

# Large Plenum Rated Heater CKL Series



### Model Code:

CKL 48 24 3 8-STEP 10.0CFM 1.2WG 7.5HP VSD SSR PT  
A B C D E F G H I J K

- A: Series
- B: 20 - 208V 24 - 240V 48 - 480V
- C: Kilowatts
- D: 1 or 3-phase
- E: Step Controller -1 to 8 Step Controller (See Model Chart)
- F: CFM
- G: External Static Pressure - Measured by Inches Water Gauge (WG)  
(Provided by Customer)
- H: Motor HorsePower
- I: Motor RPM Control /VPS Variable Pitch Sheave / VSD Variable Speed Drive
- J: Solid State Relays (SSR) for modulating 1 Stage (Vernier Stage)
- K: Proportional Thermostat and remote sensor to control discharge temperature.

- Spiral finned element
- N.E.M.A. 12 construction
- Fixed louver hood
- Can be ducted
- High mass steel fin heat exchanger
- Filter racks
- 16GA steel enclosure
- 24V control
- Dual inlet blower
- 208/240/480 volt
- Element step control
- 3-year limited warranty
- Totally Enclosed Motor with Variable Pitch Sheave
- Proportional Thermostat with Remote Sensor
- "See Table"



## The CKL Series Plenum Heater

This large kW special application unit heater is approved for use in concealed areas of buildings. It is specifically designed for highrise and office buildings, factories, auto body shops, food processing plants, plating shops and machine shops. This heater may be installed in inaccessible areas such as between a concrete ceiling and a drop tile ceiling, in a open plenum or ducted system. The heater is designed to withstand a dirty, dusty, moist or mildly corrosive environment. The heater is not intended for use where flammable vapors, gases, liquids or other combustibles are, or may be, present. Comes standard with Proportional thermostat and remote sensor to control the discharge temperature and element step controller for improved energy management. Refer to table for more info.

### Factory Installed Options

**Disconnect Switch:** Available with a 3-Pole non-fused disconnect with door interlocking feature and a padlock provision.

**Variable Speed Drive:** By adding a VSD to an AC motor, speed can be varied with precision. VSDs regulate the frequency that is fed to the motor, to run at the speed or with the torque according to the demand needed.

**Solid State Relay (SSR):** A solid state relay (SSR) enables high-precision, high-frequency temperature control by modulating the heat output as needed to meet the current demand.

**Motor HP Upgrades:** Standard models are listed with motors that will provide sufficient CFM for the kW they are designed for. Where additional CFM is required a larger motor can be provided. Up to 7.5 HP.

### Ordering Information

	MODEL	PHASE	KILO WATTS	BTUH(000)	VOLTS	AMPS	STAGES	CFM	STATIC PRESSURE	MOTOR HP	MOTOR AMPS	TEMP. RISE °F	WEIGHT lbs
208V	CKL2030-1-3-3	1	30	102.4	208	144.2	3	3000	.25"	2	3.1	31.6°	600
	CKL2040-1-4-3	1	40	136.5	208	192.3	4	3000	.25"	2	3.1	42.1°	650
	CKL2060-1-6-3	1	60	204.8	208	288.5	6	3000	.45"	2	3.1	63.2°	650
	CKL2080-1-8-3.3	1	80	273	208	384.6	8	3000	.5"	2	3.1	76.6°	700
240/208V	CKL2430-1-3-3	1	30/22.5	102.4	240/208*	125/108.2	3	3000	.25"	2	3.1	31.6°	600
	CKL2440-1-4-3	1	40/30	136.5	240/208*	166.7/144.2	4	3000	.25"	2	3.1	42.1°	650
	CKL2460-1-6-3	1	60/45	204.8	240/208*	250/216.3	6	3000	.45"	2	3.1	63.2°	650
	CKL2480-1-8-3.3	1	80	273	240/208*	333.3/288.5	8	3000	.5"	2	3.1	76.6°	700
480V	CKL4830-1-3-3	1	30	102.4	480	62.5	2	3000	.25"	2	3.1	31.6°	600
	CKL4840-1-2-3	1	40	136.5	480	83.3	2	3000	.25"	2	3.1	42.1°	650
	CKL4860-1-3-3	1	60	204.8	480	125	3	3000	.45"	2	3.1	63.2°	650
	CKL4880-1-4-3.3	1	80	273	480	166.7	4	3000	.5"	2	3.1	76.6°	700
208V	CKL4880-1-4-3.3	1	80	273	480	166.7	4	3000	.5"	2	3.1	76.6°	700
	CKL2030-3-2-3	3	30	102.4	208	83.3	2	3000	.25"	2	3.1	31.6°	600
	CKL2040-3-3-3	3	40	136.5	208	111	3	3000	.25"	2	3.1	42.1°	650
	CKL2060-3-4-3	3	60	204.8	208	166.5	4	3000	.45"	2	3.1	63.2°	650
	CKL2080-3-5-3.3	3	80	273	208	222.1	5	3300	.5"	2	3.1	76.6°	700
	CKL20100-3-6-4.1	3	100	241.3	208	277.6	6	4100	.6"	3	4.4	77.1°	850
	CKL20120-3-7-5	3	120	409.6	208	333.1	7	5000	.7"	3	4.4	75.8°	850
	CKL2430-3-2-3	3	30/22.5	102.4	240/208*	72.2/62.4	2	3000	.25"	2	3.1	31.6°	600
	CKL2440-3-2-3	3	40/30	136.5	240/208*	96.2/83.2	2	3000	.25"	2	3.1	42.1°	650
	CKL2460-3-3-3	3	60/45	204.8	240/208*	144.3/125	3	3000	.25"	2	3.1	63.2°	650
240/208V	CKL2480-3-4-3.3	3	80/60	273	240/208*	192.5/166.4	4	3300	.5"	2	3.1	76.6°	700

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## Ordering Information

240/208V

MODEL	PHASE	KILO WATTS	BTUH(000)	VOLTS	AMPS	STAGES	CFM	STATIC PRESSURE	MOTOR HP	MOTOR AMPS	TEMP. RISE °F	WEIGHT lbs
CKL24100-3-5-4.1	3		341.3	240/208*	240.6/208.1	5	4100	.6"	3	4.4	77.1°	850
CKL24120-3-6-5	3		409.6	240/208*	288.7/250	6	5000	.7"	3	4.4	75.8°	850
CKL24140-3-7-5.8	3		477.8	240/208*	336.8/291.3	7	5800	.75"	3	4.4	76.3°	900
CKL24160-3-8-6.6	3		546.1	240/208*	384.9/332.9	8	6600	.8"	3	4.4	76.6°	950
CKL4830-3-1-3	3		102.4	480	36.1	1	3000	.25"	2	3.1	31.6°	600
CKL4840-3-2-3	3		136.5	480	48.1	2	3000	.25"	2	3.1	42.1°	650
CKL4860-3-2-3	3		204.8	480	72.2	2	3000	.45"	2	3.1	63.2°	650
CKL4880-3-3-3.3	3		273	480	96.2	3	3300	.5"	2	3.1	76.6°	700
CKL48100-3-4-4.1	3		341.3	480	120.3	4	4100	.6"	3	4.4	77.1°	850
CKL48120-3-4-5	3		409.6	480	144.3	4	5000	.7"	3	4.4	75.8°	850
CKL48140-3-5-5.8	3		477.8	480	168.4	5	5800	.75"	3	4.4	76.3°	900
CKL48160-3-6-6.6	3		546.1	480	192.5	6	6600	.8"	3	4.4	76.6°	950
CKL48180-3-6-7.5	3		614.3	480	216.5	6	7500	.9"	5	6.9	75.8°	1000
CKL48200-3-7-8.3	3		682.6	480	240.6	7	8300	.95"	5	6.9	76.2°	1000
CKL48220-3-8-9.2	3		750.9	480	264.6	8	9200	1"	5	6.9	75.5°	1000
CKL48240-3-8-10	3		819.1	480	288.7	8	10000	1.2"	5	6.9	75.8°	1000

\*Dual rated heaters will draw 13% less amps and 25% less wattage when operated at 208V.

\*\*When placing an order, make sure to add ND (No Diffuser) to the model# if connecting to ductwork. \* Does not include motor load. kW rating load tolerance is plus 5% and minus 10%. Consult factory for special wattages and voltages

### BLOWER SPECIFICATIONS

- 1) Quiet forward curve, double inlet, dynamically balanced wheels.
- 2) Galvanized housing and wheels for increased corrosion resistance.
- 3) Keyed wheels, keyed shaft extensions and sealed ball bearings for higher horsepower motors.
- 4) 18" wheel for a maximum of 7.5 HP motor.
- 5) Airflows up to 10,000 CFM (see performance data chart above for SP up to 3.75" WG)
- 6) Galvanized mounting supports, vibro-pads and heavy duty mounting hardware.
- 7) Belt drive allows field adjustment of blower RPM to adjust for changes in system SP.

### Required Factory Installed Options

MODEL	DESCRIPTION
-X.XWG	X.X = External Static Pressure measured by inches Water Gauge (WG) - Provided By Customer
-XSTEP	1 to 8 Step Controller with Optional Vernier Stage (used with 1 modulating stage) - See Table For # of Stages
-2HP-VPS	2HP MOTOR with Variable Pitch Sheave
-3HP-VPS	3HP MOTOR with Variable Pitch Sheave
-5HP-VPS	5HP MOTOR with Variable Pitch Sheave
-7.5HP-VPS	7.5HP MOTOR with Variable Pitch Sheave
-10HP-VPS	10HP MOTOR with Variable Pitch Sheave
-PT	Proportional Thermostat and remote sensor to control discharge temperature.

### Optional Factory Installed Options

MODEL	DESCRIPTION
-2HP-VSD	2HP Motor with Variable Speed Drive
-3HP-VSD	3HP Motor with Variable Speed Drive
-5HP-VSD	5HP Motor with Variable Speed Drive
-7.5HP-VSD	7.5HP Motor with Variable Speed Drive
-10HP-VSD	10HP Motor with Variable Speed Drive
-SSR	Solid State Relays (SSR) for modulating 1 Stage (Vernier Stage)
-DS100	CKL 100 Amp Disconnect
-DS150	CKL 150 Amp Disconnect
-DS200	CKL 200 Amp Disconnect
-DS400	CKL 400 Amp Disconnect

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## Variable Pitch Sheave



Variable pitch sheaves (VPSs) are a simple method to vary fan speed to meet the required air flow specifications. The secret is within the threaded, angular faced discs that are the core of the V-shaped groove on each pulley. If you need more speed, move the discs toward each other. This alignment produces a belt that simply rides higher in the groove. To reduce the speed, simply increase the space between the two discs, which slows down the belt's motion.

## Variable Speed Drive



By adding a VSD to an AC motor, speed can be varied with precision. Variable speed drives sit between the electrical supply and the motor. Power from the electrical supply goes into a drive and the drive then regulates the power that is fed to the motor. This step allows the drive to adjust the frequency and the voltage that fed into to the motor based on your current process demands. This means you run your AC motors at the speed or with the torque according to the demand needed. This is why you can save large amounts of money using the AC drives.

## Step Controller



The King CKL make up air unit is equipped with a 1 to 8 step controller and an optional vernier stage. This provides on/off control for each heating stage plus one fully modulating step when ordered with Solid State Relays (SSR). The SSR option must be ordered to enable the vernier control option. For example, a 240KW unit will have 7 on/off steps at 30KW and 1 fully modulating step. The last 30KW step will modulate from 0 to 30KW to precisely control the discharge temperature. This is the most cost-effective way to achieve high quality temperature control.

## Solid State Relay (SSR)



A solid state relay (SSR) enables high-precision, high-frequency temperature control by modulating the heat output as needed to meet the current demand. It is a transistor activated by a small DC control signal produced by the temperature controller. This type of relays can switch high amperage in less than a second. They're used for heaters which require very frequent power switching and is mounted on a heat sink to dissipate the heat they generate.

## Proportional Thermostat



A proportional thermostat is designed to allow the appliance to heat more regularly and at low power, in order to minimize variations in the temperature of the room. The temperature of the room varies no more than  $\pm 0.9$  °F from the requested temperature. A proportional thermostat, therefore, makes it possible to obtain a more stable and precise temperature for better comfort.

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## Internal View

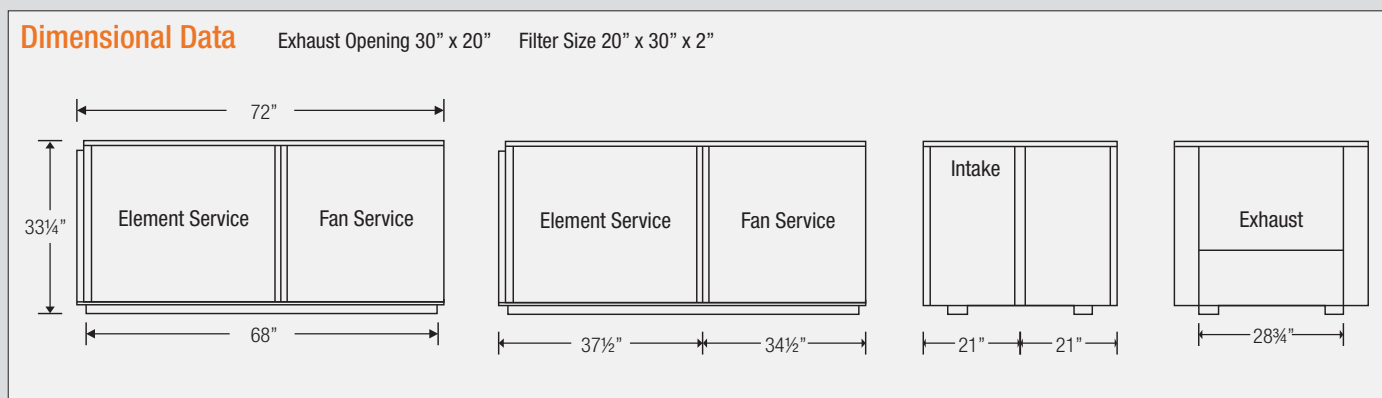
Front View



Motor & Blower



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## Engineering Specifications

*Contractor shall supply and install CKL Series plenum heaters manufactured by King Electrical Mfg. Company. Heaters shall be of the wattage and voltage as indicated on the plans.*

**Construction:** The heater case is fabricated from 16 gauge high tensile electro-galvanized Steel forming a durable unibody cabinet. Heater is finished with a rust inhibiting epoxy coating.

**Air Outlet Louver:** Fixed louvers

**Intake and Discharge Screen:** Heavy gauge Steel screen protects against foreign objects entering the heater. A filter is provided to prevent dirt and dust build-up in the heater.

**Air Filter:** Convenient access for replacement of standard filter. Filter not included.

**Variable Pitch Sheave (VPS):** Provides a simple method to vary fan speed to meet the required air flow specifications.

**Step Controller:** The King CKL make up air unit is equipped with a 1 to 8 step controller and an optional vernier stage. This provides on/off control for each heating stage plus one fully modulating step when ordered with the optional Solid State Relays (SSR).

**Proportional Thermostat:** A proportional thermostat is designed to allow the appliance to heat more regularly and at low power, in order to minimize variations in the temperature of the room. The temperature of the room varies no more than  $\pm 0.9$  °F from the requested temperature.

**N.E.M.A. 12 Wiring Compartment:** The wiring compartment is sealed with a 1/4" high density polyurethane gasket. This provides excellent protection against moisture, dust and dirt from invading the electrical components and wiring. All optional control accessories are N.E.M.A. 12 rated.

**Spiral Fin Elements:** The metal sheath element is brazed with spiral fins then molded in to a coil configuration. This combination produces the best heat transfer while eliminating the potential for hot spots by positioning the element in the maximum airflow stream.

**Easy Wiring:** A large wiring compartment with easy access allows for quick installation.

**Mounting:** The CKL heater comes with frame mounts.

**Approvals:** ETL Certified to comply with standard for Heating and Cooling Equipment ANSI/UL 1995 fourth edition.

Meets stringent City of Chicago codes for plenum use.

**Blower & Motor:** Totally enclosed outdoor ball bearing fan motor. Permanently lubricated, class B insulation, auto-protected, permanent split capacitor and 60° C ambient. Large capacity dual inlet blower handles high static pressure and moves large air volume. Motor leads are enclosed in a sealtight raceway to prolong equipment life and reduce maintenance.

**Air Intake Temperature Control:** A built-in thermostat located at the intake blower is factory set at 100°F which prevents the heater from operating when the ambient temperature exceeds this limit. This will prevent the heater from wasting energy and is an extra measure of safety.

**Variable Pitch Sheave (VPS):** Provides a simple method to vary fan speed to meet the required air flow specifications.

**Step Controller:**

The King CKL make up air unit is equipped with a 1 to 8 step controller and an optional vernier stage. This provides on/off control for each heating stage plus one fully modulating step when ordered with the optional Solid State Relays (SSR).

**Proportional Thermostat:**

A proportional thermostat is designed to allow the appliance to heat more regularly and at low power, in order to minimize variations in the temperature of the room. The temperature of the room varies no more than  $\pm 0.9$  °F from the requested temperature.

**Auto-Reset Thermal Cutout:** Power is disconnected from the heater if an overheated condition occurs. The element is re-energized automatically when the normal operating temperature returns.

**Internal Controls:** Magnetic contactors are standard on all units. A transformer is provided for 24 Volt control. This enables the customer to use a standard low voltage thermostat. Sub circuit fusing is provided when the heater ampacity exceeds 48 Amps to comply with UL standards. A fan delay is provided standard on all models to dissipate residual heat from the heating elements.

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**Air Performance Data CKL Plenum Heater - STATIC PRESSURE (inches. WG)**

CFM	.25		.50		.75		1.00		1.25		1.50		1.75		2.00		2.25		2.50		2.75		3.00		3.25		3.50		3.75	
	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
3,000	298	.25	411	.45	508	.69	588	.93	660	1.19	712	1.09	771	2.41	826	2.76	879	3.10	929	3.46	977	3.82	1,023	4.20	1,067	4.58	+	+	+	+
3,500	310	.32	414	.54	504	.79	684	1.06	656	1.35	724	1.47	785	1.74	823	3.04	875	3.41	925	3.78	972	4.17	1,018	4.56	1,062	4.96	1,104	5.37	1,145	5.78
4,000	322	.42	419	.65	505	.91	582	1.21	652	1.52	719	1.66	780	1.95	822	3.36	872	3.75	921	4.14	968	4.54	1,013	4.95	1,057	5.37	1,099	5.80	1,140	†
4,500	337	.53	428	.78	509	1.06	582	1.37	650	1.70	714	1.88	776	2.17	823	3.72	872	4.12	919	4.53	965	4.95	1,009	5.38	1,052	5.81	1,094	†	1,135	†
5,000	353	.67	439	.93	515	1.23	585	1.55	651	1.09	712	2.09	771	2.41	826	4.12	873	4.53	919	4.96	964	5.38	1,007	5.84	1,049	†	1,090	†	1,130	†
5,500	369	.84	452	1.12	524	1.43	591	1.76	654	2.12	712	2.35	769	2.69	823	4.56	876	4.99	921	5.43	964	5.88	1,007	†	1,048	†	1,088	†	1,130	†
6,000	387	1.03	465	1.33	535	1.65	599	2.00	659	2.38	715	2.64	769	2.99	822	5.05	881	5.49	925	†	967	†	1,069	†	1,048	†	†	†	†	†
6,500	x	x	480	1.58	547	1.82	608	2.28	666	2.67	719	2.97	772	3.34	823	5.58	888	†	937	†	976	†	†	†	†	†	†	†	†	†
7,000	x	x	496	1.86	560	2.22	619	2.59	676	2.00	726	3.33	777	3.72	826	†	881	†	930	†	971	†	1,011	†	†	†	†	†	†	†
7,500	x	x	513	2.17	575	2.55	631	2.95	685	3.36	735	3.74	783	4.15	831	†	881	†	921	†	964	†	†	†	†	†	†	†	†	†
8,000	x	x	x	x	590	2.93	645	3.34	696	3.77	745	4.19	792	4.62	837	†	881	†	925	†	967	†	†	†	†	†	†	†	†	†
8,500	x	x	x	x	605	3.05	659	3.78	700	4.23	758	4.69	801	5.13	845	†	888	†	930	†	971	†	†	†	†	†	†	†	†	†
9,000	x	x	x	x	622	3.81	674	4.29	722	4.73	768	5.23	812	5.69	855	†	896	†	937	†	976	†	†	†	†	†	†	†	†	†
9,500	x	x	x	x	x	x	689	4.79	730	5.28	781	5.81	824	†	866	†	908	†	†	†	†	†	†	†	†	†	†	†	†	†
10,000	x	x	x	x	x	x	705	5.37	751	5.88	795	†	837	†	877	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†

**AIR PERFORMANCE CHART SYMBOLS**

- x Performance is below 10% static efficiency
- + Performance is unstable, not recommended

† Exceeds 5 HP Motor