VWY SERIES
INSTALLATION, OPERATION & MAINTENCE

CONTENTS

Form 527N-851 Rev.B (0611)

Insert for all ADDISON® product manuals

Instructions:

In accordance with California Proposition 65 requirements, place enclosed label(s) in a highly visible location on outside of equipment to be repaired (i.e., near equipment's serial plate). See label placement drawing in equipment's Installation, Operation and Service manual for label location (when available). Avoid placing label on areas with extreme heat, cold, corrosive chemicals or other elements. Extra labels are also included where repair of multiple units is involved. To order additional labels, please call +1.407.292.4400.

To obtain a copy of the manual or for more information, visit the applicable website(s) below:

Incluya en todos los Manuales de productos de ADDISON®

Instrucciones:

De conformidad con los requerimientos de la Propuesta 65 de California, ubique la(s) etiqueta(s) adjunta(s) en un lugar bien visible en el exterior del equipo a ser reparado (es decir, cerca de la placa serial). Ver dibujo de instalación de la etiqueta en el Manual de Operaciones y Mantenimiento (si esta disponible). Evite colocar la etiqueta en áreas con calor, frío, productos químicos corrosivos u otros elementos. Se incluyen etiquetas adicionales para el caso de reparación de varias unidades. Para ordenar etiquetas adicionales, por favor llamar al +1.407.292.4400.

Para obtener una copia del manual o para obtener mas información visite los sitios Web correspondientes a continuación.

www.addison-hvac.com

⚠WARNING

This equipment, its related accessories and by-products of operation, contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

⚠ADVERTENCIA

Este equipo, sus accesorios y los productos derivados de su operación contienen productos quimicos que el Estado de California considera causantes de cáncer y defectos de nacimiento u otros daños reproductivos.

Printed in U.S.A./Impreso en EE.UU P/N 91070015 Orig

Installation Code and Annual Inspections: All installation and service of ADDISON® equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Addison and conform to all requirements set forth in the ADDISON® manuals and all applicable governmental authorities pertaining to the installation, service, operation and labeling of the equipment. To help facilitate optimum performance and safety, Addison recommends that a qualified contractor conduct, at a minimum, annual inspections of your ADDISON® equipment and perform service where necessary, using only replacement parts sold and supplied by Addison.
Further Information: Applications, engineering and detailed guidance on systems design, installation and equipment performance is available through ADDISON® representatives. Please contact us for any further information you may require, including the Installation, Operation and Service Manual.
This product is not for residential use.
This document is intended to assist licensed professionals in the exercise of their professional judgment.

Código de Instalación e Inspecciones Anuales: Todas las instalaciones y mantenimientos de productos ADDISON® deben ser realizados sólo por personal cualificado en la instalación y mantenimiento de los equipos vendidos y suministrados por Addison y/o por sus distribuidores y deben cumplir con todos los requisitos dispuestos en los manuales de ADDISON® y con todos los estándares locales aplicables a la instalación, mantenimiento, funcionamiento y etiquetado del equipo. Para conseguir un funcionamiento óptimo y seguro, Addison recomienda que un técnico cualificado revise anualmente sus equipos y realice el mantenimiento siempre que sea necesario, usando exclusivamente piezas de repuesto de ADDISON®.
Información adicional: A través de los distribuidores de Addison está disponible la información sobre aplicaciones, guías detalladas sobre diseño de sistemas e instalación y funcionamiento de los productos. Por favor contacte con nosotros si necesita más información o si requiere un manual de instalación, funcionamiento y mantenimiento.
Este producto no es para uso residencial.
La intención de este documento es la de ayudar a los profesionales autorizados en el libre ejercicio de su profesión.

Addison
7050 Overland Road
Orlando, FL 32810 U.S.A.
Telephone: +1.407.292.4400
Fax: +1.407.290.1329
www.addison-hvac.com

SAFETY RULES

To reduce the risk of injury, property, and/or air conditioner damage, please thoroughly read all safety guidelines and operating instructions prior to installing your air conditioner. This will ensure you obtain the full value from your air conditioner and help avoid needless service costs that are not covered in our warranty. Following all safety, installation, and operating instructions will also maximize the air conditioners efficiency, serviceability and longevity.

Always turn the electric power OFF before making unit connections or removing panels.

Remember to check local codes and utility standards because the installation must comply with these rules.

Be extremely careful during installation or servicing to avoid injury. Some components may have sharp edges or protrusions that can cut.

The tubing and compressor contain high pressure refrigerant and must not be exposed to high temperature or be punctured.

HIGH PERFORMANCE AND HIGH EFFICIENCY

Water-to-air heat pumps provide comfort cooling and heating from one source…..water. These water source heat pumps have been designed to meet national energy efficiency requirements as well as the unique installation requirements of today's market. Because the water is maintained at relatively constant temperatures, these units provide very efficient operation on both heating and cooling cycles. The units are mounted on the floor vertically and are normally used with a closed loop system utilizing a cooling tower and a boiler.

- Water source units are highly reliable because they do not have the problems associated with defrosting controls on air cooled units.
- Service access panels are provided on all sides of the unit to allow ease of service and component replacement.
- Disposable filters are standard. Permanent, washable filters are optional.
- Blowers are belt driven with bearings. Blower motors are 1725 rpm and are inherently protected (through 2 hp) with sealed ball bearings.
- Energy efficiency comparisons confirm that water-cooled systems provide lower operating costs as well as improved heating performance.

INSPECTION

Upon receipt of the equipment, inspect the carton and unit for any visible damage. Make a notation on the shipper's delivery ticket of any findings prior to signing. The carrier must be notified within 48 hours after delivery if any damage is found to establish a claim and request an inspection and report. The Warranty Claims Department should then be contacted.

ALWAYS move and lift units in the upright vertical position. If the unit is not in this 'upended position' after delivery for any reason, ensure that the unit is placed in the normal upright position for at least 24 hours before operating.

Prior to installation, storage at the job site must be indoors, completely shielded from various weather conditions. High or low temperatures will not harm the unit, but excessively high temperatures of 140°F (60°C) may deteriorate certain plastic materials and cause permanent damage.

INSTALLATION

To meet general factory specifications, the following installation guidelines must be completed. Unless factory parts are used in accordance with this manual, the factory warranty will be ineffective. To prevent serious injury and/or electrocution, the following installation operations should only be performed by a licensed professional. Ensure that pertinent building codes are verified prior to installation.

This unit contains a complete pressurized refrigeration system as well as associated electrical components required for operation. It should be installed and serviced by trained and qualified installation and service personnel.

The unit is shipped from the factory as an integral unit. Model sizes cannot be separated without opening the hermetic refrigeration circuit. If the unit must be separated to facilitate installation, ensure that the refrigerant charge is recovered as required by Federal Statutes. Filter and filter racks and duct flanges are shipped in the condenser section of the unit for field installation.

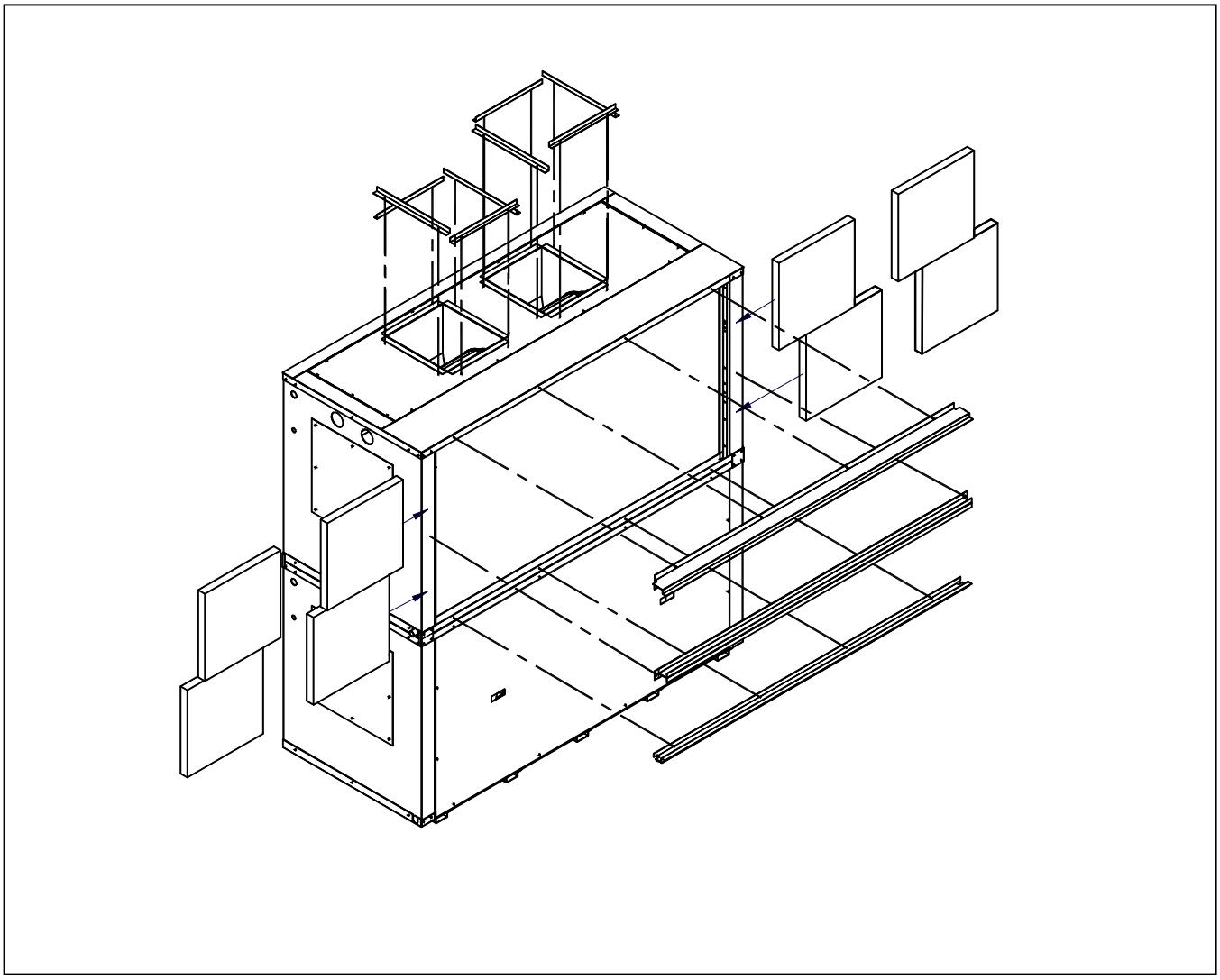


Figure 1 – Duct Flange and Filter Rack Assembly

1. To ensure the units efficiency, serviceability and longevity, proper placement and environmental conditions must be considered prior to installation. Install the unit on a level, solid surface, preferably concrete. Compressors are mounted on rubber feet and therefore should not require insulation pads to prevent possible vibration from entering the building structure. Consider space requirements depending on unit size, floor strength, location of water supply and disposal, space for servicing equipment and removal of air filter.
2. Provide sufficient room to make water, electrical and duct connections. The contractor should make sure that access has been provided including clearance for duct collars and fittings at water and electrical connections. Consider the accessibility and location of electrical service.
3. Locate the service access panels on the ends of the unit. There must be a 2ft MINIMUM service clearance on both ends and in the front. This will allow enough space for service personnel to perform maintenance or repairs.
4. Inspect the unit and shipping carton for any specific tag numbers as requested by the installing contractor. Check the voltage, phase and capacity against the plans.
5. Pay attention to the location and routing of water piping and electrical wiring marked on the submittal drawings. These models are designed for water piping entry through either side.
6. The installing contractor will find it beneficial to confer with piping, sheet metal, ceiling and electrical foremen prior to installing any conditioners.
7. If applicable, during the finishing/refurbishing of a building, cover the conditioner(s) with plastic film to protect the unit. This will prevent any fireproofing material, sandblasting, spray painting and plastering operations from damaging the unit.

8. The unit can be installed “free standing” in an equipment room.
9. If optional field installed controls are required, provide adequate space for the enclosure to mount around the corner from the electrical entrances. Do not locate the side of the unit too close to a wall.
10. Do not locate the unit next to a return air grille. This may allow blower sound to transmit through the return air grille and cause objectionable sound levels in the occupied room.
11. A secondary drain pan is always good insurance against water damage if the unit is installed in an unconditioned space or in a utility room or closet without a floor drain. A drained secondary drain pan should always be a job requirement if not covered by code.
12. Condensate Drains:
    Before installing the unit, consider the location of the IN and OUT condenser water lines and condensate drain line and ensure that the unit is installed on a level, solid surface. Allow adequate room around the unit for a condensate trap. Do not operate the unit without a minimum 30 primed trap on drain line to prevent air passage between connections or to the atmosphere. To install the condensate drain, connect it to the pipe outlet as shown below. The air handler section is provided with a condensate connection on each end of the unit. Connect either end to the drain and plug the other end. If the unit is located in an unconditioned area, insulate the drain line. Remember to install drains in accordance with local plumbing codes.

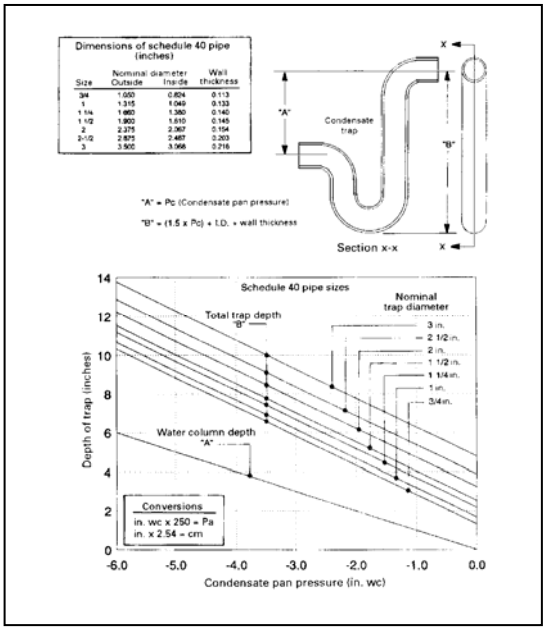


Figure 2 – Condensate P-Trap

13. Blower Mounting:
    CAUTION - DO NOT fasten ductwork to any side of the blower extension.
14. T**hermostat:**
    Install the low voltage thermostat on an inside wall approximately 5 feet above the floor in an area that is not subject to drafts, sun exposure, or heat from electrical fixtures or appliances. Locate it as close to the return air as possible. The hole in the wall behind the thermostat should be large enough for the wire to pass through. Seal or patch if the hole is too large.
    Follow all thermostat manufacturer’s instructions such as leveling the thermostat and setting the heat anticipator and calibration. See the unit wiring diagram for field wiring connections.

DUCT CONNECTIONS

General

All ductwork must be installed in accordance with local codes and requirements as described in the ASHRAE Systems Guide.

The discharge duct system normally consists of a flexible connector at the unit, a non-insulated transition piece, a short run of duct, an elbow without vanes, and a trunk duct teeing into a branch circuit with discharge diffusers. Do not connect the full duct size to the unit without using a transition piece that is sized down to the discharge collar on the unit. Do not have an angle greater than 30° on the transition piece or air performance will decrease significantly.

For sound attenuation, internally line the sides of the elbow and entire branch duct with acoustic insulation. If ducts are routed through unconditioned areas, insulate them with a vapor barrier to prevent condensation.

Lay out the ductwork without a line of sight between the air handler discharge and the distribution diffusers. Bring the return air ducts through a wall grille and then to the unit (the return duct system normally consists of a flexible connector at the unit and a trunk duct to the return air grille). Line the return air duct with acoustic insulation for sound attenuation.

Ventilation Air

Outside air may be required for ventilation. The ventilation air system is usually distributed throughout the building with separate ductwork. Do not duct outside air directly into the conditioner inlet. Instead, make sure that the outside air in each return air plenum chamber is relatively close to the conditioner air inlet. This will provide adequate distance for thorough mixing of outside and return air. The temperature of the ventilation air

must be controlled to prevent the mixture of outside air and return air from exceeding application limits.

All ductwork must be installed according to local codes, industry standard practices and requirements. If applicable, ducts passing through unconditioned spaces must be insulated in accordance with local codes. Standard blower drives provide rated unit airflow up to approximately 0.4 to 1.6 inches external static pressure and are set to provide rated air at 0.80 static pressure, unless specified otherwise.

For systems with sheet metal ductwork, install a flexible connector between the supply duct and unit and the return duct and unit to prevent vibration transmission.

If unusual static conditions occur, contact the factory to discuss other drive options.

Always insist on frequent filter cleanings. This will prevent decreased air flow during the heating cycle that could result in high compressor head pressures, inefficient operation and possible nuisance trips of the high pressure control.

See Blower Data table on page 13 for rated CFM

ELECTRICAL CONNECTIONS

Electrical connections should be made through the conduit openings located in the electrical control box of the unit. Connect low voltage thermostat wires to the low voltage terminal board. To locate the contact terminals for line voltage connections, refer to the wiring diagram in the control box cover of the unit. Line voltage terminals may be located on the contactor, a separate terminal board, or in the external box, depending on the unit model.

Typical ampacity and fusing requirements are shown on the unit nameplate located on the outside of the unit.

CAUTION

All unit connections require copper wire only. Do not use aluminum wires on the terminals of this unit.

If using accessory electric heaters for installation in the ductwork, fuse them separately in accordance with the National Electric Code and Local codes and requirements.

Disconnect Switches

Most local codes have requirements regarding disconnect switches. Check the codes in your area to determine if a disconnect switch is required within sight of the unit.

Voltage Levels

Abnormally high or low voltage can damage the unit. During normal operation, ensure that voltage is within 10% of the nameplate rating. If the voltage runs consistently 10% higher or lower, contact your power company to correct and/or regulate the voltage level.

The disconnect switch must be turned to the "ON" position to provide power to unit.

Once it is established that supply voltage will be maintained within the Utilization Range under all system conditions; check and calculate the phase balance condition. Calculate Percent Voltage Unbalance as follows:

$$\text{Percent Voltage Unbalance} = 100 \times \frac{\text{Maximum Voltage Deviation From Average Voltage}}{\text{Average Voltage}}$$

FOR EXAMPLE - With voltage of 220, 215, and 210
(Measure L1-L2, L1-L3, L2-L3)

Average voltage = 645 ÷ 3 = 215
Maximum voltage deviation from
Average voltage = 220 - 215 = 5

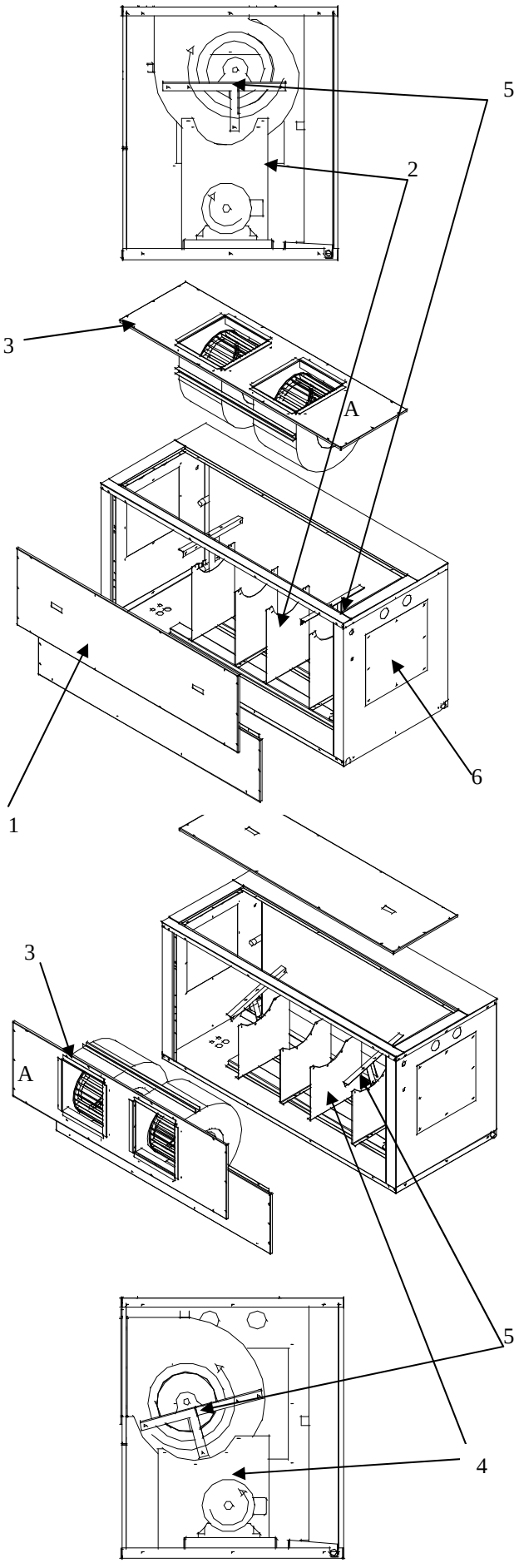
$$\text{Percent Voltage Unbalance} = \frac{100 \times 5}{215} = \frac{500}{215} = 2.3\%$$

Percent voltage unbalance must not exceed (2%) two percent. Contact power company if phase unbalance exceeds 2%. A means of disconnecting power from the unit must be placed adjacent to the unit in accordance with national electrical code or local codes. Aluminum power wire is not recommended.

Thermostats

Many commercial models use special control circuits, systems and panels. To determine if the control circuitry has been designed separately, consult the diagrams regarding control wiring and thermostats.

NOTE: If the special control circuits include a time clock to start and stop the unit, ensure that they DO NOT interrupt the line voltage to the unit. The time clocks should only interrupt the control voltage. This will prevent any damage to the compressor during start-up due to compressor crankcase heater de-energizing.



Conversion of Air Handler Section from vertical to horizontal discharge:

1. Ensure unit is off at the disconnect switch.
2. Remove all fasteners holding the front access panel in place and then remove the panel itself. (Component #1)
3. Remove motor-side access panel fasteners and remove panel. (Component #6)
4. Loosen and remove drive belt(s) from the blower shaft.
5. Remove blower sheave(s) and shaft.
6. Remove all fasteners from vertical blower support feet and remove feet. (Component #2)
7. Remove fasteners from blower panel and remove blower panel assembly. (Component #3) (Note: blowers should remain fastened to blower panel during this process.)
8. To change rotational direction of motor swap (2) of the (3) power leads going to the motor. (Note: see rotational direction of blowers with respect to the motor in the vertical versus horizontal configuration.)
9. Fasten horizontal blower support feet (Component #4) in place of vertical support feet with feet facing away from blowers as shown in the horizontal configuration of the air handler section. See table below for ordering blower feet assemblies.
10. Rotate blower panel assembly as indicated by reference "A" to horizontal position. Insert blower panel assembly as shown in the horizontal configuration of the air handler section. Recommend placement of temporary 1/8" shims under the bottom edge of blower panel to hold panel alignment until screws are secure.
11. Rotate the pillow block supports (Component #5) to ensure that the bearing support member is perpendicular to the angle that will result between the drive shaft and the blower shaft. This is necessary to reduce vibration and maximize the benefits of the pillow block bearings.
12. Fasten horizontal blower feet to blowers and fasten blower panel assembly in place.
13. Replace shaft, sheaves, and drive belt(s). (Note: new belts may be required depending upon unit size.)
14. Fasten side access panel back in place.
15. Fasten front access panel (Component #1) as shown in horizontal configuration of the air handler section.

BLOWER FEET ASSEMBLIES

UNIT SIZE	COMPONENT #2	COMPONENT #4
096/120	1410Y-0008	1410Y-0008
180	1410Y-0004	1410Y-0001
240	1410Y-0005	1410Y-0002
300	1410Y-0006	1410Y-0003
360	1410Y-0007	1410Y-0003

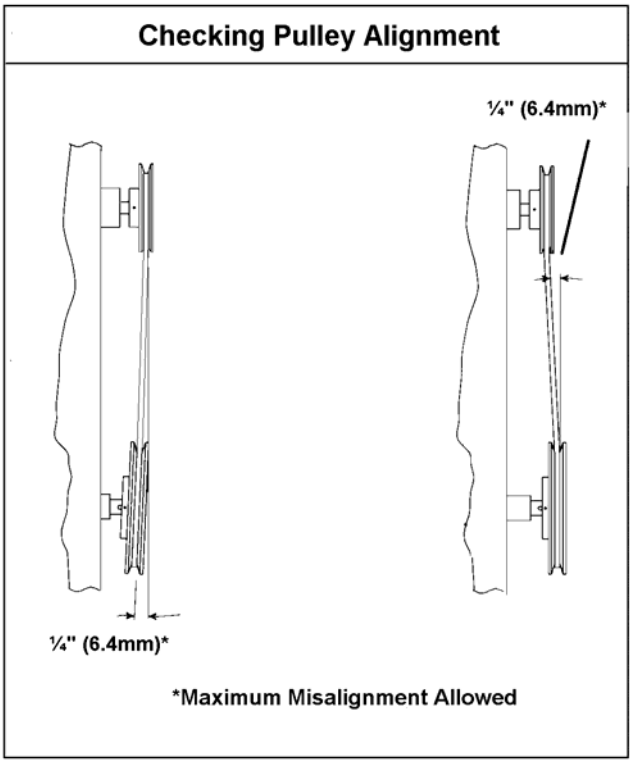


Figure 4 - Pulley alignment

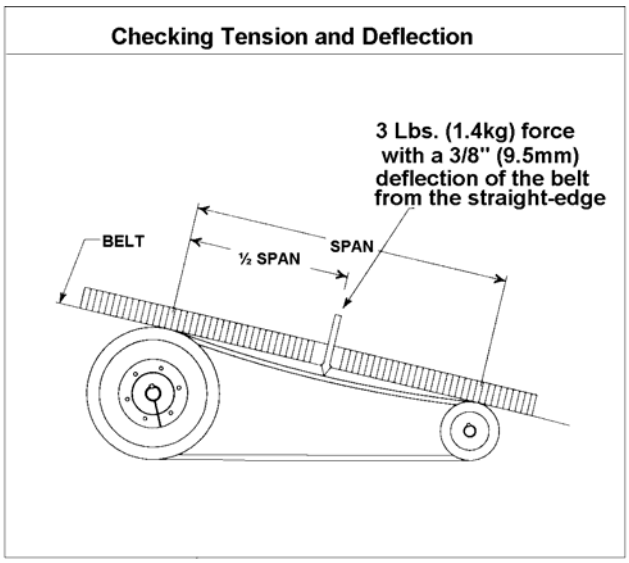


Figure 5 - Belt tension

Fan Speed Adjustment:

Adjust the adjustable pulley for the correct cfm and the correct belt tension. The evaporator and condenser blower pulley alignment and adjustment is factory set for standard RPM. The blower RPM may require adjustment dependant upon job site conditions. If blower adjustments are necessary, select the appropriate
RPM for the application from the Blower Performance Table on page 13 and make adjustments as follows:

1. Loosen belt tension by adjusting the fan motor slide base.
2. Loosen the moveable flange setscrew(s) with a hex wrench.
3. Adjust the pulley size by rotating the adjustable flange on the threaded hub. Fan speed will increase when the adjustable flange is adjusted toward the fixed flange. Fan speed will decrease when the adjustable flange is adjusted away from the fixed flange.
4. Once the adjustable pulley has been open or closed the required number of turns, tighten the moveable flange set screw(s) onto the flat surface of the pulley hub.
5. Re-alignment of the pulleys should be made with a straight edge when the fan pulley is loose on the motor shaft. After re-alignment of pulleys, be certain that pulley set screw(s) are tightened onto the blower shaft flat. Belt tension can be re-adjusted by moving the motor slide base forward or backward as required to provide belt tension of 2/3 inch depression per foot of belt span between pulleys.

WATER FLOW REQUIREMENTS:

Units used on closed loop systems do not require water valves. If there is an adequate supply of constant temperature, non-scaling water at 55°F or above, most well-water systems will not use water control valves. Water valves may be used to furnish more precise water flow on both heating and cooling cycles, increasing or decreasing flow as required to maintain unit operating pressures at design levels. The cooling control valve operates to maintain proper compressor discharge pressure on the cooling cycle. The heating control valve operates to maintain correct compressor suction pressure on the heating cycle. Install both valves with the flow direction arrow on the valve body pointing in the direction of water flow to the unit heat exchanger. Attach both refrigerant pressure capillaries with a special valve (field supplied) to the unit. To connect the two water regulating valve capillary tubes, a brass tee is required and must be field supplied. Remember to follow all local plumbing codes when connecting water lines.

NOTE: Water valves add to the total pressure head of a system and increases the required pumping power. This could possibly reduce the systems overall efficiency and performance and should be contemplated prior to installation. See the Manufacturer's Pressure Drop Data.

Water Regulating Valves:

Care must be taken when connecting the capillary tubing from the valve assemblies to the unit refrigeration tubing if water regulating valves are used. The refrigeration circuit connection is normally the unit service access Schrader type valve. To connect to this valve, a pin depressing refrigeration tee is required and must be field supplied.

Set the water regulating valves as follows:

- The cooling valve functions to maintain discharge pressure at the desired level. Follow all valve instructions and adjust it to maintain the discharge pressure given in the Cooling Performance Table on pages 13 – 16.
- The heating valve functions to maintain desired suction pressure on heating. Follow all reverse acting heating valve instructions and adjust it to maintain the suction pressure given in the Heating Performance Table on pages 13 – 16

Water Pressure Drop Table

Model	096					120					180				
GPM	9	12	16	24	28	14	18	24	30	34	20	30	40	48	52
PSI	0.7	1.3	2	4.1	5.3	1.8	2.8	4.4	6.6	8	1.1	2.3	3.8	5.3	6
FT- WC	1.7	2.9	4.7	9.5	12.2	4.1	6.5	10.2	15.3	18.5	2.6	5.4	8.7	12.2	13.8

Model	240					300					360				
GPM	30	40	50	60	65	40	52	64	75	80	55	70	80	90	100
PSI	2.5	4.2	6	8.4	9.5	1.6	2.7	3.7	4.9	5.4	2.2	4.9	5.9	7.3	8.5
FT- WC	5.7	9.7	13.9	19.4	21.9	3.8	6.2	8.5	11.3	12.4	5.1	11.3	13.5	16.8	19.7

To Measure Water Flow:
To measure water pressure attach an appropriate pressure measuring instrument at the inlet and outlet

pressure taps on each water connection. See the table above for the water flow in GPM.

Applicable ARI standards states that a rated flow gives a 10 degree F water temperature rise on the cooling cycle, at rated CFM, 80 F dry bulb and 67 F wet bulb across the evaporator coil. For most closed loop applications, the recommended flow rate will vary depending on outdoor design wet-bulb temperature.

PIPING AND WATER CONNECTIONS

Piping:

1. It is recommended to connect all units to the supply and return piping in a two-pipe reverse return configuration. A reverse return system is inherently self-balancing and requires only trim balancing where multiple quantities of units with different flow and pressure drop characteristics are connected to the same loop. To check for proper water balance, take a differential temperature reading across the water connections. To insure proper water flow, the differential should be 10°F (5°C) to 14°F (8°C). A direct return system may also work acceptably, but proper water flow balancing is more difficult to achieve and maintain.
2. The piping can be steel, copper or PVC connected to a field supplied, copper adapter brazed to the unit water circuit.
3. Connect supply and return runouts to the unit with short lengths of high pressure flexible hose for sound attenuation. One end of the hose should have a swivel fitting to facilitate removal for service. Hard piping can also be brought directly to the unit, although it is not recommended because of possible sound transmission to the conditioned space. The hard piping must have unions to facilitate unit removal.
4. Supply and return shutoff valves are required at each conditioner. The return valve is used for balancing and should have a “memory stop” so that it can always be closed off, but only reopened to the proper position for the flow required.
5. Units should not be connected to the supply and return piping until the water system has been completely cleaned and flushed. After cleaning and flushing, the initial connection should have all valves wide open in preparation for water system flushing.
6. Condensate piping can be steel, copper or PVC. Each unit is supplied with a 3/4" FPT.
7. The condensate disposal piping must have a trap and the piping must be pitched away from the unit no less than 1/4" inch per foot (21mm per meter). Generally, the condensate trap is made of PVC threaded into the unit. See Figure 2. A piece of vinyl hose from the trap to the drain line is used for simple removal. A complete copper or PVC condensate system can also be used. Union fittings in the copper lines should be applied to facilitate removal.
8. No point in the drain system may be above the drain connection of any unit.
9. Do not install automatic flow controlled devices prior to system cleaning and flushing.
10. A high point of the piping system must be vented.

11. Check local codes to determine if dielectric fittings are required.

Cleaning and Flushing System

1. Clean and flush the water circulating system of all construction dirt and debris prior to operating any conditioner. If the conditioners are equipped with water electric or pressure operated shutoff valves, the supply and return runouts must be connected together at each conditioner location. This will prevent the introduction of dirt into the unit. Additionally, pressure operated valves only open when the compressor is operating.

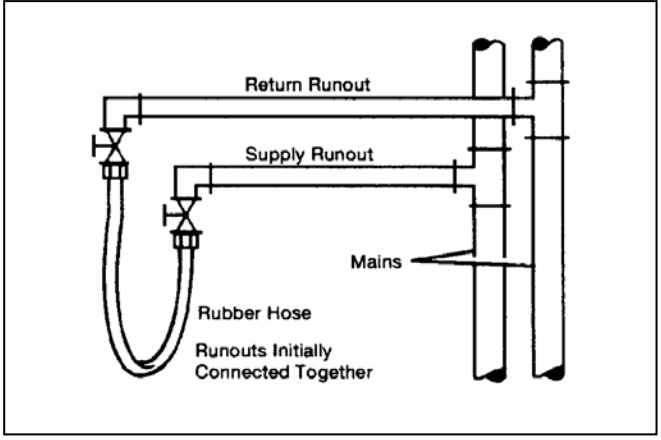


Figure 6 – Piping short circuit for loop cleaning

2. Fill the system at the city water makeup connection with all air vents open. After filling, vents should be closed. The contractor should start main circulator with the pressure reducing valve makeup open. To ensure circulation through all components of the system, check vents in sequence to bleed off any trapped air. Make sure the power to the heat rejector unit is off, and that the supplementary heat control is set at 80°F (27°C). With the water circulating, the contractor should check and repair any leaks in the piping. Open the drains at the lowest point(s) in the system for initial flush and blow-down and make sure the city water fill valves are set to make up water at the same rate. Check the pressure gauge at pump suction and manually adjust the makeup to hold the same positive steady pressure both before and after opening the drain valves. Continue to flush for at least two hours, or longer if required, until clear, clean drain water is seen.
3. Since many states and localities have banned the introduction of phosphates into their sewage systems, such as Trisodium Phosphate, a cleaning agent used during the flushing process, it is recommended to simply flush with warm 80°F (27°C) water for a longer period of time.
4. Make sure the supplemental heater and circulator pump are shut off. Open all drains and vents to completely drain down the system. Connect the short circuited supply and return runouts to the conditioner supply and return connections. Teflon tape is recommended over pipe dope for pipe thread connections. Do not use sealers at the swivel flare connections of hoses.
5. Refill the system with clean water. Test the litmus paper for acidity, and treat as required to leave the water slightly alkaline (pH 7.5 to 8.5). The specified percentage of antifreeze may also be added at this time. Use commercial grade antifreeze designed for HVAC systems only. Do not use automotive grade antifreeze.
6. Set the system control and alarm panel heat add setpoint to 70°F (21°C) and the heat rejection setpoint to 85°F (29°C). Supply power to all motors and start the circulating pumps. After full flow has been established through all components, including the heat rejector (regardless of season), and air vented and loop temperatures stabilized, each of the conditioners will be ready for check, test and start-up and for air and water balancing.

PIPING & WATER REGULATION

1. GROUND WATER FROM 70°F to 85°F (No water pressure tank. The unit and pump cycle together). Ground water temperatures above 70°F (usually found only in Florida or with artesian wells) do not require water regulating valves if the water pump supplies only the unit and cycles on and off with the unit.
2. GROUND WATER FROM 70°F to 85°F (With pressure tank. Pump cycles on pressure switch.) The same system as used in (1) above may be used, but use a 24volt electric solenoid valve to provide water shut off when the compressor stops. Wire it to Terminals Y and C on the low voltage terminal board so the valve opens when the compressor starts. It is recommended to put the valve in the water discharge line, as far from the unit as possible. Install it in a location so the valve noise does not disturb any occupants of the building. Put the valve in the discharge line to minimize the water hammer effect when the valve closes. The valve should be a fast opening, slow closing valve. Since the valve does not prevent water flow out of the lines if a water leak develops, a secondary drain pan should be installed beneath the unit, at least 2" larger than the unit and with lips 2" high, with 1" min. drain line. This will prevent flooding in case a leak develops in the water system inside the unit. The 24 volt solenoid may be installed in the

water inlet line, before the unit. However, an expansion tank might have to be installed to prevent water hammer problems that may develop.

3. GROUND WATER BELOW 70°F. (With or without pressure tank.) For water temperatures lower than 70°F, it is necessary use automatic water regulating valves because less water is required on the cooling cycle and more water is required on the heating cycle.

COOLING TOWER WITH BOILER APPLICATION

During the cooling operation, heated water is rejected into the closed loop water piping and circulated through the cooling tower. The cooling tower provides evaporative cooling to this heated water.
During the heating operation, the chilled water from the unit picks up heat from the closed loop water piping. However, in most applications a boiler is required to heat the water to maintain a high enough water temperature. The cooling tower must maintain water temperatures of 55°F to 95°F.

Some important considerations when using a closed loop system are:

1. Pressure and temperature ports are recommended in both supply and return lines for balancing the system.
2. Accurately set the water flow by measuring the pressure drop across the heat exchanger. Refer to page 9 for water flow and pressure drop information.
3. In case of emergency service requirements, ball valves in the water piping will isolate the unit from the closed loop water piping to the tower.
4. Never leave the water piping exposed because water lines will freeze.
5. Flush all field piping (both supply and return) before connecting to the unit. All air must be eliminated from the closed loop.
6. Chemical water treatment is necessary on open cooling towers to ensure the water is free of corrosive minerals and calcium build up.
7. On closed loop systems, an initial treatment of the system is advised to prevent bacteria growth.

START-UP INSTRUCTIONS

1. Ensure that the blower turns free without rubbing, then tighten the set screw on the shaft.
2. Leak test water piping connections prior to operating.
3. Check if the unit is receiving the correct rated voltage with a voltmeter. If it is 10% higher or lower, contact the power company prior to operating.
4. Ensure that the thermostat switch is "OFF" before starting the unit. Units are equipped with compressor crankcase heaters that must be pre-heated for at least 12 hours prior to operating. Turn the power "ON", but DO NOT operate the unit for a minimum of 12 hours.
5. Make sure the air filters are clean and properly positioned.
6. If the capacity is questionable (See Capacity Check), install suction and discharge line gauges on the compressor.
7. Turn the Thermostat Fan Switch "ON". The indoor blower should operate. Verify that airflow is present. Ensure that the supply grills in each room are OPEN, properly directed, and have the correct airflow. Make sure that duct dampers are not closed and/or restricting airflow.
8. Verify that the blower is running in the proper direction. If it is incorrect, reverse two phase leads at the disconnect switch.
9. Ensure that the water flow to the unit and the water temperature rise is correct.
10. Once the airflow and water flow are correct, turn the temperature to the highest setting on the thermostat. Then turn the system switch to "COOL". The compressor should not come on yet. Slowly turn the temperature setting down until the thermostat makes contact and begins cooling. Verify that the compressor and water pump come "ON" and are operating correctly.
11. After the room temperature conditions are close to normal, check the pressure readings on the suction and discharge gauges. The rated airflow and return air temperatures are about 80 deg. d.b., 67 deg. w.b., and pressures should be as indicated in the tables on pages 13 and 16.
12. After verifying that the cooling operation is working properly, turn the thermostat " OFF" and listen for the reversing valve to shift. Then turn the temperature setting as low as it will go and switch to the "HEAT" position. Gradually raise the temperature setting until the compressor comes "ON". Verify that the unit is providing heat. The unit cannot be pressure checked until the heating season has started and indoor conditions are in the normal range of 70 degrees dry bulb. If the cooling operation works properly, the heating operation will be satisfactory. Do not test the heating operation too long with high return air temperatures. It is recommended to check the operation again at the beginning of the heating season.
13. During the heating cycle, with the rated airflow and return air temperatures of 70 degrees dry bulb, the pressures should be approximately as indicated in the heating table on pages 13 – 16

If there is a high temperature rise across the evaporator, check for proper air flow due to duct design. Also check if any grilles and dampers are closed or if filters are dirty.

14. Verify that the unit is drawing the approximate rated current with an ampmeter.
15. Finally, check that all unit panels are on and correctly positioned and that the unit is operating normally. Make sure the owner is aware of the proper thermostat operation and that rapid cycling can cause the unit to trip on its overload. Ensure that the water flow is not restricted in any way. Make sure the pump cycles correctly.

MAINTENANCE PROCEDURES

To maximize the longevity, serviceability and efficiency of your unit, adhere to the following maintenance guidelines.

Make sure the main power is disconnected prior to working on this unit. Be careful working around the metal edges of the door panels and door frames to prevent injury.

The compressor head and back pressures must be checked and appropriate adjustments made at the beginning of each cooling season. If the system has a low refrigerant charge, or if the compressor's crank-case oil level is low, the hermetic system probably has a leak. Evacuate the system and recharge with refrigerant and oil to repair any leaks. If any repairs are made to the hermetic system, install a new liquid
line filter drier. If the compressor motor burns out, install a suction line cleanup filter drier.

1. **Filters** - Check air filters once a month. Wash or change as required. Do not operate the unit without air filters.
2. **Bearings** – Lubrication is not required because only sealed bearings are used in the evaporator blower motors.
3. **Paint Finish** – Paint is an electrodeposition paint process that provides a durable finish. If paint lifts or peels, scrape and sand the affected area and touch up using paint obtained from the factory for this purpose.
4. **Water System** – Check the pump when filters are cleaned to ensure that it is operating properly.

5. **Condenser Coils** – Check condenser coils yearly for liming or clogging. Clogged coils lead to high head pressure and inefficient operation.
6. **Refrigerant Pressure** – Check the refrigerant pressure any time the unit is not operating properly. If the water flow and airflow is correct and the unit is still malfunctioning, contact a competent service contractor.
7. **Contactor Points** – Check contactor points twice a year to ensure they are not burned or pitted as a result of low voltage, lightening strikes, or other electrical difficulties.
8. **Condensate Drains** – Check that the condensate is draining properly from the unit at least once a month. Proper drainage is imperative to prevent water damage to the building.
9. **Evaporator Blower** – Be alert for noises that may indicate loose blower wheels or failing motor.
10. **Condensate Drain Pan** – Clean and flush the evaporator condensate drain pan every 6 months.
11. **Evaporator Blower Belts** – Check bi-annually for correct tension. Worn or cracked belts should be replaced. Belts with multiple belt drives should be replaced with "matched sets".

Blower Performance

Model		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	CFM	R.P.M.	B.H.P.	R.P.M.	B.H.P.	R.P.M.	B.H.P.	R.P.M.	B.H.P.	R.P.M.	B.H.P.	R.P.M.	B.H.P.	R.P.M.	B.H.P.
VWY 096	2800	860	0.9	930	1.0	945	1.2	1010	1.3	1025	1.4	1095	1.5	1150	1.7
	3200	880	1.1	940	1.3	1000	1.4	1025	1.5	1080	1.7	1100	1.7	1210	2
	3600	900	1.4	960	1.5	1020	1.7	1075	1.8	1085	2.0	—	—	—	—
VWY 120	3000	875	1.0	930	1.2	975	1.3	1020	1.4	1060	1.6	1100	1.7	1155	2
	4000	900	1.6	955	1.7	990	1.9	1050	2.0	1095	2.2	1145	2.3	1250	2.5
	5000	930	2.1	980	2.2	1030	2.4	1080	2.5	1125	2.7	1175	2.9	—	—
VWY 190	5500	950	1.9	1035	2.1	1090	2.3	1135	2.5	1190	2.7	1200	2.9	1285	3.2
	6000	1020	3.1	1075	3.4	1125	3.5	1175	3.7	1225	4.0	1270	4.3	1315	4.5
	6500	1060	3.3	1120	3.6	1140	3.8	1190	4.1	1240	4.4	1285	4.6	1330	4.9
VWY240	7000	910	2.7	980	3.1	1030	3.4	1100	3.6	1150	3.9	1200	4.3	1240	4.6
	8000	1000	3.8	1050	4.3	1110	4.5	1160	4.8	1220	5.2	1270	5.5	1300	5.8
	9000	1090	5.2	1150	5.6	1190	5.8	1240	6.4	1290	6.6	1330	7	1370	7.4
VWY300	9000	650	2.8	700	3.2	740	3.6	800	3.9	840	4.3	900	4.7	950	5
	10000	710	3.8	770	4.3	800	4.6	830	5.0	880	5.4	920	5.8	970	6.1
	11000	720	4.6	760	5.0	810	5.4	840	5.8	900	6.3	930	6.5	980	7.2
VWY 360	11000	800	4.8	850	5.2	890	5.6	940	6.0	980	6.5	1020	7	1060	7.4
	12000	870	6.0	910	6.5	950	7.0	990	7.5	1030	8.0	1070	8.4	—	—
	13000	920	7.5	970	8.0	1010	8.6	1050	9.1	1080	9.6	1120	—	—	—

Notes: 1. Gray Shaded areas for "S" models.
2. Unshaded areas for "M" models.
3. Above E.S.P. values include two inch throwaway filter static.
4. Tables can be interpolated but not extrapolated.

TROUBLESHOOTING

SYMPTOM	***POSSIBLE CAUSE***	POSSIBLE REMEDY
Fan and compressor will not run.	1. Check for blown fuse or if circuit breaker is open. Check electrical circuits and motor windings for shorts or grounds. 2. Check if wires are loose/broken. 3. Check if supply voltage is too low. 4. Check if control system is faulty.	1a. Replace fuse or reset circuit breakers after fault is corrected. 2a. Replace or tighten wires. 3a. Consult the power company. 4a. Check thermostat for correct wiring and check 24 volt transformer for burnout. * Call dealer or factory for advise**.**
Fan is operating, but the compressor is not working.	1. Check capacitor. 2. Check if wires are loose/broken. 3. Check if high pressure tripped due to plugged condenser, lack of condenser water, too warm condenser water, inadequate airflow due to dirty filters, coil or fan motor failure. 4. Check if low temperature switch tripped due to plugged condenser, lack of condenser water, too warm condenser water, inadequate airflow due to dirty filters, coil or fan motor failure. 5. Check thermostat setting, calibration and wiring. 6. Check if the compressor overload protection is open. If the compressor dome is hot, the overload will not reset until cooled down. 7. Check if the compressor motor is grounded to the compressor shell. 8. Check if the compressor winding is open. Check continuity with the ohmmeter.	2a. Replace or tighten wires. 6a. If the overload is external, replace it. If the overload is internal, replace the compressor. 7a. If the compressor motor is grounded to the compressor shell, replace it. 8a. If the winding is open, replace the compressor.
Compressor attempts to starts, but doesn't.	1. Check the capacitor. 2. Check for defective compressor by making resistance check on winding. 3. Check run capacitor.	
Compressor is running in short cycles.	1. Check the thermostat mounting and location. 2. Check all relays, relaying and contacts. 3. Check the run capacitor. 4. Check the high pressure switch. 5. Check the low temperature switch. 6. See if the reversing valve has shifted to either side.	
System has insufficient cooling and/or heating.	1. Check the thermostat for improper location. 2. Airflow may be insufficient. 3. If the unit heats, check the reversing valve coil. 4. Check the capillary tubes for	2a. Check and clean the filter. 3a. Replace the reversing valve if it is defective.

	possible refrigerant flow restriction. 5. Check for water flow restriction.	
SYMPTOM	POSSIBLE CAUSE	POSSIBLE REMEDY
The unit is noisy while operating.	1. Check if the fan wheel is hitting the housing. 2. Check if the fan wheel is bent. 3. Check if the fan wheel on the shaft is loose. 4. Make sure the compressor is floating free on the isolator mounts. 5. Check if the tubing is touching the compressor. 6. Check screws on panel. 7. Check for chattering or humming in the contact relays due to low voltage or a defective holding coil. 8. Check the water balance for proper flow rate.	1a. Adjust for clearance if necessary. 2a. Replace the fan wheel if it is bent. 3a. Tighten the fan wheel on the shaft if it is loose. 5a. Readjust the tubing, if necessary, by bending slightly. 6a. Tighten screws if necessary. 7a. Replace component if defective.

NOTES

ADDISON PRODUCTS COMPANY
Division of HEAT CONTROLLER. INC.
7050 Overland Road, Orlando, FL 32810

This page left blank

Installation Code and Annual Inspections:

All Installation and service of equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied and conform to all requirements set forth in the manuals and all applicable governmental authorities pertaining to installation, service and operation of the equipment. To help facilitate optimum performance and safety, It is recommended that a qualified contractor annually inspect your equipment and perform service where necessary, using only replacement parts sold and supplied by the manufacturer.

Further Information: Applications, engineering and detailed guidance on systems design, installation and equipment performance is available through manufacturer's representative. Please contact us for any further information you man require, including the Installation, Operation and Service Manual.

These products are not for residential use.

This document is intended to assist licensed professional in the exercise of their professional judgment.

#5271-1500