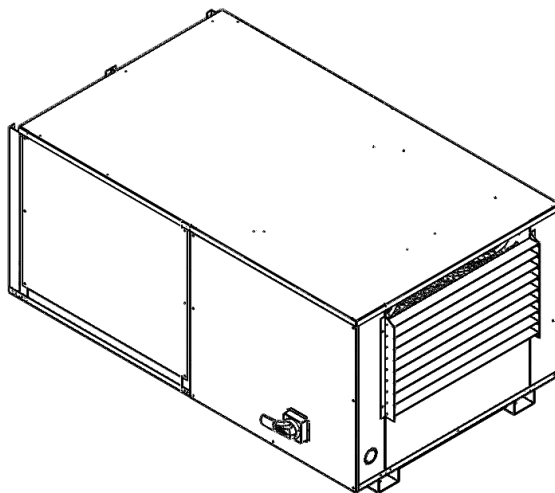


INSTALLATION AND MAINTENANCE



Model CKL

Plenum Rated Make Up Air Unit Heater



**UNIVERSAL
INSTRUCTIONS**



**WARNING: RISK OF ELECTRIC SHOCK. CAN CAUSE INJURY OR DEATH.
DISCONNECT ALL REMOTE ELECTRIC POWER SUPPLIES BEFORE SERVICING.**

This manual is provided for qualified contractors. All service must be performed by a qualified service agency. It is *extremely important* you verify the electrical power supply is the same voltage of the CKL being installed. 208V, 240V, and 480V heaters are *not* interchangeable. Powering a 480V unit with 240V supply wires will reduce the heater output by approximately 75% and is never recommended. Powering a 208V or 240V unit with 480V supply wires will destroy the electrical components and voids all warranties.

CHECK: Be sure filters (not supplied) are in proper position and not torn, damaged, or clogged during use.

GENERAL REQUIREMENTS AND SPECIFICATIONS

- 1. Receiving & Inspection** – The person and/or company signing off on the delivery Bill of Lading is the receiver who is responsible to inspect for shipping damage. All shipping damage claims must be made by the receiver to the transportation company.
- 2. Location** – The CKL does not have to be centrally located to the heating area, it can operate as a stand-alone device or be multiplied parallel or in series with other HVAC ducted systems. The unit is supplied with a 24V temperature sensor. If this sensor is used, it needs to be located at least 3 feet downstream from the unit. If not used, the thermostat can be remotely located and read ambient temperature where it is installed. The heater is designed to withstand a dirty, dusty, moist or mildly corrosive environment. Not intended for use where flammable vapors, gases, liquids or other combustibles are, or may be present. Be sure the structural support at the unit location is adequate to support the unit's weight. If roof top installed, use a qualified rigging contractor to properly locate the unit.
- 3. Positions** – The CKL is designed to be mounted in a horizontal position either right side up on a surface or upside down hung from threaded rods. The flow is one direction, from the intake to the exhaust.
- 4. Installation Clearance** – Though shipped from the factory approved for "zero inch" clearance for compact, space saving installations, the CKL is recommended to be installed with a minimum service clearance.
- 5. Service Clearance** – The CKL is serviced from the access panels which are located on all sides and top of the unit. Leave at least 24" (610 mm) clearance in front of the panels to allow for field wiring, programming, troubleshooting, or repairs.
- 6. Power** – Disconnect power supply before making wiring connection to prevent electrical shock and equipment damage. Ensure supply voltage to the heater is as indicated on the serial plate and is not less than 5% below the rated voltage.

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PRODUCT DESCRIPTION:

This unit has been specifically designed for industrial use. The durable construction uses a high tensile strength electro-galvanized 12 gauge steel base frame, and 16 gauge cabinet. It can be located in inaccessible open plenum areas such as between a concrete ceiling, drop tile ceiling, or recessed floor. The unit can also be installed in a ducted HVAC system or rooftop installation. A large wiring compartment with easy access allows for quick installation.

There are various motor horse power selections of the belt driven system. The motor is a totally enclosed non-ventilated type with a lubricated ball bearing shaft, class B insulation, auto-protected, permanent split capacitor, rated at 140°F (60°C) ambient. Motor leads are protected in conduit.

The dual inlet high capacity centrifugal blower handles high static pressure and moves high CFM air volume. Drive options for the CKL include a standard variable pitch sheave or an optional electronic variable frequency drive (VFD). For CFM tuning, see the additional data sheets or instructions provided with these devices.

The CKL unit heater delivers make up air via a 1 to 8 step controller and a vernier proportional stage controller. This system provides precise modulation of the multi-stage heating system allowing smooth, precise control of the load without increasing switching wear in the system contactors.

The CKL is designed with high mass spiral fin heat exchanging electric elements. Placement of these elements in the maximum airflow stream produces the best heat transfer while eliminating the potential for inefficient heat exchange hot spots. This heat circuit design includes a proportional inbuilt thermostat that will, if applicable, be pre-configured from the factory for remote location installation. Auto reset thermal protection cuts off power from the heater if an overheated condition occurs. The elements are re-energized automatically when the normal operating temperature returns.

Diagrams used throughout the installation manual represent general installation requirements. Due to various model configurations available, actual unit mechanical and wiring requirements will vary depending upon specific models, so please refer to the additional product data sheets and wiring diagram provided. Magnetic contactors are standard on all units. A transformer is provided for 24V controls enabling the use of a standard low voltage thermostat. Subcircuit fusing is provided when the heater ampacity exceeds 48 Amps in compliance with UL standards. A fan delay is standard on all models to dissipate residual heat from the heating elements.

HANDLING:

The CKL is self contained and fastened to a wooden crate from the factory. There are four fasteners located at the base of the unit which must be removed. If rooftop installed, it is recommended to leave the unit in the crate and unpack it on the roof to ensure the unit is protected from any damage during lifting. Use a qualified rigging contractor to locate the unit onto the rooftop.

INSTALLATION AND MAINTENANCE

INSTALLATION OVERVIEW:

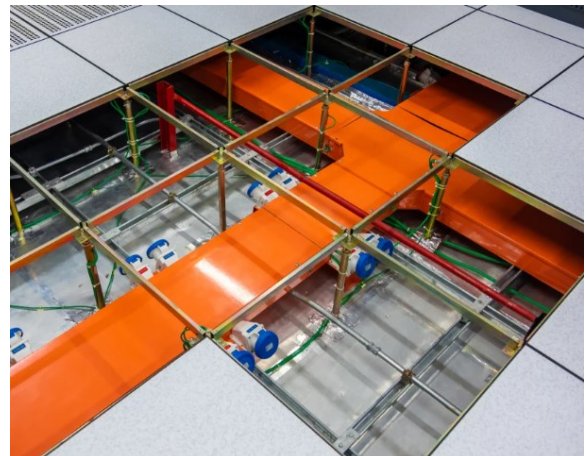
This CKL contains interface/logic devices, a voltage transformer, fuses, centrifugal blower and motor drive train. Based on the application, other system components may be required to make your system operate as desired, these additional components must be provided by the qualified installing contractor. These components may include but are not limited to:

- Outside hood or protective covering
- Insulated inlet ducting
- Outlet ducting
- Additional current transformers (only for multi-fan applications)
- Low voltage wiring for the current transformer
- Source power wiring
- Hanging or surface mounting hardware
- Vibration isolation
- Filters

TYPICAL LOCATIONS:



Drop Ceiling Plenum



Under Floor Plenum



Ducted Roof Top

INSTALLATION AND MAINTENANCE

MECHANICAL INSTALLATION:

This product is designed for zero clearance, but use the following mounting and spacing criteria:

1. The CKL is to be installed horizontally in an upright or up side down configuration. The base frame rails are designed with four 1/2" through holes to accept threaded and bolted rod in a typical Unistrut® method of suspension mounting. These holes are also used for fastening the unit upright in a surface mounted application.
2. According to UL safety standards, no materials shall be in contact with the cabinet housing which has a flame point less than wood, 300°F (150°C).

GENERAL:

1. Select a location which will provide minimal vibration and blower noise to the building occupants. It is recommended to mount the CKL on vibration dampeners.
2. Outside hood or ducting materials are not included with this unit. It is the qualified contractor's responsibility to provide the necessary weather protection. Providing external insulation may be required in certain situations.
3. In cold climates, frost and or condensation may collect on metal parts of this product. Insulated ducting must be used between the outside inlet air hood and the inlet of this unit.
4. A field installed inlet damper will mediate moisture from collecting inside the unit and direct it away to the outside of the building through the building intake vent. Install the damper slightly inclined from the heater inlet approximately ¼" higher and slope ducting away from the heater. A damper may also prevent cold air migration.

FIELD WIRING:

CKL heaters come equipped with fused protection of the furnace internal wiring only. A disconnect is standard on every unit. If the unit is inaccessible, a separate field installed disconnect, other than the main breaker, may be required in an accessible area. See local building codes for further information. See wiring diagram provided with unit for main power wiring terminal connections.

Provide adequate circuit protection at the distribution panel using the proper wire size required from distribution panel to the unit. If there are any questions, consult your local and national electric codes. All wiring used must be approved for 75°C. NOTE: no wire may have more than 120 VAC potential to ground. This must be checked on installation to avoid motor damage. Unit must be grounded by connection of grounding wire from the distribution panel to the terminal provided in unit.

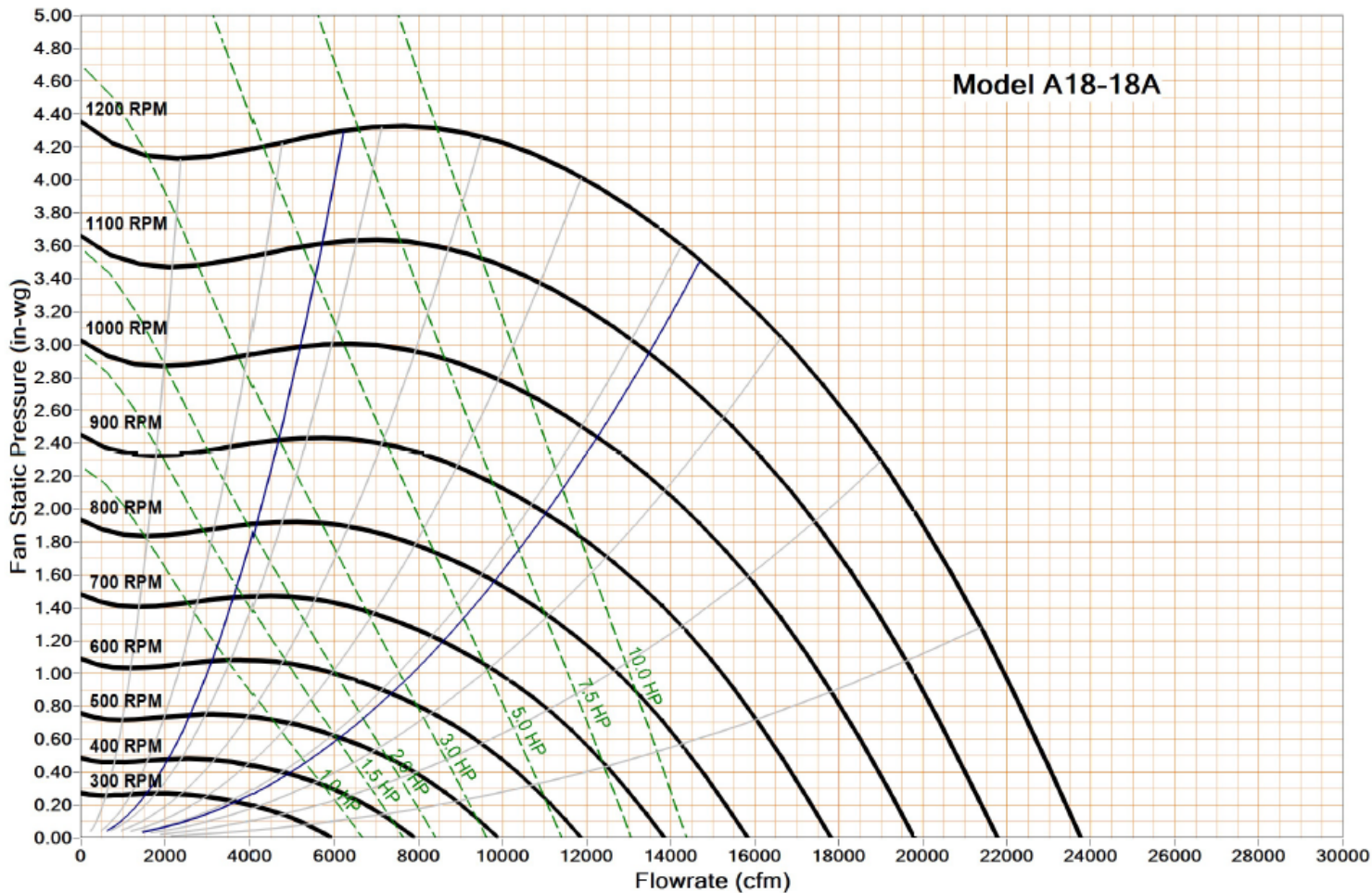
CONTROL WIRING:

See wiring diagram provided with unit for main power wiring terminal connections.

MODEL CODES EXAMPLE:

CKL	48	140	-3	-8	-6.0	-1.2	-VPS5	-SSR	-PT	-D200
Chicago King Large Series	20 = 208V 24 = 240V 48 = 480V	KW 50 to 240	1 or 3 Phase	Step Controller 1 to 8	CFM (In Thousands)	Max External Static Pressure (Inches W.C.)	Control Type VPS, VFD & Motor HP 2, 3, 5, 7.5, 10	Solid State Relay	Proportional Thermostat	Disconnect Switch

BLOWER CFM PERFORMANCE*



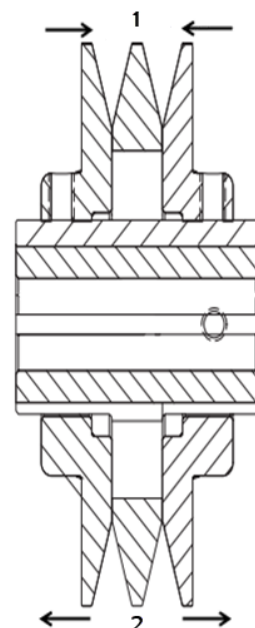
*This blower curve is based on factory performance of the blower only, not as installed in a system. When tuning air flow, always use CFM readings taken directly from the CKL unit or from the exhaust register if calculating with ducted performance.

BLOWER SPEED ADJUSTMENT:

If equipped with the optional variable frequency drive (VFD), fixed position sheaves will be used, consult the VFD manual for instructions on how to adjust motor speed for CFM changes.

If not equipped with a VFD, A variable pitch motor sheave will be standard on the CKL drive train. The variable pitch belt drive system accepts either A or larger B size belts which will vary the speed of the blower resulting in CFM changes from the factory setting. Adjustments in direction 1 will increase blower RPM. Adjustments in direction 2 will decrease blower RPM. See next page for sheave Adjusting procedures.

The sheaves on the belt drive pulley system are factory aligned and torqued to 130 in. lb. onto the motor and blower shaft keys.



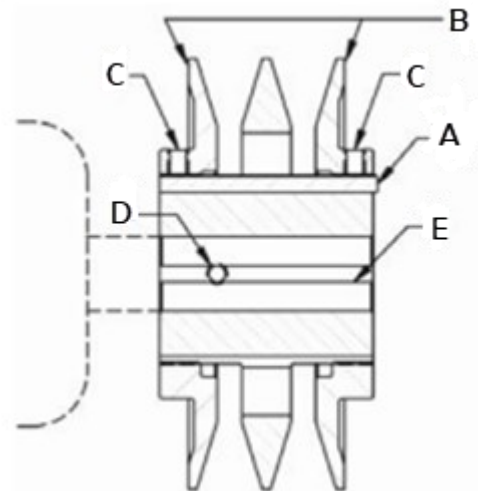
SHEAVE ADJUSTING PROCEDURE

BELTS:

1. The adjustable motor mount base slides the motor toward or away from the blower. This device is used to remove, reinstall, and tension belts.
2. Loosen the four bolts that mount the motor to the sliding base.
3. To remove or reinstall belts, move the motor toward the blower by adjusting the slider bolt(s).
4. To tension belts, move motor away from blower by adjusting the slider adjustment bolt(s). Use a belt tensioning tool (not provided) to ensure proper belt tension.
5. Tighten the four bolts that mount the motor to the sliding base.

MOUNTING SHEAVE TO MOTOR SHAFT:

1. Variable pitch sheaves must be mounted so the outer belt does not extend beyond the motor shaft, failure to do so can cause sheave or bearing failures.
2. With belts removed, make sure the shaft, sheave bore, keys, and keyways are free of burrs, paint, or debris.
3. Loosen flange set screws C then remove flange key A from sheave.
4. If needing to adjust placement of the sheave on the motor shaft, adjust B flanges outward until set screw D is visible. If setscrew D is not fully visible, B flanges may have to be unscrewed further to gain access to setscrew D. Set screw D must be toward the motor, not the outside of the sheave.
5. Loosen set screw D and slide the variable pitch sheave into alignment with blower sheave. Use a straight edge to align four points of contact (two points on each sheave).
6. Once variable pitch sheave and blower sheave are properly aligned, make sure motor shaft key E protrudes slightly from the sheave in order to grip it with pliers to remove.
7. Tighten set screw D onto the shaft key E by tightening and loosening the set screw three times, this allows the knurl of the set screw to dig into the shaft key E. Torque set screw to 110 in. lb. minimum - 130 in. lb. maximum.

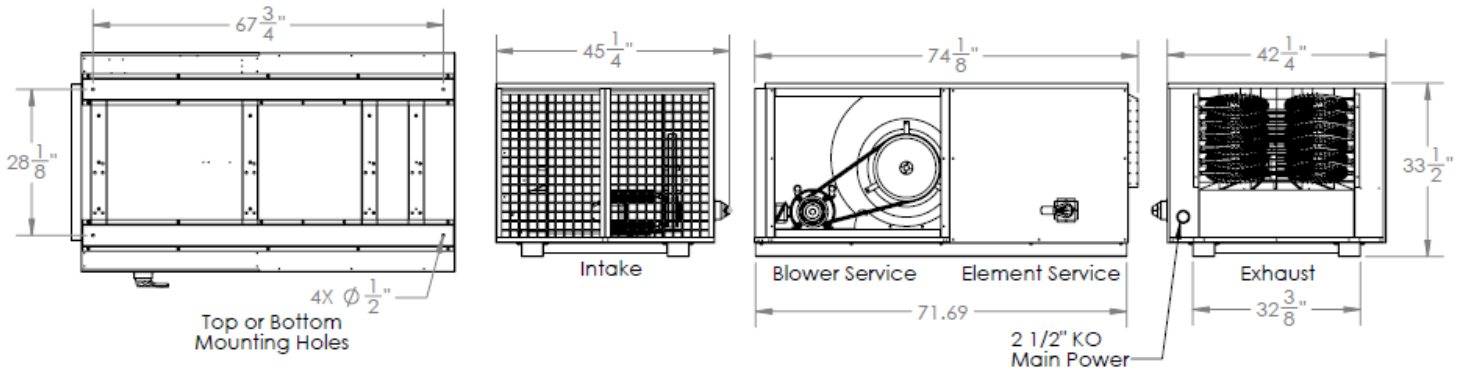


ADJUSTING BLOWER RPM:

All flanges have a small notch on the O.D. of the flange. This mark is located directly over the keyway of each flange. When these three notches are all aligned, keyways will then also be aligned and allow insertion of key A into the sheave keyway.

1. Loosen flange set screws C then remove sheave key A from sheave.
2. Rotate B flanges inward until they nearly touch the center flange with keyways aligned. This is now the starting position for making speed adjustments.
3. To decrease blower RPM, rotate B flanges outward from center the same number of half or full turns being sure to align the keyway notches. **Do not rotate B flanges more than five full turns for "A" size belts or six full turns for "B" size belts.**
4. Replace key A and torque set screws C to 110 in. lb. minimum - 130 in. lb. maximum being sure to loosen and tighten as previously instructed.
5. Reinstall and tension belts. *The ideal tension is the lowest tension at which the belt will not slip under peak load conditions* (consult Browning® Toolbox Technician APP).

DIMENSIONAL DATA



INSTALLATION AND MAINTENANCE

SEQUENCE OF OPERATION:

1. If the exhaust air temperature reads about 69°F and the unit is set to temper 100% outside air to 70°F, the thermostat switch is enabled and will call for power to the heating elements. Heat will then modulate to maintain 70°F.
2. When the controller temperature setting is satisfied, the elements will turn off automatically but the blower will continue to operate, this is a normal energy saving function of the CKL.
3. If used, the factory supplied heat sensor can be effected by many variables which can effect exhaust air heat loss (cold wall, drafts, duct length, duct type, etc.), you may need to set the controller thermostat higher or lower to achieve the desired exhaust air temperature at the heat register furthest away from the unit.
4. The CKL cannot deliver warm air if any of the following conditions exist:
 - a) The electric circuit breaker for this unit is turned "Off".
 - b) The intake filters are clogged with dirt and dust. Heat is exchanged through air flow volume. The volume of the intake air must match that of the exhaust air demand. If this volume is impeded by clogged filters, there will not be sufficient heat transfer air volume. This can also cause a build up of heat within the unit which may trip the high limit safety feature. Clean filters will ensure proper functionality and safety.
 - c) The thermostat on the unit is not set correctly as described above.
5. If the building HVAC system is equipped to cool as well as heat, the air conditioning condensing unit must be turned "ON" when summer cooling is required. If ducted to supply fresh outdoor air as a make up air unit, the CKL can be used to supply 100% outdoor air on demand. Be sure to set the CKL thermostat seasonally.
6. The heat/cool thermostat of a building HVAC unit typically has HEAT/OFF, COOL, FAN AUTO, and FAN ON positions. The CKL should be wired in series with each of these air demands if make up air is to be supplied in all seasons.

PERIODIC MAINTANENCE CHECKLIST:

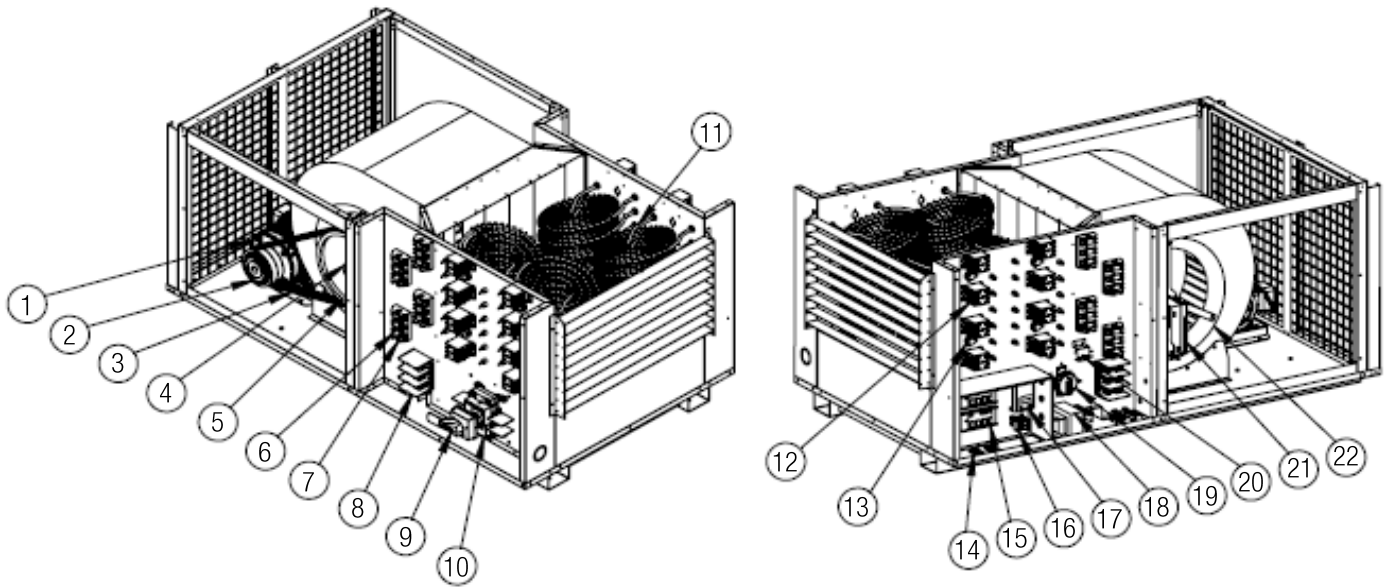
ITEM	PROCEDURE	FREQUENCY
Belt Tension	New belts will stretch and it is necessary to retention them after an initial wear-in time.	24 Hours & 48 Hours
Drive Belts	Check for proper belt tension and cracked belts. Replace cracked belts.	6 months
Filters	(Not provided) check filters to see if they are clean and operable. Replace as needed.	Monthly
Dust Accumulation	Check entire air flow path for any dust accumulations. Brush and vacuum as needed. Note heavy dust accumulations on the blower fan blades can cause rotation imbalance and premature bearing wear or failure.	Yearly
Vibration Dampeners	(Not provided) check for cracks and wear, replace as needed.	Yearly
Electrical components	Check for dust accumulations. Only use a vacuum to clean, do not use compressed air.	Yearly
Motor Bearing Oil	(Not provided)	Yearly

The motor is tested with oil at the manufacturing facility then drained prior to shipment. A small amount of residual oil and rust inhibitor will remain in the oil sump. This residual oil and rust inhibitor is compatible with Turbine Type Mineral Oils and Synthetic, PAO (Poly Alpha Olefin) based oils. It is not necessary to drain this residual oil when adding new oil for operation. Change oil once per year with normal service conditions. Frequent starting and stopping, damp or dusty environment, extreme temperature, or any other severe service conditions will warrant more frequent oil changes. Add oil into oil fill hole at each bearing housing. Wipe excess oil from threads of drain hole and coat the plug threads with Gasoila® P/N SS08 or equivalent thread sealant before replacing the drain plug. Tighten drain plug to 20 lb. ft. See the motor nameplate for the approximate quantity of oil required.

SERVICE & TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSES	POSSIBLE REMEDY
Excessive vibration or noise	<ol style="list-style-type: none"> 1. Blower bearings worn 2. Motor bearings worn or lacking lubrication 3. Loose fasteners 4. Dust accumulation in blower causing rotation imbalance 5. Belt noise from worn belts 	<ol style="list-style-type: none"> 1. Contact King-Electric 2. Lubricate or replace 3. Tighten fasteners 4. Clean accumulations 5. Replace belts
Smoke	<ol style="list-style-type: none"> 1. Dust accumulation on heating elements 	<ol style="list-style-type: none"> 1. Clean accumulations
Low Air Flow	<ol style="list-style-type: none"> 1. Dirty filters 	<ol style="list-style-type: none"> 1. Clean or replace dirty or worn filters
Not Enough Heat	<ol style="list-style-type: none"> 1. Dirty filters 2. One or many heat circuit fuses are blown 3. Short in wires 4. One or many elements failed 	<ol style="list-style-type: none"> 1. Clean or replace dirty or worn filters 2. Replace fuse 3. Consult a qualified technician 4. Consult a qualified technician

REPLACEMENT PARTS LIST



ITEM	DESCRIPTION
1	Motor
2	Motor Sheave
3	Belt
4	Blower Bushing
5	Blower Sheave
6	Fuse
7	Fuse Block
8	Terminal Block
9	Disconnect Handle
10	Disconnect Switch
11	Element
12	Contactator
13	High Limit
14	24V Terminal Block
15	Staging Relay Module
16	Fan Relay
17	Thermostat Proportional Modulating
18	Transformer
19	Air Flow Switch
20	Thermostat incoming air
21	Variable Frequency Drive (if installed)
22	Blower