MOISTURE 1/2 SAE FLARE MALE - FEMALE	1
6	K22-06950-11	VALVE SUCTION REGULATOR 1-1/8 30 PSI SHORT LEGS	1
7	K22-06910-00	VALVE ROTA 1-1/4"-12 x 7/8" C BRASS TOP PORT	1
8	K22-06970-00	VALVE ROTALOCK 1"-14 x 5/8" C BRASS TOP PORT	1
9	K28-08249-00	SEAL TEFLON .75 OD .63 ID .062 THK FOR ROTOLOCK 1"	1
10	K28-04836-00	SEAL TEFLON 1" OD .88" ID .062 THK FOR ROTOLOCK 1-1/4"	1
11	K22-06972-00	CAP SERVICE VALVE 3/4-16	2
12	K15-00042-04	KIT VALVE DISCHARGE TEMPERATURE CONTROL (DTC)	1
13	K25-26093-00	VALVE TX 3/8 C x 1/2 C	1
14	K22-06911-00	VALVE DISCHARGE PRESSURE REGULATOR 7/8 C 180 PSIG	1
15	K25-26089-01	VALVE SOLENOID 1/2 ODF NORMALLY CLOSED LESS COIL	1
16	360-14789-00	COIL SOLENOID NC 24 VAC 1194 MM LEADS 1/2 CONDUIT	1
17	060-06902-00	BRACKET DRIER MOUNTING	1
18	360-06903-00	BOLT DRIER MOUNTING	1
19	K21-00642-00	NUT WING BRASS 1/4-20	1
20	K26-17451-01	HEAT EXCHANGER SUCTION ACCUMULATER WITH LABEL	1
21	K15-00038-10	COMPRESSOR SCROLL WITH ROTALOCK FITTINGS	1

SECTION 7.5 EVAPORATOR DECK VIEW

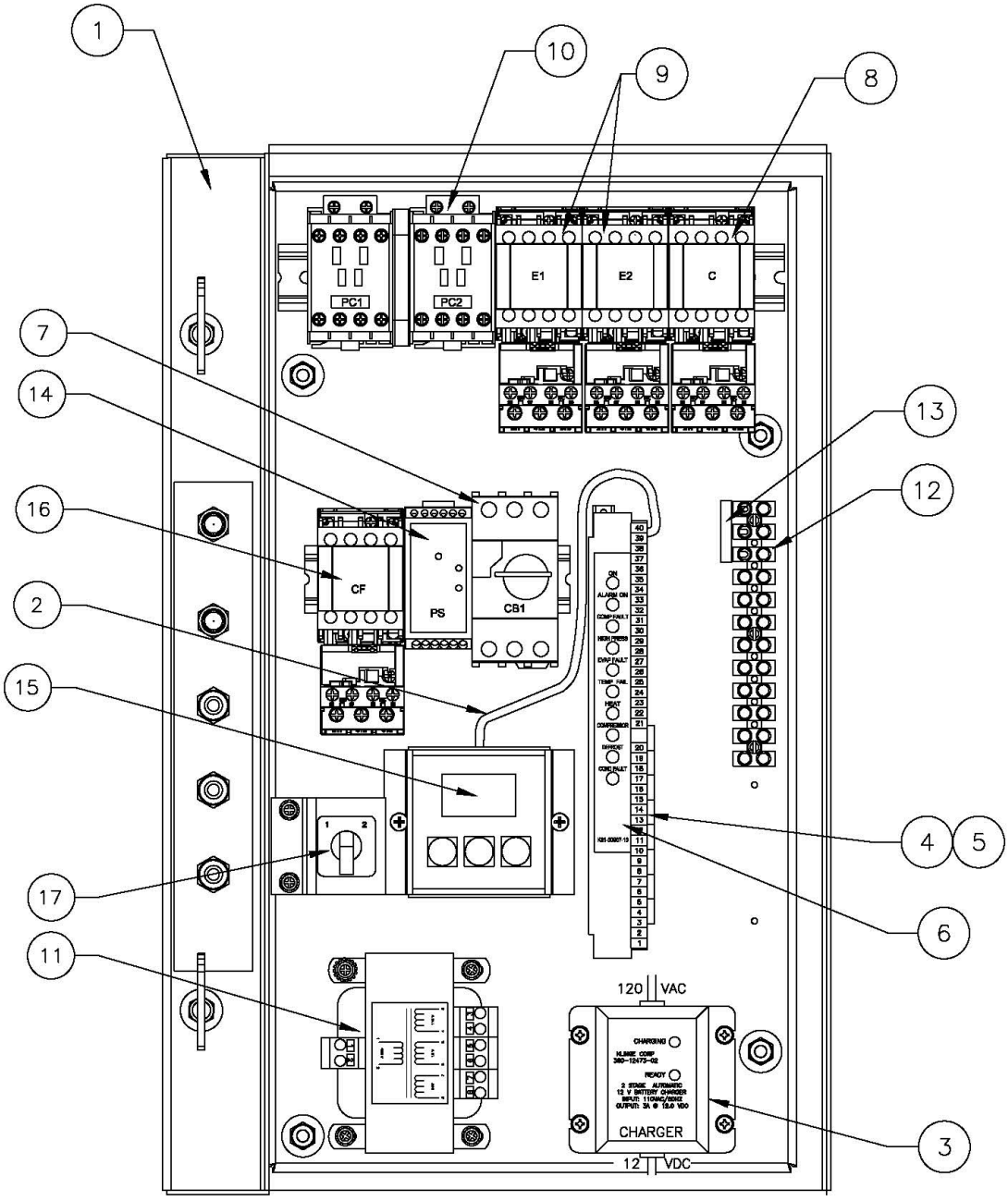


SECTION 7.5
EVAPORATOR SECTION VIEW

SECTION 7.5 EVAPORATOR DECK VIEW

ITEM	PART NO.	DESCRIPTION	QTY.
1	360-15446-00	MOTOR EVAPORATOR	2
2	360-13807-01	KIT PROBE 6” RETURN & DEFROST	2
3	K25-26093-00	VALVE TX 3/8 X 1/2 X 1/4	1
4	060-06456-00	ROD SUPPORT EVAPORATOR COVER	1
5	K26-25155-00	COIL EVAPORATOR 1/2 TUBE DUAL	1
6	060-06835-00	PAN DRAIN WELDED	1
7	K26-24892-00	FAN 16 DIA 14 DEG 1/2 BORE 4	2
8	060-13372-00	SPACER RETURN PROBE	1
9	060-13371-00	TUBE RETURN PROBE THRU COIL	1
10	K35-05606-00	LABEL ARROW 1” X 2”	2
11	060-06457-00	BRACKET DOOR SUPPORT	1
12	060-06458-00	CLIP RETAINER	1
13	K21-15649-01	CLAMP CUSHION SS 1/4 ID	2
14	060-13373-00	SUPPORT PROBES	1

SECTION 7.6A ELECTRICAL CONTROL BOX INTERNAL (RIGHT HAND SIDE)



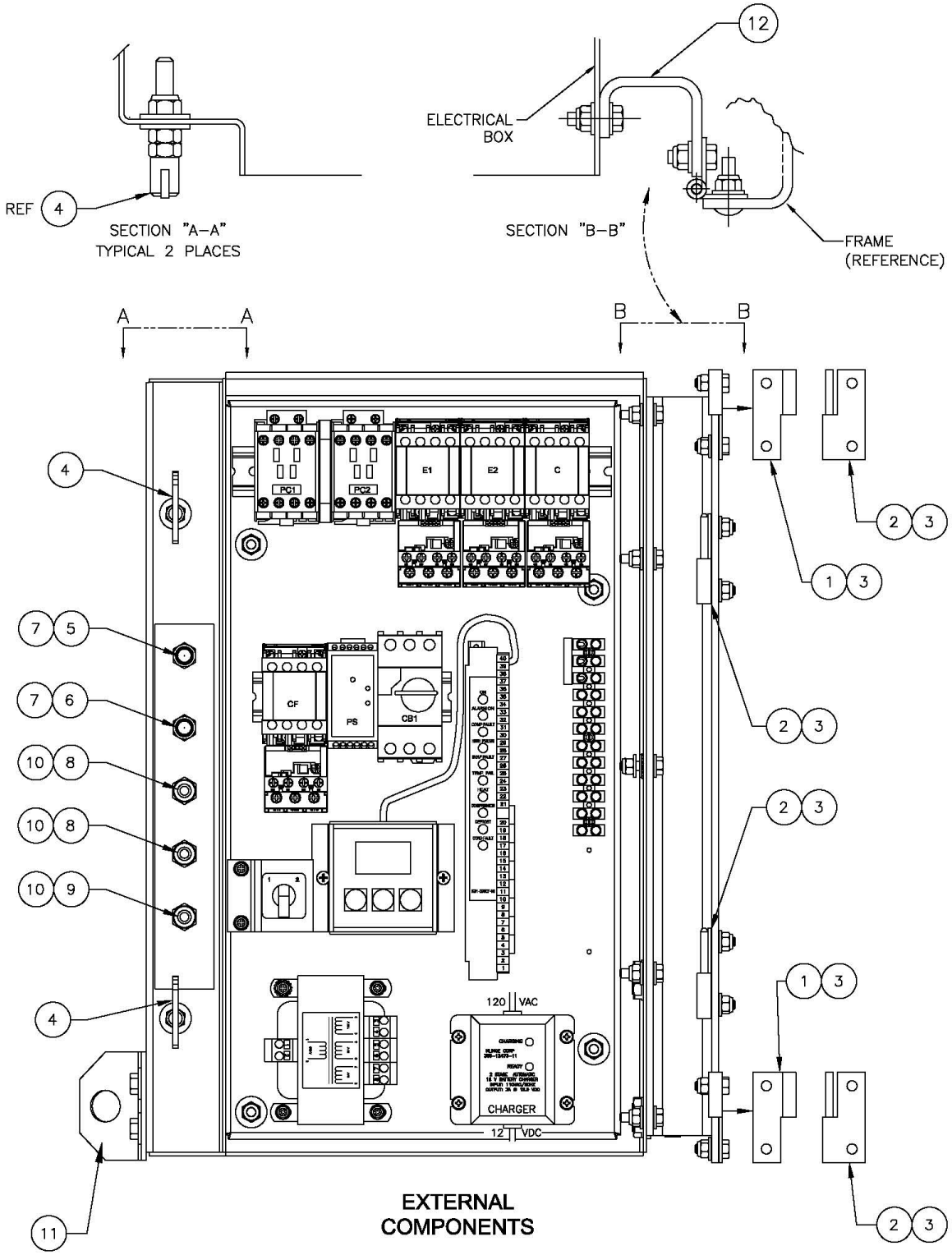
INTERNAL
COMPONENTS

SECTION 7.6 A
CONTROL BOX

SECTION 7.6A ELECTRICAL CONTROL BOX INTERNAL (RIGHT HAND SIDE)

ITEM	PART NO.	DESCRIPTION	QTY.
1	360-14754-10	ELECTRICAL BOX RIGHT HAND COMPLETE	1
		CONSISTING OF ITEMS (2 THRU 17 SECTION 7.6A) AND	
		(1 THRU 12 SECTION 7.6B)	
2	360-12540-01	CABLE RIBBON SHIELDED 10 WIRE 18 IN LONG	1
3	360-12473-11	BATTERY CHARGER MODIFIED FOR NMR	1
4	360-10829-00	BASE THERMOSTAT WITH LABEL INCLUDES ITEM 5	1
5	K25-26139-00	HOLDER CARD (SET OF 2 TOP & BOTTOM)	1
6	K31-00907-10	THERMOSTAT LABELED SINGLE COOL AND HEAT NMR	1
7	K24-22363-25	CIRCUIT BREAKER 19-25 AMP 3 POLE	1
8	K24-22230-00	STARTER COMPRESSOR 16 AMP 3 POLE 24 VAC	1
9	K24-22232-00	STARTER MOTOR 9 AMP 3 POLE 24 VAC	2
10	K24-22169-00	CONTACTOR REVERSING 16 AMP 6 POLE 24 VAC	1
11	K25-26404-00	TRANSFORMER 460V – 12V/24V/110V	1
12	K25-26488-12	TERMINAL BLOCK 12 POLE	1
13	K25-26550-03	JUMPER TERMINAL BLOCK 3 POLE	1
14	K31-00809-00	PHASE SENSOR	1
15	K31-00811-00	DISPLAY TEMPERATURE AND SELECTOR C/F	1
16	K24-22509-00	STARTER MOTOR 9 AMP 3 POLE 24 VAC	1
17	K24-22392-01	SWITCH ROTARY 3P 10 AMP	1

SECTION 7.6B ELECTRICAL CONTROL BOX EXTERNAL (RIGHT HAND SIDE)

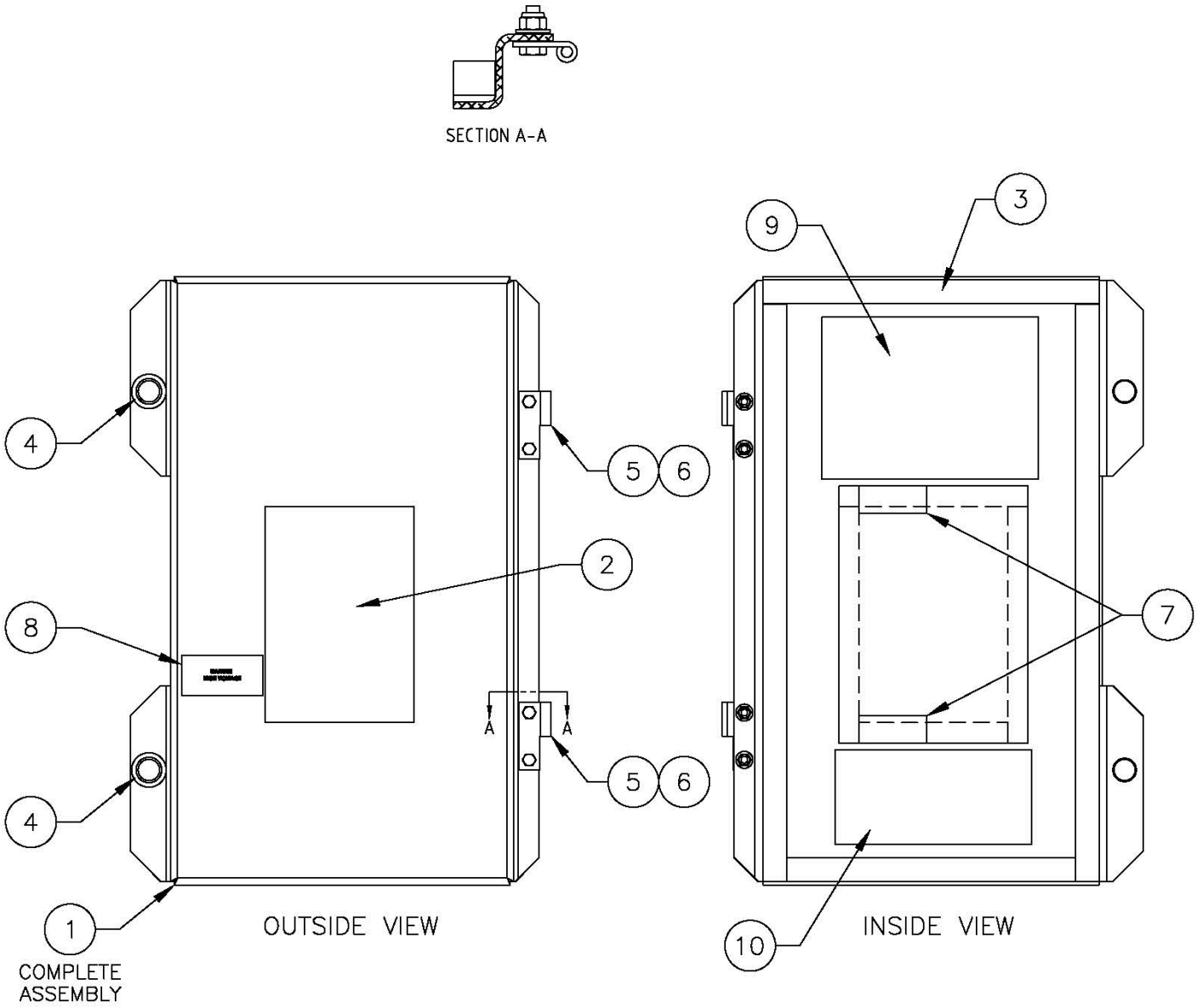


SECTION 7.6 B
CONTROL BOX

SECTION 7.6B ELECTRICAL CONTROL BOX EXTERNAL (RIGHT HAND SIDE)

ITEM	PART NO.	DESCRIPTION	QTY.
1	K29-17879-01	HINGE SLIP SS 9/32 HOLES WITH SOCKET	2
2	K29-17880-02	HINGE SLIP SS 9/32 HOLES WITH PIN	4
3	060-09113-00	INSULATOR HINGE	6
4	K21-16313-00	FASTENER BABY ANTILUSE M8 x 1.25	2
5	K24-22144-00	SWITCH TOGGLE 3PST ON-OFF #6 SCREW	1
6	K24-21355-00	SWITCH TOGGLE SPDT ON-(MOM-ON) #6 SCREW	1
7	K24-17239-00	BOOT TOGGLE SWITCH	2
8	K24-20565-00	CIRCUIT BREAKER 8 AMP 1 POLE 1/4 PUSH ON	2
9	K24-22138-00	CIRCUIT BREAKER 5 AMP 1 POLE 1/4 PUSH ON	1
10	K24-18164-00	BOOT CIRCUIT BREAKER 3/8-27 THREAD	3
11	060-10820-00	RETAINER ELECTRICAL BOX PASSIVATE & POLISH	1
12	060-10748-00	BRACKET HINGE ELECTRIAL BOX	1

SECTION 7.7 DOOR ELECTRICAL BOX



SECTION 7.7
ELECTRICAL BOX DOOR

SECTION 7.7 DOOR ELECTRICAL BOX

ITEM	PART NO.	DESCRIPTION	QTY.
1	360-10801-00	DOOR ASSEMBLY ELECTRICAL BOX NMR-171A-10	1
		INCLUDES ITEMS (2 THRU 10)	
2	K28-10849-01	WINDOW ELECTRICAL BOX	1
3	K28-10813-00	STRIP SPONGE 3/8 x 7/8 SOFT CLOSED CELL	6.50 FT
4	K28-10847-04	GROMMET INSERT .875 HOLE SIZE	2
5	K29-17879-01	HINGE SLIP SS 9/32 HOLES SOCKET	2
6	060-09113-00	INSULATOR HINGE	2
7	K28-09446-00	STRIP SPONGE 3/4” X 1” (CUT 2 PIECES 2.50 IN LG)	0.42 FT
8	K35-05899-00	LABEL DANGER HIGH VOLTAGE 1.5 X 3	1
9	K35-06310-02	LABEL ELECTRICAL SCHEMATIC NMR-171A-10	1
10	K35-06311-02	LABEL COMPONENT LAYOUT	1

SECTION 7.8 SUGGESTED SPARE PARTS LIST

ITEM	DESCRIPTION	PART NO.	QTY
1	Boot, Switch	K24-17239-00	1
2	Boot, Circuit Breaker	K24-18164-00	1
3	Circuit Breaker, 25A	K24-22363-25	1
4	Circuit Breaker, 8A	K24-20565-00	1
5	Switch, On-Off	K24-22144-00	1
6	Starter Compressor	K24-22230-00	1
7	Contactor Reversing	K24-22169-00	1
8	Starter Condenser	K24-22509-00	1
9	Transformer 460 - 12/24V	K25-26404-00	1
10	Coil, Solenoid Valve	360-14789-00	1
11	Thermostat	K31-00907-10	1
12	Phase Sensor	K31-00809-00	1
13	Touch Pad	K31-00811-00	1
14	Switch, High Pressure	360-13232-01	1
15	Ribbon Cable 18" long	360-12540-01	1
16	Probe Kit Return & Defrost	360-13807-01	1
17	Battery Charger	360-12473-11	1
18	Thermostat Kit	K15-00042-00	1
19	Kit Temp Control Valve	K15-00042-04	1
20	Evaporator Fan Motor	360-15446-00	1
21	Condenser Fan Motor	K24-21158-00	1
22	Compressor	K15-00038-10	1
23	Starter Evaporator	K24-22232-00	1
24	Switch Discharge High Temperature	360-13234-01	1
25	Circuit Breaker, 5A	K24-22138-00	1