



Outdoor Condensing Unit Installation Instructions

GENERAL INSTALLATION INSTRUCTIONS

* To properly locate these outdoor air-cooled condensing units, carefully consider these important factors:

- Weight of the unit. If units are installed on the roof, their weight and weight distribution should be checked against the building specifications and the building codes.
- Distance of the unit to the refrigerated cabinet.
- Distance to the power supply.
- Space around the condensing unit and in between adjacent units. This should consider prevention of the re-circulation of the air and insure enough airflow through the unit. These distances should also provide enough room around the units so that enclosure panels may be removed and that adequate accessibility is provided to the compressor, electrical boxes and other controls. (See Diagram 1)
- Orientation of the units should consider the prevailing wind direction. It is recommended not to position the units in such a way that the airflow direction through the unit faces the prevailing wind direction for the area.

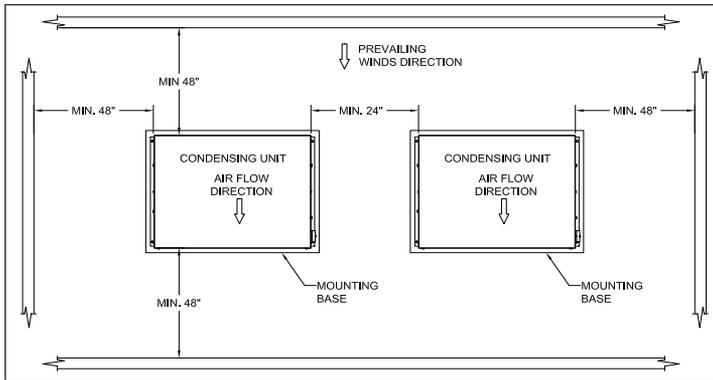
The units should be mounted and secured on adequate rigid and leveled bases, to avoid improper lubrication conditions for the compressor. Never use the shipment pallet as a permanent mounting base. If vibration is a concern then proper vibration isolators should be installed under the mounting base.

WARNING

Main power supply should always be disconnected and locked off to avoid accidental start up or electric shock. Failure to do so could result in injury or death.

Some parts like condenser fins or some corners on the sheet metal parts are sharp and may potentially cause injury. Use extra caution when working around these parts.

Diagram 1



Lifting/Handling Instructions

* When a crane is used to lift the unit then proper measures should be taken to protect the enclosure panels. It is strongly recommended the application of spreader bars to prevent damages to the sides. (See Diagram 2) Some care should be taken to locate the center of gravity before lifting. The compressor as the heaviest part of the unit may not be located in the center of the unit base.

* Never lift or displace the outdoor units with enclosure panels removed. All the panels should be in place and properly tightened. Don't remove the shipment pallet until the unit arrives at the final destination. If unit has to be re-located then apply a proper pallet to carry the unit.

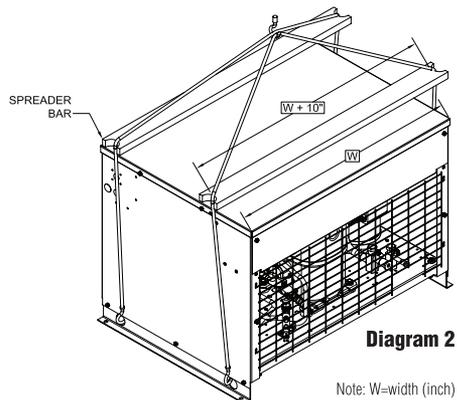


Diagram 2

Note: W=width (inch)

ELECTRICAL CONNECTIONS

In order that these units have the starting, operating and dependability characteristics required of them, the compressor and its protective devices are designed for operation within a very specific minimum and maximum voltage range. This voltage range is defined in the following table:

Voltage shown on Unit Nameplate	Voltage Code	Voltage Range
208 - 230/60/1	XD, XN, NA	253 - 197
208 - 230/60/3	XT, TB	253 - 180

Verify before any electrical installation if the voltage and phases of the supply satisfy those required of the unit.

CAUTION: Any non-compliance with voltage ranges and phase balances or any altering of electrical components without Tecumseh written approval will void the warranty.

Refer to "Minimum Circuit Ampacity" and "Maximum Fuse Size" data on the unit nameplate and applicable electrical codes to size the electrical wires, fuses and over current protection devices.

Refer to wiring diagram (attached inside of the electrical cabinet) to complete unit control circuit. If unavailable, refer to wiring diagram number in chart below and reference diagram in the appendix.

WD Number	Description
WD21-1T2	230V, 1 Phase, 1 Fan Motor
WD21-2AT2	230V, 1 Phase, 2 Fan Motors with fan control
WD21-2XT2, -2XT2C	230V, 1 Phase, 2 Fan Motors
WD23-1T2B	230V, 3 Phase, 1 Fan Motor
WD23-2AT2, -2YT2	230V, 3 Phase, 2 Fan Motors with fan control
WD23-2XT2, -2ZT2	230V, 3 Phase, 2 Fan Motors
WD21-104	WIRING DIAGRAM, 230-60-1, 1 Fan Motor
WD23-104	WIRING DIAGRAM, 230-60-3, 1 Fan Motor
WD21-204	WIRING DIAGRAM, 230-60-1, 2 Fan Motors
WD23-204	WIRING DIAGRAM, 230-60-3, 2 Fan Motors
WD23-208	WIRING DIAGRAM, 230-60-3, 2 Fan Motors

A pump down cycle should be employed to control all these units. Solenoid valve for the liquid line is an option that may be supplied loose and should be field installed by others. Room thermostat is supplied and installed by others.

REFRIGERANT PIPING (See Suction and Liquid Line Sizes in Appendix)

Standard piping practices and local/national codes should be employed to size and install refrigerant gas and liquid lines.

PIPING

Employ only Refrigeration grade copper tubing. Always keep the tubes free of moisture and dirt and remove any burrs present on the tubes.

A) The selection of the suction gas line sizes should be guided by the following criteria:

- Assurance of adequate velocity, thus ensuring oil return capability (the tube size must be limited to maintain velocities no less than 750 fpm for horizontal and down flow and no less than 1500 fpm for up flow)
- Assurance of acceptable pressure drop (The tube size should be limited to maintain pressure drop no greater than the equivalent of a 2°F temperature drop.)
- Assurance of satisfactory sound level (the tube size should be limited to maintain velocities no greater than 3000 fpm.)

Horizontal suction lines should be sloped downward in the direction of the compressor at least 1/2" per 10' of line. The appendix tables recommend suction line sizes for installations where the line is horizontal or down low. In the event the suction line is up, flow use "one standard size" smaller. A suction trap should be installed at the base of suction risers. Suction line lengths in excess 100 feet may require additional oil be added to the compressor.



PIPING (continued)

- B) Liquid line sizes are based on pressure drops that will not permit gas formation for horizontal lengths up to 100'. For lines longer than 100' horizontal and for lines that travel up vertically additional sub-cooling must be provided to overcome the vertical liquid head pressures and extra length. Liquid refrigerant in vertical column will exert a downward pressure of 0.5 – 0.6 pounds per linear foot of tube, and depending upon the direction of the refrigerant flow, will either add or subtract from the liquid line pressure drop.
- C) Elbows, valves and reduced joint sizes increase pressure drop and deserve additional consideration.
- D) Long radius elbows should be employed to minimize pressure losses.
- E) To prevent oxidation and scale forming inside the tubes it is recommended to flow dry nitrogen through the tubing during the soldering operations. A light flow of about ¼ CFM is sufficient.
- F) Follow the manufacturer's instructions when brazing service valves or other parts that may be damaged by excessive heat.
- G) After all leak check procedures (below) are complete, refrigerant lines that may be exposed to high and low ambient temperatures should be insulated. As a rule of thumb, suction lines should be insulated with an industry accepted material of no less than ¾" wall thickness. Liquid lines should also be insulated with at least ½" wall thickness. The insulating material should be of a kind intended for outdoor use.

PRESSURE TESTING FOR LEAKS

A pressure leak test is mandatory and is to be performed for the complete refrigeration system, including the condensing unit, prior to system charging.

To thoroughly leak check the system, the system should be pressurized to a maximum of 150 psig with dry nitrogen to the high and low side of the system. With the pressure equalized at 150 psig, a leak check should be performed on EVERY joint in the system, including the condensing unit, to ensure that no major leaks are present. The initial charge may then be released.

The leak check procedure should then be repeated using a much more accurate means to determine that the system is 100% free of leaks. Use of electronic leak detection equipment is highly recommended due to its potential accuracy when used correctly in accordance with the manufacturers instructions. If trace amounts of refrigerant are used, use only the refrigerant indicated on the serial label of the condensing unit.

If trace amounts of refrigerant are used during the leak check procedure, this must be properly recovered and disposed of in an appropriate manner to protect the environment.

As an added precaution, the leak check charge should be left in the system for no less than 12 hours without loss of pressure.

Every joint in the system including, but not limited to, factory welds, flare nuts and pressure controls must be leak checked.

A leak free system is required for the installation to function correctly.

SYSTEM FLUSHING, PURGING, AND PRESSURE TESTING FOR LEAKS

Failure to properly flush, purge, or pressure test a system for leaks can result in serious injury or death from explosion, fire, or contact with acid-saturated refrigerant or oil mists.

Follow these precautions when flushing, purging or pressure testing a system for leaks:

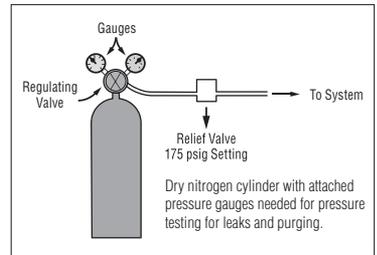
- Use flushing products according to the manufacturer's instructions
- To purge a system, use only dry nitrogen.
- When pressure testing for leaks, use only regulated dry nitrogen or dry nitrogen plus trace amounts of serial label refrigerant.
- When purging or pressure testing any refrigeration or air conditioning system for leaks, never use air, oxygen or acetylene.
 1. Oxygen can explode on contact with oil.
 2. Acetylene can decompose and explode when exposed to pressures greater than approximately 15 psig.
 3. Combining an oxidizing gas, such as oxygen or air, with an HCFC or HFC refrigerant under pressure can result in a fire or explosion.

SYSTEM FLUSHING, PURGING, AND PRESSURE TESTING FOR LEAKS (continued)

Use a pressure regulating valve and pressure gauges. (See Diagram 3)

- Commercial Cylinders of nitrogen contain pressures in excess of 2000 psig at 70°F. At pressures much lower than 2000 psig, compressors can explode and cause serious injury or death. To avoid over pressurizing the system, always use a pressure-regulating valve on the nitrogen cylinder discharge. The pressure regulator must be able to reduce the pressure down to 1 to 2 psig and maintain this pressure.
- The regulating valve must be equipped with two pressure gauges:
 - One gauge to measure cylinder pressure
 - One gauge to measure discharge or down stream pressure
- Use a pressure relief valve.
 - In addition to pressure regulating valve and gauges, always install a pressure relief valve. This can also be frangible disc type pressure relief device. This device should have a discharge port at least ½" NPT size. The valve or frangible disc device must be set to 175 psig.
- **Do not pressurize the system beyond 150 psig field leak test pressure.**
- **Disconnect nitrogen cylinder and release the pressure in the system before evacuating and connecting a refrigerant container.**

Diagram 3



Nitrogen pressurizing method can be used for gross leak detection. A more detailed leak check with refrigerant leak detectors is necessary. Use only the refrigerant noted on the serial label. (See Diagram 5)

PRESSURE CONTROLS

Always protect low (or dual) pressure control from excessive high pressure. It is recommended to disconnect the low-pressure (or the low side of the dual pressure) control prior to pressurization.

WARRANTY

Follow the leak check procedure very carefully. **Warranty will be voided if compressor fails as a result of refrigerant leakage related problems.** Leakage of refrigerant to the atmosphere has been identified as a major source of global warming and ozone depletion.

SYSTEM EVACUATION

Following the pressure testing for leaks, the system must be evacuated.

Use a vacuum pump (not a compressor) to draw a vacuum of 500 microns or less from both sides of the system. Do not attempt to draw a vacuum on the system with the pump connected only on the low side. The high side of the system should be interconnected with the low side by using a minimum 3/8" OD copper tube. Use a good electronic gauge to measure the vacuum because a refrigeration gauge cannot provide an accurate reading at this resolution.

Break the vacuum with dry nitrogen.

These procedures should be performed at ambient temperature above 65°F.

Note: Never use a compressor to evacuate a system. Instead, use a high pressure vacuum pump specifically designed for that purpose. Never start the compressor while it is under a deep vacuum. Always break the vacuum with a refrigerant charge before energizing the compressor. Failure to follow these instructions can damage the hermetic terminal. As always, to avoid serious injury or death from terminal venting with ignition, never energize the compressor unless the terminal cover is securely fastened.

WARRANTY

Follow the evacuation procedure very carefully. **Warranty will be voided if compressor fails as a result of moisture related problems.**



SYSTEM CHARGING

Failure to properly charge the system can result in serious injury or death from explosion or fire.

Follow these precautions when charging a system:

- Do not operate the compressor without charge in the system.
Operating the compressor without a charge in the system can damage the hermetic terminal. As always, to avoid serious injury or death from terminal venting with ignition, never energize the compressor unless the protective terminal cover is securely fastened.
- Use proper refrigerant.
Use only the serial label refrigerant when charging the system. Using a different refrigerant can lead to excess system pressure and an explosion. Use of a refrigerant other than the serial label refrigerant will void the compressor warranty.
- Do not overcharge a refrigeration or air conditioning system.
Overcharging a refrigeration or air conditioning system can result in explosion. To avoid serious injury or death, never overcharge the system. Always use proper charging techniques. Limit charge amounts to those specified on the system equipment serial label or in the original equipment manufacturer's service information.
Overcharging the system immerses the compressor motor, piston, connecting rods, and cylinders in liquid refrigerant. This creates a hydraulic block preventing the compressor from starting. The hydraulic block is also known as locked rotor.
Continued supply of electricity to the system causes heat to build in the compressor. This heat will eventually vaporize the refrigerant and rapidly increase system pressure. If, for any reason, the thermal protector fails to open the electrical circuit, system pressure can rise to high enough levels to cause a compressor housing explosion.

WARRANTY

Use of a refrigerant other than those listed on the serial label will void the compressor warranty.

APPROVED HERMETIC COMPRESSOR OILS

Hermetic compressors are charged with optimum oil that will be adequate for close-coupled systems designed in accordance with good engineering practice.

Refrigerant/ Compressor	Approved Compressor Oil
R22	Napthenic, Synthetic, Napthenic/Paraffinic
AKA	Witco-Suniso 3GS, Shrieve Chemical Zerol 150TD, Witco-LP200, Penreco Sontex 200LT
AJA	Witco-Suniso 3GS, Shrieve Chemical Zerol 150TD
AWG	Witco-Suniso 3GS, Shrieve Chemical Zerol 150TD Witco-LP200, Penreco Sontex 200LT
AVA	Witco-Suniso 3GS, Shrieve Chemical Zerol 150TD Witco-LP200, Penreco Sontex 200LT
AGA	Shrieve Chemical Zerol 300, Penreco Soltex SA-68 Witco-LP200, Penreco Sontex 200LT
R22/R407C	Polyol Ester (with approved additives)
AVA ,AWG,AGA	Witco-Suniso SL32, SL22; Penreco Sontex SEZ32 SEZ-22; Castrol Inc. Icematic SW-32; Mobil EAL Arctic 32, 22; Emery 2927-A; ICI Emkarate RL32S
R404A, R507	Polyol Ester (with approved additives)
AKA, AJA, AWG, AVA, AGA	Witco-Suniso SL32, SL22; Penreco Sontex SEZ32 SEZ-22; Castrol Inc. Icematic SW-32; Mobil EAL Arctic 32, 22; Emery 2927-A; ICI Emkarate RL32S
R404A, R507, R22, R134a, R407A, R407F	Polyvinyl Ether (PVE)
VSC, VSCF	Apollo America Corporation, FVC32D

Some system designs containing unusual evaporators or extensive interconnecting pipes, may require additional oil. However since excess oil can also damage compressors, care should be taken not to exceed the oil charge amounts specified.



SYSTEM START-UP PROCEDURE

- Check the electrical connections if they are properly attached and secured.
- Check the electrical supply versus nameplate specifications.
- Check if the Voltage deviation is within the specified range.
- Check all mechanical and electrical connections if they are properly tightened and secured. Compressor mounting parts, fan motor mounting screws, fan blade tightening screw, shroud electrical boxes etc.
- Check that the safety and pressure controls are connected and set correctly.
- Check that the suction and liquid valves are open.
- Check by isolating the compressor motor if the control circuit including thermostat and solenoid valve(if used) is wired and operates correctly.
- Confirm that the system has been properly leak tested, evacuated and charged. If not, then follow the leak testing, evacuating and charging procedures described respectively in the following sections of this manual "Pressure testing for leaks", "System evacuation" and "Refrigerant charging". **If the system has been previously charged then make sure that the crank case heater is turned on at least 24 hours prior to start up**, otherwise warm up the compressor bottom shell to assure that the refrigerant will not cause damage to the compressor due to the slugging condition. Do not attempt to warm up the compressor by applying a flame to the crankcase.
- Turn on the electrical power to the condensing unit and unit cooler(s) or freezer(s). The compressor will start when the low-pressure control closes.
- Always re-assemble the enclosure panels when start-up job is completed. Make sure all panels are secure and panel screws are properly tightened.

OPERATIONAL CHECKOUT PROCEDURE

- Check if the voltage deviation is within the specified range.
- 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. Unbalance should not exceed 2%.
- Check proper phase connections on three phase models only.
- Check that the discharge and suction pressures are within the allowable design limits.
- Check the liquid flow in the liquid sight glass.
- Check the compressor sight glass (if equipped) for proper oil level. The ideal oil level is 1/2 way up the sight glass, however, oil levels between 1/4 and 3/4 of the sight glass are acceptable.
- Measure compressor and evaporator superheats. Make proper adjustments if necessary.
- Check the high-pressure control setting by simulating a condenser block, shutting off the fans and observing with extreme caution the pressure rise.
- Check the low-pressure setting by simulating a pump-down cycle. Observe the cut-off pressure, and adjust according to the table below.
- Check (if equipped) the defrost and timer controls for proper initiation and termination settings.
- If any malfunction is observed at any time during either start-up or operational checkout procedures, stop the unit, disconnect power and correct the malfunction accordingly.
- **Re-check after 48 hours** of operation for loose electrical connections, abnormal vibrations that may have developed, refrigerant charge and correct any probable malfunction observed.
- Always re-assemble the enclosure panels when operational check out procedure is completed. Never leave loose or not properly tightened panels.

Low Pressure Control Settings

Minimum Temperature* °F (°C)	R22, R407C		R404A, R507, R407A, R407F		R134a	
	Max Cut In	Max Cut Out	Max Cut In	Max Cut Out	Max Cut In	Max Cut Out
50 (10)	70	30	85	40	45	15
40 (4.4)	55	25	70	35	35	10
30 (7.1)	40	20	50	30	25	5
20 (-6.7)	30	10	40	20	18	0
10 (-12.2)	20	5	30	10	12	0
0 (-17.8)	15	0	25	5	6	0
-10	10	0	15	0	—	—
-20	8	0	10	0	—	—

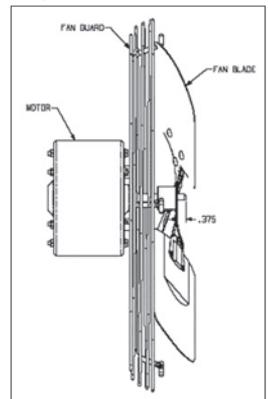
*Minimum Temperature is the coldest temperature of either the evaporator or outdoor ambient.

MAINTENANCE

The refrigeration systems should be scheduled for check-up, inspection and maintenance service, at least twice a year, in order to assure a trouble free operation for many years. When servicing these systems the main power supply must be disconnected and locked off. Extreme care must be used when servicing a unit that requires the power to be "ON".

- Inspect for abnormal indications, vibration, noise.
- Inspect and feel the bottom crankcase housing and determine that it is warm. Make sure that the upper housing is not sweating.
- Inspect all electrical parts for loose connections. Tighten them if necessary
- Inspect insulation status of all wires.
- Inspect contactors and make sure that they are functioning correctly.
- Inspect the fan motors, make sure that the fan blades are tight and all mounting joints are tight. Refer to the figure on the right for proper positioning of the fan on the motor shaft.
- Check the crankcase and receiver heaters for proper operation. Use an ampere meter to check for current draw.
- Inspect refrigerant level in the system.
- Check and make sure that the condenser surface is clean and free of dirt and debris.
- Inspect the operation of the control system. Make sure that all of the safety controls are operational and functioning properly.
- Check all refrigeration piping. Make sure that all mechanical joints and flare nuts are tight.
- Always re-assemble the enclosure panels when maintenance job is completed. Never leave loose or not properly tightened panels.

Diagram 4



ATTENTION!

Make sure all screws are re-tightened before start-up
Make sure all wires are hooked up per wiring diagram

TROUBLESHOOTING

Basic troubleshooting tips are provided in the appendix. For more in-depth help, please refer to the Tecumseh Service handbook or Electrical Service Guidebook on our website at www.tecumseh.com.

QUESTIONS AND SUPPORT

Tecumseh Tech Support: 800.211.3427 or Email: technical.service@tecumseh.com

The unit should be inspected before unpacking for signs of damage or loss and packing list should be checked against material received to ensure shipment is complete. A report should be compiled and a claim must be filed with the freight carrier if shipping damage is discovered.

If damages to the packing are obvious but no visible damage on the unit or the parts are noted then a report should be compiled and a claim for "probable hidden damages" should be filed with the transportation carrier. The manufacturer is not responsible for damages or loss caused by the transportation carrier.

Tecumseh reserves the right to change any information in this publication at any time.

This document is not intended to replace the training required for professional service personnel, or replace other information available from refrigeration and air conditioning equipment manufacturers.

APPENDIX

REFRIGERATION CHARGE (LBS) ADJUSTMENT FOR LOW AMBIENT CONDITIONS

Model Number	Condenser Coils	Replacement Condenser	Refrig	70F	50F	30F	10F	0F	-20F
AWG4520E**HS	50857-1	K42-16	R22	2.30	2.71	3.15	3.24	3.46	3.66
AWG4520W***S	50857-1	K42-16	R22	2.30	2.71	3.15	3.24	3.46	3.66
AWG4520W***S	50857-1	K42-16	R407C	2.20	2.61	3.04	3.13	3.36	3.56
AWG4524E**HN	50855-1	K42-13	R22	4.05	4.79	5.55	5.71	6.11	6.46
AWG4524W***N	50855-1	K42-13	R22	4.05	4.79	5.55	5.71	6.11	6.46
AWG4524W***N	50855-1	K42-13	R407C	3.88	4.60	5.36	5.53	5.92	6.28
AWG4525E**HN	50858-1	K42-17	R22	4.32	5.10	5.92	6.09	6.51	6.89
AWG4525W***N	50858-1	K42-17	R22	4.32	5.10	5.92	6.09	6.51	6.89
AWG4525W***N	50858-1	K42-17	R407C	4.13	4.91	5.71	5.89	6.31	6.69
AWG4530E**HN	50858-1	K42-17	R22	4.32	5.10	5.92	6.09	6.51	6.89
AWG4530E***N	50858-1	K42-17	R22	4.32	5.10	5.92	6.09	6.51	6.89
AWG4530E***N	50858-1	K42-17	R407C	4.13	4.91	5.71	5.89	6.31	6.69
AVA4540E**HN	50858-1	K42-17	R22	4.32	5.10	5.92	6.09	6.51	6.89
AVA4540W***N	50858-1	K42-17	R22	4.32	5.10	5.92	6.09	6.51	6.89
AVA4540W***N	50858-1	K42-17	R407C	4.13	4.91	5.71	5.89	6.31	6.69
AVA4544E**HM	50785-4	K42-2	R22	9.45	11.17	12.96	13.33	14.26	15.08
AVA4544W***M	50785-4	K42-2	R22	9.45	11.17	12.96	13.33	14.26	15.08
AVA4544W***M	50785-4	K42-2	R407C	9.05	10.74	12.50	12.90	13.82	14.65
AVA4547E**HM	50785-4	K42-2	R22	9.45	11.17	12.96	13.33	14.26	15.08
AGA4553E**HM	50785-4	K42-2	R22	9.45	11.17	12.96	13.33	14.26	15.08
AGA4553W***M	50785-4	K42-2	R22	9.45	11.17	12.96	13.33	14.26	15.08
AGA4553W***M	50785-4	K42-2	R407C	9.05	10.74	12.50	12.90	13.82	14.65
AGA4563E**HM	50777-6	K42-1	R22	13.40	15.84	18.37	18.89	20.21	21.38
AGA4563W***M	50777-6	K42-1	R22	13.40	15.84	18.37	18.89	20.21	21.38



REFRIGERATION CHARGE (LBS) ADJUSTMENT FOR LOW AMBIENT CONDITIONS continued

Model Number	Condenser Coils	Replacement Condenser	Refrig	70F	50F	30F	10F	0F	-20F
AGA4563W***M	50777-6	K42-1	R407C	12.83	15.23	17.73	18.28	19.58	20.77
AGA4572E**HM	50777-6	K42-1	R22	13.40	15.84	18.37	18.89	20.21	21.38
AGA4572W***M	50777-6	K42-1	R22	13.40	15.84	18.37	18.89	20.21	21.38
AGA4572W***M	50777-6	K42-1	R407C	12.83	15.23	17.73	18.28	19.58	20.77
AKA9446EXD*S	50857-1	K42-16	R22	2.30	2.71	3.15	3.24	3.46	3.66
AKA9459EXD*S	50857-1	K42-16	R22	2.30	2.71	3.15	3.24	3.46	3.66
AKA9475EXD*S	50857-1	K42-16	R22	2.30	2.71	3.15	3.24	3.46	3.66
AJA9484EXD*S	50857-1	K42-16	R22	2.30	2.71	3.15	3.24	3.46	3.66
AKA9440ZXD*S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AKA9464ZXD*S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AWA9490Z***S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AWA9510Z***N	50855-1	K42-13	R404A, R507	3.57	4.27	4.99	5.16	5.54	5.89
AWA9512Z***N	50858-1	K42-17	R404A, R507	3.81	4.55	5.32	5.50	5.90	6.28
AWA9514Z***N	50855-1	K42-13	R404A, R507	3.57	4.27	4.99	5.16	5.54	5.89
VSC9518Z**HN	50858-1	K42-17	R404A, R507	3.81	4.55	5.32	5.50	5.90	6.28
VSC9518X***N	50858-1	K42-17	R404A, R507	3.81	4.55	5.32	5.50	5.90	6.28
VSC9518X***N	50858-1	K42-17	R22	4.32	5.10	5.92	6.09	6.51	6.89
VSC9518X***N	50858-1	K42-17	R134a	4.38	5.16	5.98	6.15	6.57	6.95
VSC9518X***N	50858-1	K42-17	R407A	4.17	4.95	5.77	5.96	6.39	6.78
VSC9518X***N	50858-1	K42-17	R407F	4.06	4.83	5.63	5.81	6.23	6.61
AWA9518Z***N	50858-1	K42-17	R404A, R507	3.81	4.55	5.32	5.50	5.90	6.28
VSC9522Z**HN	50858-1	K42-17	R404A, R507	3.81	4.55	5.32	5.50	5.90	6.28
VSC9522X***N	50858-1	K42-17	R404A, R507	3.81	4.55	5.32	5.50	5.90	6.28
VSC9522X***N	50858-1	K42-17	R22	4.32	5.10	5.92	6.09	6.51	6.89
VSC9522X***N	50858-1	K42-17	R134a	4.38	5.16	5.98	6.15	6.57	6.95
VSC9522X***N	50858-1	K42-17	R407A	4.17	4.95	5.77	5.96	6.39	6.78
VSC9522X***N	50858-1	K42-17	R407F	4.06	4.83	5.63	5.81	6.23	6.61
AVA9523Z**HN	50858-1	K42-17	R404A, R507	3.81	4.55	5.32	5.50	5.90	6.28
VSC9524Z**HM	50785-4	K42-2	R404A, R507	8.33	9.95	11.64	12.05	12.92	13.74
VSC9524X***M	50785-4	K42-2	R404A, R507	8.33	9.95	11.64	12.05	12.92	13.74



REFRIGERATION CHARGE (LBS) ADJUSTMENT FOR LOW AMBIENT CONDITIONS continued

Model Number	Condenser Coils	Replacement Condenser	Refrig	70F	50F	30F	10F	0F	-20F
VSC9524X***M	50785-4	K42-2	R22	9.45	11.17	12.96	13.33	14.26	15.08
VSC9524X***M	50785-4	K42-2	R134a	9.58	11.30	13.09	13.45	14.38	15.21
VSC9524X***M	50785-4	K42-2	R407A	9.12	10.84	12.63	13.05	13.98	14.83
VSC9524X***M	50785-4	K42-2	R407F	8.89	10.57	12.32	12.73	13.64	14.47
AVA9525Z***N	50858-1	K42-17	R404A, R507	3.81	4.55	5.32	5.50	5.90	6.28
VSC9529Z**HM	50785-4	K42-2	R404A, R507	8.33	9.95	11.64	12.05	12.92	13.74
VSC9529X***M	50785-4	K42-2	R404A, R507	8.33	9.95	11.64	12.05	12.92	13.74
VSC9529X***M	50785-4	K42-2	R22	9.45	11.17	12.96	13.33	14.26	15.08
VSC9529X***M	50785-4	K42-2	R134a	9.58	11.30	13.09	13.45	14.38	15.21
VSC9529X***M	50785-4	K42-2	R407A	9.12	10.84	12.63	13.05	13.98	14.83
VSC9529X***M	50785-4	K42-2	R407F	8.89	10.57	12.32	12.73	13.64	14.47
AVA9529Z***N	50858-1	K42-17	R404A, R507	3.81	4.55	5.32	5.50	5.90	6.28
AVA9532Z***M	50785-4	K42-2	R404A, R507	8.33	9.95	11.64	12.05	12.92	13.74
VSC9534Z**HM	50785-4	K42-2	R404A, R507	8.33	9.95	11.64	12.05	12.92	13.74
VSC9534X***M	50785-4	K42-2	R404A, R507	8.33	9.95	11.64	12.05	12.92	13.74
VSC9534X***M	50785-4	K42-2	R22	9.45	11.17	12.96	13.33	14.26	15.08
VSC9534X***M	50785-4	K42-2	R134a	9.58	11.30	13.09	13.45	14.38	15.21
VSC9534X***M	50785-4	K42-2	R407A	9.12	10.84	12.63	13.05	13.98	14.83
VSC9534X***M	50785-4	K42-2	R407F	8.89	10.57	12.32	12.73	13.64	14.47
AGA9538Z***M	50777-6	K42-1	R404A, R507	11.81	14.11	16.50	17.08	18.32	19.48
AGA9542Z***M	50777-6	K42-1	R404A, R507	11.81	14.11	16.50	17.08	18.32	19.48
AJA7494ZXDHS	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AWA7512Z***S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AWA7515Z***S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AVA7523Z***N	50855-1	K42-13	R404A, R507	3.57	4.27	4.99	5.16	5.54	5.89
AJA2423Z***S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AJA2436Z***S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AWA2444Z***S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AWA2457Z***S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34



REFRIGERATION CHARGE (LBS) ADJUSTMENT FOR LOW AMBIENT CONDITIONS continued

Model Number	Condenser Coils	Replacement Condenser	Refrig	70F	50F	30F	10F	0F	-20F
AWA2479Z***S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AWA2490Z***N	50855-1	K42-13	R404A, R507	3.57	4.27	4.99	5.16	5.54	5.89
AVA2510Z***S	50857-1	K42-16	R404A, R507	2.02	2.42	2.83	2.93	3.14	3.34
AVA2512Z***N	50855-1	K42-13	R404A, R507	3.57	4.27	4.99	5.16	5.54	5.89
AVA2515Z***N	50858-1	K42-17	R404A, R507	3.81	4.55	5.32	5.50	5.90	6.28
VSC2518Z***M	50785-4	K42-2	R404A, R507	8.33	9.95	11.64	12.05	12.92	13.74
VSC2522Z***M	50785-4	K42-2	R404A, R507	8.33	9.95	11.64	12.05	12.92	13.74
VSC2527Z***M	50777-6	K42-1	R404A, R507	11.81	14.11	16.50	17.08	18.32	19.48
VSC2533Z***M	50777-6	K42-1	R404A, R507	11.81	14.11	16.50	17.08	18.32	19.48



SUCTION AND LIQUID LINE SIZES (INCH)

Refrigerant R22						
Condensing Unit	Suction Line Sizes (Capacity at system Evaporator Design Temperature) °F (°C)					Liquid Line Sizes
Btu/h	-40 (-40)	-20 (-28.8)	0 (-17.8)	20 (-6.6)	40 (4.4)	
1,200	—	—	3/8	3/8	3/8	1/4
2,400	—	—	1/2	3/8	3/8	1/4
3,600	—	—	1/2	1/2	3/8	1/4
4,800	—	—	5/8	1/2	3/8	1/4
6,000	—	—	5/8	1/2	3/8	1/4
7,200	—	—	3/4	5/8	1/2	1/4
8,400	—	—	3/4	5/8	1/2	1/4
9,600	—	—	3/4	5/8	5/8	1/4
10,800	—	—	7/8	3/4	5/8	3/8
12,000	—	—	7/8	3/4	5/8	3/8
18,000	—	—	1 1/8	7/8	3/4	3/8
24,000	—	—	1 1/8	1 1/8	7/8	3/8
36,000	—	—	—	1 3/8	1 1/8	1/2
48,000	—	—	—	1 3/8	1 3/8	1/2
60,000	—	—	—	—	1 3/8	1/2
72,000	—	—	—	—	1 3/8	1/2
Refrigerant R404A/R507						
1,200	1/2	3/8	3/8	3/8	3/8	1/4
2,400	5/8	1/2	1/2	3/8	3/8	1/4
3,600	3/4	5/8	1/2	1/2	3/8	1/4
4,800	7/8	3/4	5/8	1/2	1/2	1/4
6,000	1 1/8	7/8	3/4	5/8	1/2	1/4
7,200	1 1/8	7/8	3/4	5/8	1/2	1/4
8,400	1 1/8	7/8	3/4	5/8	1/2	1/4
9,600	1 3/8	1 1/8	7/8	3/4	5/8	1/4
10,800	1 3/8	1 1/8	7/8	3/4	5/8	3/8
12,000	1 3/8	1 1/8	7/8	3/4	5/8	3/8
18,000	—	1 3/8	1 1/8	7/8	3/4	3/8
24,000	—	1 5/8	1 3/8	1 1/8	7/8	1/2
36,000	—	—	1 5/8	1 3/8	1 1/8	1/2
48,000	—	—	—	1 5/8	1 3/8	1/2
60,000	—	—	—	—	1 3/8	5/8
72,000	—	—	—	—	1 3/8	5/8

SUCTION AND LIQUID LINE SIZES (INCH) continued

Refrigerant R134a						
Condensing Unit	Suction Line Sizes (Capacity at system Evaporator Design Temperature) °F (°C)					Liquid Line Sizes
	Btu/h	-40 (-40)	-20 (-28.8)	0 (-17.8)	20 (-6.6)	
1200	—	—	3/8	3/8	3/8	1/4
2400	—	—	1/2	1/2	3/8	1/4
3600	—	—	5/8	1/2	1/2	1/4
4800	—	—	3/4	5/8	1/2	1/4
6000	—	—	3/4	5/8	1/2	1/4
7200	—	—	7/8	3/4	5/8	1/4
8400	—	—	7/8	3/4	5/8	3/8
9600	—	—	7/8	3/4	5/8	3/8
10800	—	—	1 1/8	7/8	3/4	3/8
12000	—	—	1 1/8	7/8	3/4	3/8
18000	—	—	1 3/8	1 1/8	7/8	3/8
24000	—	—	1 3/8	1 3/8	1 1/8	1/2
36000	—	—	2 1/8	1 3/8	1 1/8	1/2
48000	—	—	2 1/8	1 5/8	1 3/8	1/2
60000	—	—	2 5/8	2 1/8	1 5/8	1/2
72000	—	—	2 5/8	2 1/8	1 5/8	1/2

WIRING DIAGRAMS

Wiring diagrams with solid lines represent factory installed components, whereas dotted lines represent field installed/optional components. Field installed/optional components should be installed per manufacturer's instruction and as shown in wiring diagram. Contact Tecumseh for additional assistance if needed.

WD21-1T2

FIELD INSTALLED
SOURCE & THERMOSTAT

ROOM THERMOSTAT

DEFROST CONTROL
RANGE: 8140x
PRECISION: 81400x

COMPRESSOR CONDUCTOR
RANGE: 500 (40A) A

RECEIVER HEATER

DEFROST HEATER CONDUCTOR
RANGE: 10 (10A) B

HEATER CONDUCTOR

DEFROST HEATER CONDUCTOR

POTENTIAL RELAY
SEE PAGE 8

START CAPACITOR
WITH BLEEDER RESISTOR

CONDENSER CAPACITOR

COMPRESSOR TERMINAL

CRANK CASE HEATER

BLACK
RED
YELLOW

BLACK
RED
YELLOW

GREEN

IMPORTANT

COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.)

NOTES

FIELD WIRING NOTES

- ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.
- CONNECT INCOMING POWER LEADS FROM POWER SUPPLY TO L1, L2 AND L3 IN COMPRESSOR CONDUCTOR OR TO L1, L2 AND L3 IN DISCONNECT SWITCH IF PROVIDED. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.) PROVIDE EQUIPMENT GROUNDING CONDUCTOR. USE 75°C MIN. WIRING.
- PLACE JUMPER ACROSS P1 AND P2 IN TERMINAL BLOCK IF NO OTHER CONTROLLING DEVICES BE INSTALLED.
- DEFROST HEATERS LOAD SHOULD NOT BE HEAVIER THEN THE MAXIMUM HEATERS LOAD INDICATED ON THE UNIT LABEL.

GENERAL NOTES:

- CONDUCTOR COLD LINE IS FACTORY CONNECTED TO 230 V SOURCE IN PANEL AS SHOWN.
- COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET.

LOW PRESSURE CONTROL
 HIGH PRESSURE SWITCH
 FACTORY COMPONENTS
 OPTIONAL FACTORY COMPONENTS
 OPTIONAL FIELD COMPONENTS

CONDENSING UNIT WIRING, 230V 60Hz 1 Ph, T1 & T2 defrost options

A
WD21-1T2

WD21-2AT2

FIELD INSTALLED
SOURCE & THERMOSTAT

ROOM THERMOSTAT

DEFROST CONTROL
RANGE: 8140x
PRECISION: 81400x

COMPRESSOR CONDUCTOR
RANGE: 500 (40A) A

RECEIVER HEATER

DEFROST HEATER CONDUCTOR
RANGE: 10 (10A) B

HEATER CONDUCTOR

DEFROST HEATER CONDUCTOR

POTENTIAL RELAY
SEE PAGE 8

START CAPACITOR
WITH BLEEDER RESISTOR

CONDENSER CAPACITOR

COMPRESSOR TERMINAL

CRANK CASE HEATER

BLACK
RED
YELLOW

BLACK
RED
YELLOW

GREEN

IMPORTANT

COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.)

NOTES

FIELD WIRING NOTES

- ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.
- CONNECT INCOMING POWER LEADS FROM POWER SUPPLY TO L1 AND L3 IN COMPRESSOR CONDUCTOR L1 AND L3 IF TWO POLE CONDUCTOR OR TO L1 AND L3 IN DISCONNECT SWITCH IF PROVIDED. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.) PROVIDE EQUIPMENT GROUNDING CONDUCTOR. USE 75°C MIN. WIRING.
- PLACE JUMPER ACROSS P1 AND P2 IN TERMINAL BLOCK IF NO OTHER CONTROLLING DEVICES BE INSTALLED.
- DEFROST HEATERS LOAD SHOULD NOT BE HEAVIER THEN THE MAXIMUM HEATERS LOAD INDICATED ON THE UNIT LABEL.

GENERAL NOTES:

- CONDUCTOR COLD LINE IS FACTORY CONNECTED TO 230 V SOURCE IN PANEL AS SHOWN.
- WITH ANY T2/C2 APPROVED START RELAY USED, CONNECT LEADS TO SAME NUMBERED TERMINALS REGARDLESS OF LOCATION.
- COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET.

ADJUSTABLE FAN CONTROL
 LOW PRESSURE CONTROL
 HIGH PRESSURE SWITCH
 FACTORY COMPONENTS
 OPTIONAL FACTORY COMPONENTS
 OPTIONAL FIELD COMPONENTS

CONDENSING UNIT WIRING, 230V 60Hz 1 Ph, Adjustable fan control, T1 & T2 defrost options

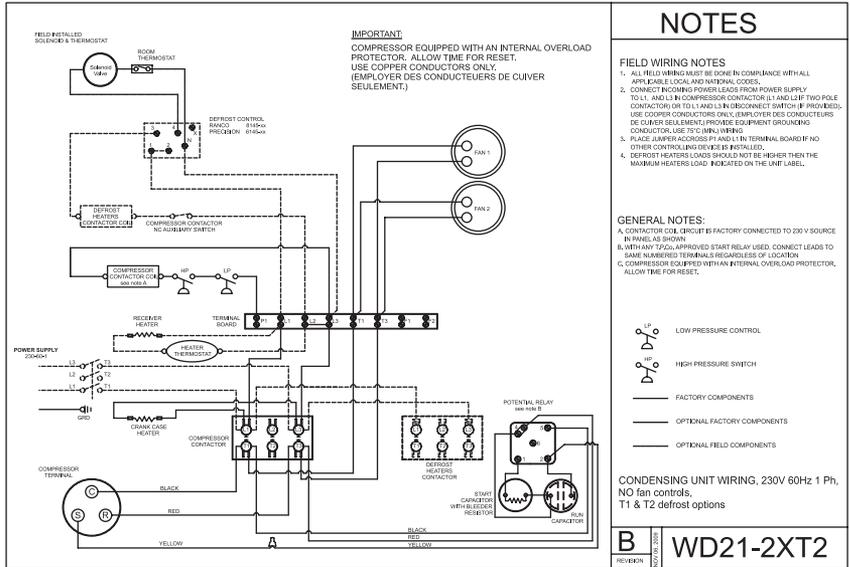
B
WD21-2AT2



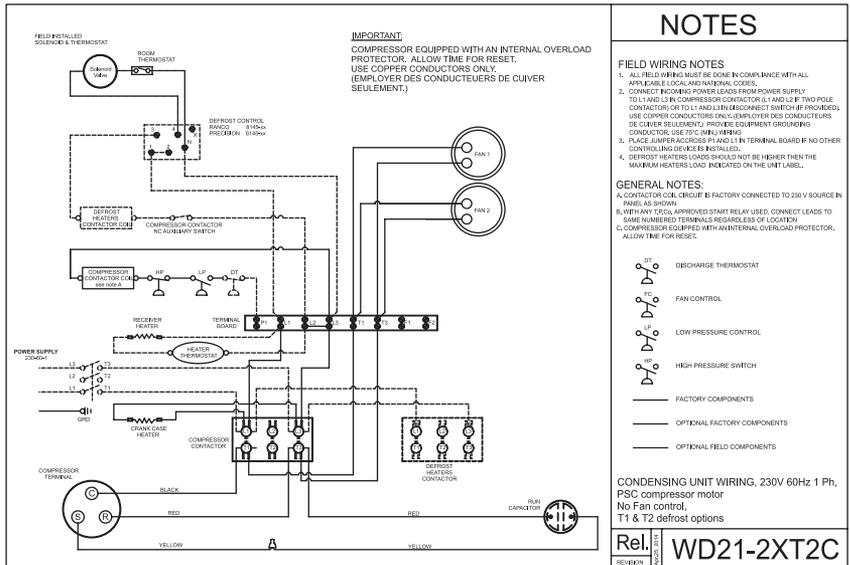
WIRING DIAGRAMS

Wiring diagrams with solid lines represent factory installed components, whereas dotted lines represent field installed/optional components. Field installed/optional components should be installed per manufacturer's instruction and as shown in wiring diagram. Contact Tecumseh for additional assistance if needed.

WD21-2XT2



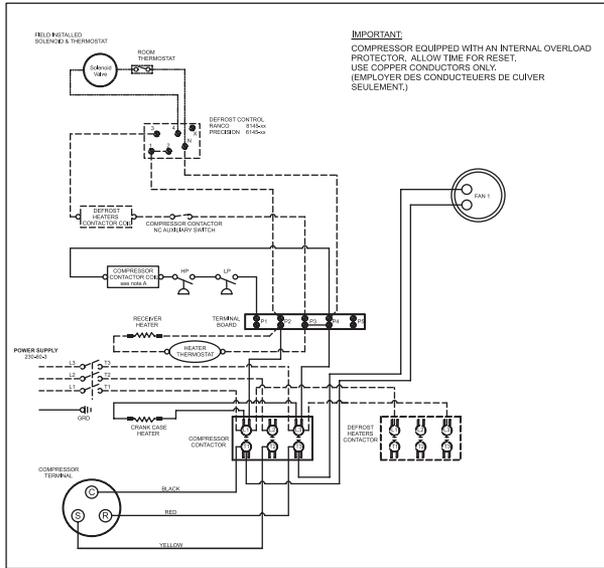
WD21-2XT2C



WIRING DIAGRAMS

Wiring diagrams with solid lines represent factory installed components, whereas dotted lines represent field installed/optional components. Field installed/optional components should be installed per manufacturer's instruction and as shown in wiring diagram. Contact Tecumseh for additional assistance if needed.

WD23-1T2B



NOTES

FIELD WIRING NOTES

- ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.
- CONNECT INCOMING POWER LEADS FROM POWER SUPPLY TO L1, L2 AND L3 IN COMPRESSOR CONTACTOR OR TO L1, L2 AND L3 IN DISCONNECT SWITCH IF PROVIDED. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.) PROVIDE EQUIPMENT GROUNDING CONDUCTOR. USE 75°C MIN. WIRING.
- PLACE JUMPER ACROSS P1 AND P2 IN TERMINAL BLOCK IF NO OTHER CONTROLLING DEVICES INSTALLED.
- DEFROST HEATERS LOAD SHOULD NOT BE HEAVIER THEN THE MAXIMUM HEATERS LOAD INDICATED ON THE UNIT LABEL.

GENERAL NOTES:

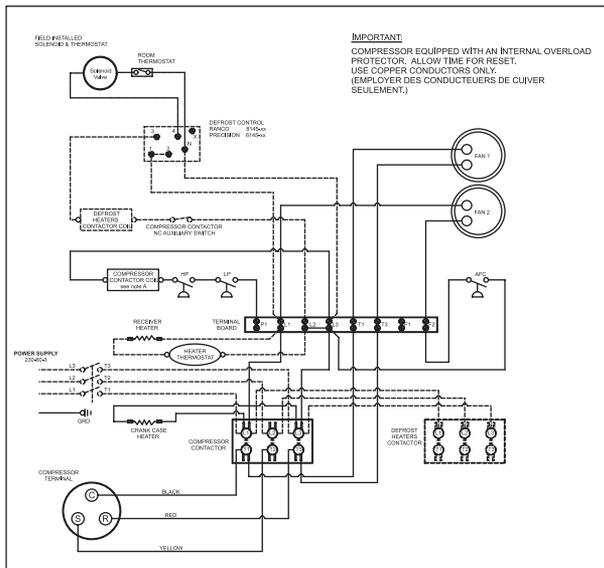
- CONTACTOR COIL (SHOWN) IS FACTORY CONNECTED TO 230 V SOURCE IN PANEL AS SHOWN.
- COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET.

LOW PRESSURE CONTROL
 HIGH PRESSURE SWITCH
 FACTORY COMPONENTS
 OPTIONAL FACTORY COMPONENTS
 OPTIONAL FIELD COMPONENTS

CONDENSING UNIT WIRING, 230V 60Hz 3 Ph, T1 & T2 defrost options

A | **WD23-1T2B**

WD23-2AT2



NOTES

FIELD WIRING NOTES

- ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.
- CONNECT INCOMING POWER LEADS FROM POWER SUPPLY TO L1, L2 AND L3 IN COMPRESSOR CONTACTOR OR TO L1, L2 AND L3 IN DISCONNECT SWITCH IF PROVIDED. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.) PROVIDE EQUIPMENT GROUNDING CONDUCTOR. USE 75°C MIN. WIRING.
- PLACE JUMPER ACROSS P1 AND L1 IN TERMINAL BLOCK IF NO OTHER CONTROLLING DEVICES INSTALLED.
- DEFROST HEATERS LOAD SHOULD NOT BE HEAVIER THEN THE MAXIMUM HEATERS LOAD INDICATED ON THE UNIT LABEL.

GENERAL NOTES:

- CONTACTOR COIL (SHOWN) IS FACTORY CONNECTED TO 230 V SOURCE IN PANEL AS SHOWN.
- COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET.

ADJUSTABLE FAN CONTROL
 LOW PRESSURE CONTROL
 HIGH PRESSURE SWITCH
 FACTORY COMPONENTS
 OPTIONAL FACTORY COMPONENTS
 OPTIONAL FIELD COMPONENTS

CONDENSING UNIT WIRING, 230V 60Hz 3 Ph, adjustable fan control, T1 & T2 defrost options

B | **WD23-2AT2**



WIRING DIAGRAMS

Wiring diagrams with solid lines represent factory installed components, whereas dotted lines represent field installed/optional components. Field installed/optional components should be installed per manufacturer's instruction and as shown in wiring diagram. Contact Tecumseh for additional assistance if needed.

WD23-2YT2

<p style="text-align: center;">IMPORTANT</p> <p style="text-align: center;">COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.)</p>	<h3 style="text-align: center;">NOTES</h3> <p>FIELD WIRING NOTES</p> <ol style="list-style-type: none"> ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES. CONNECT INCOMING POWER LEADS FROM POWER SUPPLY TO L1, L2 AND L3 IN COMPRESSOR CONTACTOR OR TO L1, L2 AND L3 IN DISCONNECT SWITCH IF PROVIDED. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.) PROVIDE EQUIPMENT GROUNDING CONDUCTOR. USE 1/0 IN WIRING. IF PHASE MONITOR IS NOT INSTALLED, PLACE JUMPER ACROSS P1 AND 1 IN TERMINAL BOARD. DEFROST HEATERS LOADS SHOULD NOT BE HEAVIER THAN THE MAXIMUM HEATERS LOAD INDICATED ON THE UNIT LABEL. <p>GENERAL NOTES:</p> <ol style="list-style-type: none"> CONTRACTOR COIL CIRCUIT IS FACTORY CONNECTED TO 230 V SOURCE IN PANEL AS SHOWN. COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> FAN CONTROL </div> <div style="text-align: center;"> LOW PRESSURE CONTROL </div> <div style="text-align: center;"> HIGH PRESSURE SWITCH </div> <div style="text-align: center;"> DISCHARGE THERMOSTAT </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> FACTORY COMPONENTS </div> <div style="text-align: center;"> OPTIONAL FACTORY COMPONENTS </div> <div style="text-align: center;"> OPTIONAL FIELD COMPONENTS </div> </div> <p style="text-align: center;">CONDENSING UNIT WIRING, 230V 60Hz 3 Ph, Fan control, T1 & T2 defrost options</p> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; font-weight: bold; font-size: 1.2em;">WD23-2YT2</div> </div>
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WD23-2XT2

<p style="text-align: center;">IMPORTANT</p> <p style="text-align: center;">COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.)</p>	<h3 style="text-align: center;">NOTES</h3> <p>FIELD WIRING NOTES</p> <ol style="list-style-type: none"> ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES. CONNECT INCOMING POWER LEADS FROM POWER SUPPLY TO L1, L2 AND L3 IN COMPRESSOR CONTACTOR OR TO L1, L2 AND L3 IN DISCONNECT SWITCH IF PROVIDED. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.) PROVIDE EQUIPMENT GROUNDING CONDUCTOR. USE 1/0 IN WIRING. PLACE JUMPER ACROSS P1 AND 1 IN TERMINAL BOARD IF NO OTHER CONTROLLING DEVICE IS INSTALLED. DEFROST HEATERS LOADS SHOULD NOT BE HEAVIER THAN THE MAXIMUM HEATERS LOAD INDICATED ON THE UNIT LABEL. <p>GENERAL NOTES:</p> <ol style="list-style-type: none"> CONTRACTOR COIL CIRCUIT IS FACTORY CONNECTED TO 230 V SOURCE IN PANEL AS SHOWN. COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> LOW PRESSURE CONTROL </div> <div style="text-align: center;"> HIGH PRESSURE SWITCH </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> FACTORY COMPONENTS </div> <div style="text-align: center;"> OPTIONAL FACTORY COMPONENTS </div> <div style="text-align: center;"> OPTIONAL FIELD COMPONENTS </div> </div> <p style="text-align: center;">CONDENSING UNIT WIRING, 230V 60Hz 3 Ph, NO fan controls, T1 & T2 defrost options</p> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; font-weight: bold; font-size: 1.2em;">WD23-2XT2</div> </div>
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WIRING DIAGRAMS

Wiring diagrams with solid lines represent factory installed components, whereas dotted lines represent field installed/optional components. Field installed/optional components should be installed per manufacturer's instruction and as shown in wiring diagram. Contact Tecumseh for additional assistance if needed.

WD21-204

<p>IMPORTANT: COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVER SEULEMENT.)</p>	<p style="text-align: center;">NOTES</p> <p>FIELD WIRING NOTES</p> <ol style="list-style-type: none"> ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES. CONNECT INCOMING POWER LEADS FROM POWER SUPPLY TO L1 AND L2 IN COMPRESSOR CONTACTOR OR TO L1 AND L2 IN FAN CONTACTOR (OR TO L1 AND L2 IN DISCONNECT SWITCH IF PROVIDED). USE COPPER CONDUCTORS ONLY. EMPLOYER DES CONDUCTEURS DE CUIVER SEULEMENT. PROVIDE EQUIPMENT GROUNDING CONDUCTOR USE 75°C (194°F) WIRING. PLACE JUMPER ACROSS P1 AND P2 IN TERMINAL BOARD IF NO OTHER CONTROLLING DEVICES IS INSTALLED. DEFROST HEATERS LOADS SHOULD NOT BE MORE THAN THE MAXIMUM HEATERS LOAD INDICATED ON THE UNIT LABEL. <p>GENERAL NOTES:</p> <ol style="list-style-type: none"> CONTACTOR COIL (C) BY FACTORY CONNECTED TO 230 V SOURCE IN PANEL AS SHOWN. WITH ANY 7.5/10A APPROVED START RELAY USED, CONNECT LEADS TO SAME NUMBERED TERMINALS REGARDLESS OF LOCATION. COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR, ALLOW TIME FOR RESET. <p>FAN CONTROL (ADJUSTABLE / FIXED)</p> <p>LOW PRESSURE CONTROL / SWITCH</p> <p>HIGH PRESSURE SWITCH</p> <p>FACTORY INSTALLED COMPONENTS</p> <p>FIELD INSTALLED COMPONENTS</p> <p>CONDENSING UNIT WIRING, 230V 60Hz 1 Ph, Fan Control Defrost Timer, Defrost Heaters Contactor Receiver Heater</p> <p>REL. NO. WD21-204 REV. 04</p>
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WD23-104

<p>IMPORTANT: COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVER SEULEMENT.)</p>	<p style="text-align: center;">NOTES</p> <p>FIELD WIRING NOTES</p> <ol style="list-style-type: none"> ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES. CONNECT INCOMING POWER LEADS FROM POWER SUPPLY TO L1, L2 AND L3 IN COMPRESSOR CONTACTOR OR TO L1 AND L3 IN DISCONNECT SWITCH (IF PROVIDED). USE COPPER CONDUCTORS ONLY. EMPLOYER DES CONDUCTEURS DE CUIVER SEULEMENT. PROVIDE EQUIPMENT GROUNDING CONDUCTOR. USE 75°C (194°F) WIRING. PLACE JUMPER ACROSS P1 AND P2 IN TERMINAL BLOCK IF NO OTHER CONTROLLING DEVICES IS INSTALLED. DEFROST HEATERS LOADS SHOULD NOT BE MORE THAN THE MAXIMUM HEATERS LOAD INDICATED ON THE UNIT LABEL. <p>GENERAL NOTES:</p> <ol style="list-style-type: none"> CONTACTOR COIL (C) BY FACTORY CONNECTED TO 230 V SOURCE IN PANEL AS SHOWN. COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR, ALLOW TIME FOR RESET. <p>LOW PRESSURE CONTROL / SWITCH</p> <p>HIGH PRESSURE SWITCH</p> <p>FACTORY INSTALLED COMPONENTS</p> <p>FIELD INSTALLED COMPONENTS</p> <p>CONDENSING UNIT WIRING, 230V 60Hz 3 Ph, Defrost Timer, Defrost Heaters Contactor Receiver Heater</p> <p>REL. NO. WD23-104 REV. 04</p>
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WIRING DIAGRAMS

Wiring diagrams with solid lines represent factory installed components, whereas dotted lines represent field installed/optional components. Field installed/optional components should be installed per manufacturer's instruction and as shown in wiring diagram. Contact Tecumseh for additional assistance if needed.

WD23-204

<p style="text-align: center;">IMPORTANT: COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.)</p>	<p style="text-align: center;">NOTES</p> <p>FIELD WIRING NOTES</p> <ol style="list-style-type: none"> ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES. CONNECT INCOMING POWER LEADS FROM POWER SUPPLY TO L1, L2, AND L3 IN COMPRESSOR CONTACTOR OR TO L1, L2 AND L3 IN DISCONNECT SWITCH (IF PROVIDED). USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.) PROVIDE EQUIPMENT GROUNDING CONDUCTOR. IF PHASE MONITOR IS NOT INSTALLED, PLACE JUMPER ACROSS P1 AND L1 IN TERMINAL BLOCK IF NO OTHER CONTROLLING DEVICE IS INSTALLED. DEFROST HEATERS LOADS SHOULD NOT BE HIGHER THAN THE MAXIMUM HEATERS LOAD INDICATED ON THE UNIT LABEL. <p>GENERAL NOTES:</p> <ol style="list-style-type: none"> CONTACTOR COIL (CR) IS FACTORY CONNECTED TO 230 V SOURCE IN PANEL AS SHOWN. COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR, ALLOW TIME FOR RESET. <p style="text-align: center;"> FAN CONTROL (ADJUSTABLE / FIXED) LOW PRESSURE CONTROL / SWITCH HIGH PRESSURE SWITCH FACTORY INSTALLED COMPONENTS FIELD INSTALLED COMPONENTS </p> <p>CONDENSING UNIT WIRING, 230V 60Hz 3 Ph, Fan control, Defrost Timer, Defrost Heaters Contactor Receiver Heater</p> <p>REL. WD23-204</p>
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WD23-208

<p style="text-align: center;">IMPORTANT: COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR. ALLOW TIME FOR RESET. USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.)</p>	<p style="text-align: center;">NOTES</p> <p>FIELD WIRING NOTES</p> <ol style="list-style-type: none"> ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES. CONNECT INCOMING POWER LEADS FROM POWER SUPPLY TO L1, L2, AND L3 IN COMPRESSOR CONTACTOR OR TO L1, L2 AND L3 IN DISCONNECT SWITCH (IF PROVIDED). USE COPPER CONDUCTORS ONLY. (EMPLOYER DES CONDUCTEURS DE CUIVRE SEULEMENT.) PROVIDE EQUIPMENT GROUNDING CONDUCTOR. IF PHASE MONITOR IS NOT INSTALLED, PLACE JUMPER ACROSS P1 AND L1 IN TERMINAL BLOCK. DEFROST HEATERS LOADS SHOULD NOT BE HIGHER THAN THE MAXIMUM HEATERS LOAD INDICATED ON THE UNIT LABEL. <p>GENERAL NOTES:</p> <ol style="list-style-type: none"> CONTACTOR COIL (CR) IS FACTORY CONNECTED TO 230 V SOURCE IN PANEL AS SHOWN. COMPRESSOR EQUIPPED WITH AN INTERNAL OVERLOAD PROTECTOR, ALLOW TIME FOR RESET. <p style="text-align: center;"> FAN CONTROL LOW PRESSURE CONTROL HIGH PRESSURE SWITCH DISCHARGE THERMOSTAT FACTORY INSTALLED COMPONENTS FIELD INSTALLED COMPONENTS </p> <p>CONDENSING UNIT WIRING, 230V 60Hz 3 Ph, Phase Monitor, Fan control, Discharge Thermostat Defrost Timer, Defrost Heaters Contactor Receiver Heater</p> <p>rel. WD23-208</p>
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CONDENSING UNIT MODEL NOMENCLATURE

AVA 2 510 Z XN HS

Family & Generation

AK, A.J, AW, AV, AG, VS Series

Application Range

4	High	+20°F to 55°F (-6.7°C to 12.8°C)
9/7	Comm/Med	-10°F to 45°F (-23.3°C to 7.2°C)
2	Low	-40°F to 10°F (-40°C to -12.2°C)

Capacity

First number is total digits

Remainder is capacity in Btu/h

This example 10,000 Btu/h Capacity

Release Variant

11th Digit

- Legacy Models
 - H = Outdoor/Hooded
- Gen III Feature Packages
 - K = Silver
 - L = Platinum
 - U = Gold

12th Digit

- S = Small Cabinet
- M = Medium Cabinet
- L = Large Cabinet

Voltage

NA	208-230/60/1
XD	208-230/60/1, 200/50/1
XN	208-230/60/1, 200/220/50/1
XT	200-230/60/3, 200-220/50/3
TB	200-230/60/3

Refrigerant

- E = R22
- W = R22/R407C
- X = Multi-Refrigent*
- Z = R404A/R507

*Multi-Refrigent Commercial Scroll can use R22, R134A, R404A, R507, R407A, and R407F

SERIAL LABEL

MODEL AVA2510ZXNHS		REFRIGERANT R404A	CHARGE (lbs)
SERIAL NO. 16F291000123		EVAP. TEMP RANGE (F) -40F to 10F	UNIT DATE F2910
UNIT B. O. M. 32L2116-2E		VOLTAGE - HZ - PHASE 208 - 230V - 60HZ	COMP. DATE C1510
COMPRESSOR MODEL AVA2490ZXN		COMPRESSOR B. O. M. AV182ET - 001 - P4	MIN. CIRCUIT AMP. 21
FAN MOTORS (S) QTY 1		VOLTAGE - HZ - PHASE 208 - 230V - 60HZ	Max circuit breaker (IACR type per HEC) MAX FUSE SIZE (A) 35
DESIGN PRESSURE (PSIG) HI 450 LD 181		FAN HORSEPOWER 50 Watts	Remote de frost heater (max. load (A))
REMOTE CONDENSER MIN. PRESSURE (PSIG)		FLRA .7	PROTECTION THERMALLY
			

First letter indicates month (see Table 1), next 2 digits indicate day of the month, following 2 digits indicate year.

Table 1

A - January	D - April	G - July	K - October
B - February	E - May	H - August	L - November
C - March	F - June	J - September	M - December



TROUBLESHOOTING

This trouble-shooting chart is not designed to replace the training required for a professional refrigeration service person, nor is it comprehensive. As a trained professional, for your safety and others always be aware of the following issues:

- Terminal venting and electrocution
- Properties of refrigerant and other chemicals involved
- Proper compressor removal methods
- Proper system flushing, purging and leak testing methods
- Proper system charging methods
- Proper system evacuation method
- Start capacitor overheating issues

Troubleshooting Chart

Complaint

Possible Causes

A. Compressor will not start - no hum

1. System component not functioning properly:
 - Control/contactor stuck in open position
 - Control off due to cold location
 - Thermostat not functioning properly
2. Line disconnect switch open
3. Circuit breaker tripped or fuse open or removed
4. Thermal protector not working properly
5. Wiring improper or loose
6. Compressor motor has a ground fault (also known as a short circuit to ground)

B. Compressor will not start - hums but trips on thermal protector

1. Improperly wired
2. Low voltage to compressor
3. System component, such as thermostat or control/contactor, not functioning properly
4. Compressor electrical problems:
 - Compressor motor has a winding open or shorted
 - Start capacitor not working properly
 - Relay does not close
5. Liquid refrigerant in compressor
6. Internal mechanical trouble in compressor.

Troubleshooting Chart

Complaint	Possible Causes
C. Compressor starts, but does not switch off of start winding	<ol style="list-style-type: none">1. Improperly wired2. Low voltage to compressor3. Compressor electrical problems:<ul style="list-style-type: none">• Compressor motor has a winding open or shorted• Relay failing to open• Run capacitor not working properly4. Discharge pressure too high5. Internal mechanical trouble in compressor
D. Compressor starts and runs, but short cycles on thermal protector	<ol style="list-style-type: none">1. Too much current passing through thermal protector:<ol style="list-style-type: none">a. Extra sources of current drawb. Compressor motor has winding shorted2. Low voltage to compressor (single phase) or unbalanced voltage (three-phase)3. Compressor electrical problems, such as thermal protector or run capacitor not working properly4. Discharge pressure too high5. Suction pressure too high6. Return gas too warm
E. Unit runs OK, but run cycle is shorter than normal (due to component(s) other than thermal protector)	<ol style="list-style-type: none">1. System components, such as thermostat, control or contactor, not functioning properly2. High pressure cut-out due to:<ol style="list-style-type: none">a. Insufficient air or water supplyb. Overcharge of refrigerantc. Air in systemd. Water leak into refrigerant side of a water-utilizing system3. Low pressure cut-out due to:<ol style="list-style-type: none">a. Liquid line solenoid leakingb. Undercharge of refrigerantc. Restriction in expansion device



START-UP INFORMATION

Important: This start-up information should be completely filled in for each installation and remain with the unit as a permanent record for future reference.

Project Name: _____

Address of Installation: _____

Installing Contractor Name: _____

Address: _____

Phone: _____

Type of System (Cooler, Freezer, etc...) _____

Design Box Temperature _____ °F _____ °C Thermostat setting _____ °F _____ °C

Condensing Unit System start-up date _____

Unit model # _____

Unit serial # _____

Compressor model # _____

Compressor serial # _____

Evaporator(s) Manufacturer _____

Evaporator(s) QTY _____

Expansion valve - Manufacturer _____

Expansion Valve Model # _____

Leak Check Procedure: _____

Unit leak check by: _____

Company: _____ Date: _____

Refrigerant Type _____ Total Charge _____

System evacuation # of times _____

Final micron _____

Ambient at start-up _____ °F _____ °C

Operating box temperature _____ °F _____ °C

Defrost settings _____ / day Minutes fail safe _____

Condensing unit electrical rating: Volts _____ Phase _____ Hz _____

Voltage at compressor terminals: L1/L2 _____ L2/L3 _____ L1/L3 _____

Amperage at compressor: L1 _____ L2 _____ L3 _____

Compressor discharge pressure _____ psig

Compressor suction pressure _____ psig

Discharge line temperature at compressor _____ °F _____ °C

Suction line temperature at compressor _____ °F _____ °C

Superheat at compressor _____ °F _____ °C

Suction line temperature at evaporator TX valve bulb _____ °F _____ °C

Superheat at evaporator _____ °F _____ °C

