

Electronic Furnace KFS ECO2S Series



Model Code:

KFS	24	20	1	2S1	ECM
A	B	C	D	E	F

- A: Series
- B: 24 - 240V 20 - 208V
- C: Kilowatts
- D: 1-phase 3-phase
- E: 2 Stage 2S1= 2 Stage 1-phase
2S3= 2 Stage 3-phase
- F: ECM Motor



- Energy efficient motor
- 2 stage comfort heating 15% savings
- Heavy Duty Open coil elements
- Sequenced heating elements
- Down flow or up flow
- 16" x 20" x 1" inlet filter
- Welded cabinet design
- Horizontal or vertical mount
- Mobile home approved
- Breaker disconnects
- Baked enamel finish
- Extended life
- 24 Volt control
- Fan only relay
- Quiet sound insulated cabinet
- 5 Year limited warranty



The KFS ECO2S Electric Furnace

ENERGY SAVINGS meets MAXIMUM COMFORT with the ECM Motor & 2 Stage Heating

The ECO2S Series Model adds a state of the art electronically controlled motor and 2 heating stages for added comfort and Maximum Energy Savings. The KFS ECO2S Series furnace is the quietest and most compact unit available in its class. Ideal for residential applications, and yet powerful enough for commercial and process heating applications as well. It's the perfect choice for both new and replacement installations. The compact design allows it to be installed in either upflow, downflow or horizontal applications. Featuring a maintenance free blower, an insulated cabinet for quiet operation, and heavy gauge coiled nickel-chromium wire heating elements, the KFS furnace will provide years of trouble-free operation.

Motor Features

- Energy Saver
- AFUE 100% (Energy Guide Rating) Most Efficient
- 3 speeds available
- Designed for extended life
- Efficiency up to 80%
- 60 second time delay
- Up to 33% greater efficiency with ECM motor
- Up to 200% greater efficiency with Endura Pro motor in constant fan mode

Heating Features

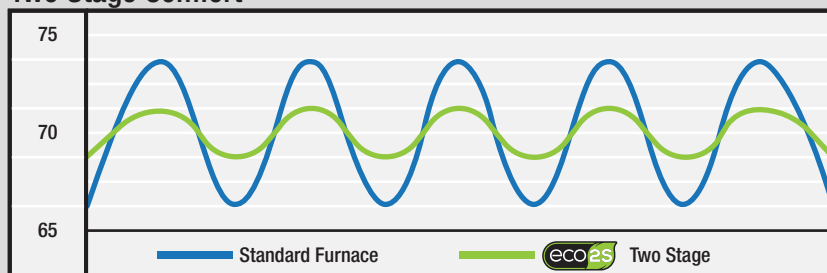
- 2-Stage Elements & control
- Ni-Chrome Elements
- More even heating

TWO STAGE COMFORT Why 2 Stage is Better

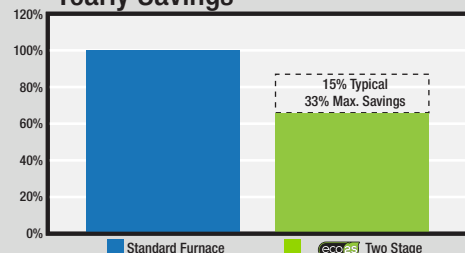
2 Stage controlled Furnaces allow you to use less energy during mild Spring and Fall temperatures. It's like having a smaller furnace installed just for spring and fall, then when winter hits you have the reserve power of the second heating stage to fight off the cold weather. It also has the benefit of creating more even comfort temperatures.

Note: The Furnace will run a percentage longer to reach the room temperature so the ECM motors efficiency is key to getting the most out of your Furnace.

Two Stage Comfort

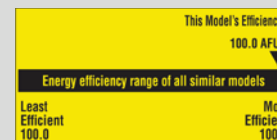


Yearly Savings



The ECO2S Series is more efficient and will save you up to 33% more per year versus standard furnace motors

- Designed for extended life
- Energy efficient
- Improved reliability
- Cooler operating temperature
- 3 speeds
- 15% 2 Stage



Electronic Furnace KFS ECO2S Series

Ordering Information

MODEL	PHASE	STAGE 1	STAGE 2	KILO WATTS	BTU (000)	VOLTS	**AMPS	CIRCUIT PROTECTION						75°C WIRE SIZING						# OF ELEMENTS	MOTOR		TEMPERATURE RISE			HEIGHT	WT. (lbs)
								L1	L2	L3	L4	L5	L6	L7	L8	L1	L2	L3	L4		L5	L6	L7	L8	VOLTS		
KFS2003-1-ECM	1	3kW	*N/A	3	10.2	208	17.8	20	0	0	0	#10	0	0	0	1	208	1/5	12°	11°	9°	30½"	57				
KFS2005-1-ECM	1	5kW	*N/A	5	17.1	208	27.2	40	0	0	0	#8	0	0	0	1	208	1/5	20°	16°	16°	30½"	57				
KFS2006-1-2S1-ECM	1	3kW	3kW	6	20.5	208	32.2	40	0	0	0	#8	0	0	0	2	208	1/5	24°	22°	19°	30½"	57				
KFS2010-1-2S1-ECM	1	5kW	5kW	10	34.1	208	51.4	30	40	0	0	#6	0	0	0	2	208	1/5	41°	37°	32°	30½"	65				
KFS2015-1-2S1-ECM	1	10kW	5kW	15	51.2	208	75.5	40	60	0	0	#8	#6	0	0	3	208	1/5	61°	55°	47°	30½"	74				
KFS2020A-1-2S1-ECM	1	10kW	10kW	20	68.3	208	99.5	60	60	0	0	#6	#6	0	0	4	208	1/5	81°	73°	63°	37½"	76				
KFS2020-1-2S1-ECM	1	10kW	10kW	20	68.3	208	99.4	60	60	0	0	#6	#6	0	0	4	208	1/3	57°	51°	41°	37½"	76				
KFS2025-1-2S1-ECM	1	15kW	10kW	25	85.3	208	123.4	30	60	60	0	#10	#6	#6	0	5	208	1/3	72°	63°	51°	37½"	81				
KFS2030-1-2S1-ECM	1	20kW	10kW	30	102.4	208	147.4	60	60	60	0	#6	#6	#6	0	6	208	1/3	86°	76°	62°	37½"	85				
KFS2404-1-ECM	1	4kW	*N/A	4	13.6	240	20.0	20	0	0	0	#10	0	0	0	1	240	1/5	16°	15°	13°	30½"	57				
KFS2405-1-ECM	1	5kW	*N/A	5	17.1	240	24.2	30	0	0	0	#10	0	0	0	1	240	1/5	20°	18°	16°	30½"	57				
KFS2408-1-2S1-ECM	1	4kW	4kW	8	27.3	240	37	50	0	0	0	#6	0	0	0	2	240	1/5	32°	30°	25°	30½"	65				
KFS2410-1-2S1-ECM	1	5kW	5kW	10	34.1	240	45	60	0	0	0	#6	0	0	0	2	240	1/5	41°	37°	32°	30½"	65				
KFS2412-1-2S1-ECM	1	5.75kW	5.75kW	11.5	39.2	240	51.3	40	30	0	0	#8	#10	0	0	2	240	1/5	47°	42°	36°	30½"	65				
KFS2415-1-2S1-ECM	1	10kW	5kW	15	51.2	240	65.9	30	60	0	0	#10	#6	0	0	3	240	1/5	61°	55°	47°	30½"	74				
KFS2418-1-2S1-ECM	1	11.5kW	5.75kW	17.25	58.8	240	75.2	40	60	0	0	#8	#6	0	0	3	240	1/5	70°	63°	55°	30½"	74				
KFS2420A-1-2S1-ECM	1	10kW	10kW	20	68.3	240	86.7	60	60	0	0	#6	#6	0	0	4	240	1/5	81°	73°	63°	37½"	76				
KFS2420-1-2S1-ECM	1	10kW	10kW	20	68.3	240	86.5	60	60	0	0	#6	#6	0	0	4	240	1/3	57°	51°	41°	37½"	76				
KFS2422-1-2S1-ECM	1	11.5kW	11.5kW	22.5	68.3	240	96.9	60	60	0	0	#6	#6	0	0	4	240	1/3	57°	51°	41°	37½"	76				
KFS2425-1-2S1-ECM	1	15kW	10kW	25	85.3	240	107.4	30	60	60	0	#10	#6	#6	0	5	240	1/3	72°	63°	51°	37½"	81				
KFS2430-1-2S1-ECM	1	20kW	10kW	30	102.4	240	128.2	60	60	60	0	#6	#6	#6	0	6	240	1/3	99°	77°	71°	37½"	85				
KFS2435-1-2S1-ECM	1	23kW	11.5kW	34.5	117.7	240	146.9	15	60	60	60	#14	#6	#6	#6	6	240	1/3	99°	77°	71°	37½"	85				

MODEL	PHASE	STAGE 1	STAGE 2	KILO WATTS	BTU (000)	VOLTS	**AMPS	CIRCUIT PROTECTION			75°C WIRE SIZING				# OF ELEMENTS	MOTOR		TEMPERATURE RISE			HEIGHT	WT. (lbs)
								L1	L2	L3	L1	L2	L3	L4		VOLTS	HP	LOW	MED.	HIGH		
KFS2009-3-ECM	3	9kW	*N/A	9	30.7	208	28.3	40	#8	3	208	1/5	20°	18°	16°	30½"	74					
KFS2012-3-2S3-ECM	3	7.5kW	3.75kW	11.5	38.4	208	34.6	40	#8	3	208	1/5	46°	41°	35°	30½"	74					
KFS2015-3-2S3-ECM	3	10kW	5kW	15	51.2	208	43.5	60	#6	3	208	1/5	61°	55°	47°	30½"	74					
KFS2022-3-2S3-ECM	3	15kW	7.5kW	22.5	76.8	208	65.5	100	#3	6	208	1/3	64°	61°	46°	37½"	85					
KFS2030-3-2S3-ECM	3	20kW	10kW	30	102.4	208	86.5	110	#2	6	208	1/3	86°	76°	62°	37½"	85					
KFS2405-3-ECM	3	5kW	*N/A	5	17.1	240	15.4	20	#12	1	240	1/5	20°	18°	16°	30½"	57					
KFS2410-3-2S3-ECM	3	5kW	5kW	10	34.1	240	27.4	40	#8	2	240	1/5	41°	37°	32°	30½"	74					
KFS2412-3-ECM	3	12kW	*N/A	12	40.9	240	32.3	40	#8	3	240	1/5	47°	42°	36°	30½"	74					
KFS2415-3-2S3-ECM	3	10kW	5kW	15	51.2	240	45	50	#6	3	240	1/5	61°	55°	47°	30½"	74					
KFS2418-3-ECM	3	17.25kW	*N/A	17.25	58.8	240	44.8	60	#6	3	240	1/5	70°	63°	55°	30½"	74					
KFS2420-3-2S3-ECM	3	15kW	5kW	20	68.3	240	51.3	70	#6	4	240	1/3	57°	51°	41°	37½"	74					
KFS2425-3-2S3-ECM	3	15kW	10kW	25	85.3	240	63	75	#4	5	240	1/3	72°	63°	51°	37½"	85					
KFS2430-3-2S3-ECM	3	20kW	10kW	30	102.4	240	75.3	100	#3	6	240	1/3	86°	76°	62°	37½"	85					
KFS2435-3-2S3-ECM	3	23kW	11.5kW	34.5	117.7	240	86.2	110	#2	6	240	1/3	99°	87°	71°	37½"	85					

* Not Available in 2-Stage

** Includes motor load

Accessories

MODEL	UPC	DESCRIPTION	WEIGHT(lbs.)
KFS-4PJB	20185	* 4-Pole Jumper Bar - 15kW to 20kW	.05
KFS-6PJB	20184	* 6-Pole Jumper Bar - 25kW to 30kW	.05
KFSSB	20182	1" discharge sub base	5
KFS-Q02C	20181	Small Cooling Cabinet 16" L x 22" W x 19½" H - 13 lbs.	25
KFS-Q03C	20180	Large Cooling Cabinet 18" L x 22" W x 19½" H - 15 lbs.	25
KFS-DT	20186	Transition from 14" x 14" Outlet to 12" round	25

* For single strike connection

DIMENSIONAL CLEARANCE	
Cabinet Sides	1 in.
Cabinet Front	0 in.
Exhaust duct within 3 feet of furnace	1 in.
Return Air Plenum	0 in.

Options

ADD SUFFIX:	DESCRIPTION
-JB	15 kW to 30 kW, 1-Phase
-1/3HP	1/3 HP Motor & Blower - 3 kW to 18 kW

Factory Installed Options

ADD SUFFIX:	DESCRIPTION
-DS40	40 Amp, 3-Pole Disconnect Switch w/ Padlock Provision
-DS60	60 Amp, 3-Pole Disconnect Switch w/ Padlock Provision
-DS80	80 Amp, 3-Pole Disconnect Switch w/ Padlock Provision

Electronic Furnace KFS ECO2S Series



Factory Installed Options Remove Suffix -2S1 or -2S3 from base model when adding SCR Power control

ADD SUFFIX:	DESCRIPTION
-SCR45-1	SCR Fully Modulating Fan Coil Unit, 45 Amp, 1-Phase, Includes Modulating thermostat & duct sensor
-SCR45-3	SCR Fully Modulating Fan Coil Unit, 45 Amp, 3-Phase, Includes Modulating thermostat & duct sensor
-SCR45X2-1	SCR Fully Modulating Fan Coil Unit, 90 Amp, 1-Phase, Includes Modulating thermostat & duct sensor
-SCR45X2-3	SCR Fully Modulating Fan Coil Unit, 90 Amp, 3-Phase, Includes Modulating thermostat & duct sensor
-SCR45X2-3	SCR Fully Modulating Fan Coil Unit, 90 Amp, 3-Phase, Includes Modulating thermostat & duct sensor

Additional Add-On Options

ADD SUFFIX:	DESCRIPTION
-RMT	Connection Block for Remote Modulating Thermostat (Customer Provided)

SCR Fully Modulating Fan Coil Unit Includes:



SCR Power Control



Modulating Thermostat



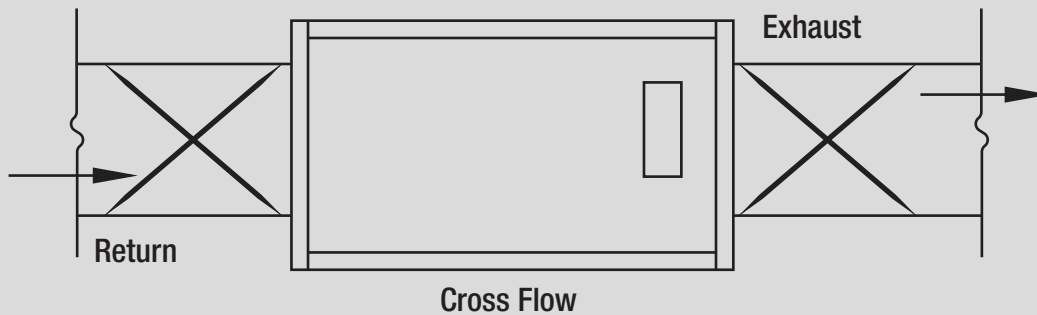
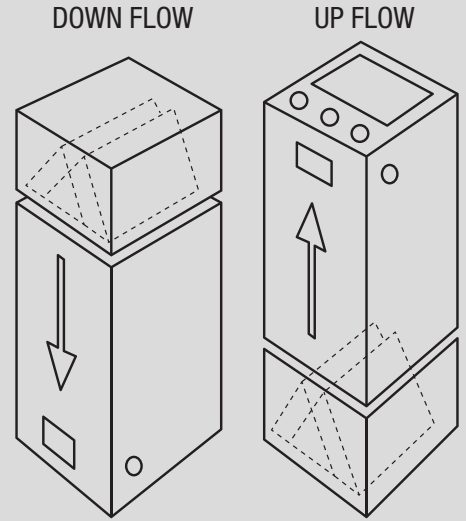
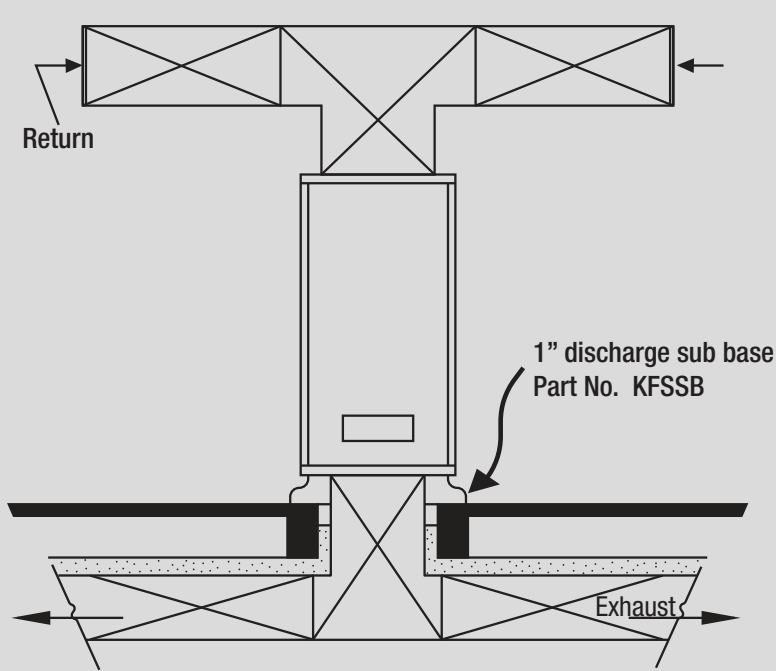
Duct Temperature Sensor



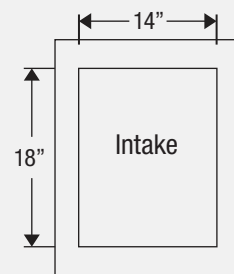
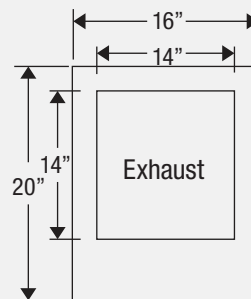
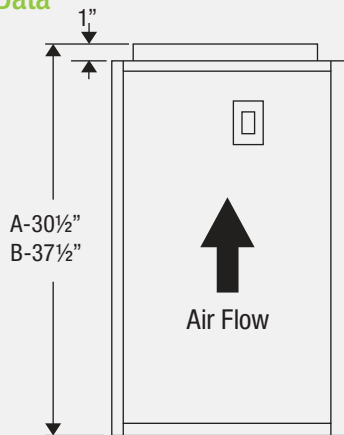
ECM Motor

- SCR Power Control provides precise modulation of the electric resistance heating load. Available for 208V, 240V, 480V 1-phase and 3-Phase. Amp rating: 45A and 75A or 90A (2x45A units). Accepts 4 – 20 mA or 0-10 VDC input signal Includes LED indication light.
- Selectable 3-Speed Fan is set up at installation to provide the required CFM.
- Modulating Thermostat with 0 to 10VDC modulating output controls the output temperature by modulating directly to the SCR power controller. Can be mounted remotely or on the unit for make up air applications.
- Duct Temperature Sensor is used with the modulating thermostat and is mounted on the discharge side unit to precisely control the air temperature. Controls discharge air temperature regardless of the incoming air temperature typical of make up air applications.
- ECM Motor for multiple speed control.

Electronic Furnace KFS EC02S Series



Dimensional Data



The height of the KFS furnace is the only dimension that changes. Please refer to selection chart to determine the size of the unit.

Electronic Furnace KFS ECO2S Series

Air Flow Chart

FURNACE SIZE	BLOWER WIDTH	24 VOLT MOTOR TERMINAL	CFM (STATIC)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Small (3-18 KW) 30.5" tall	9" 1/5 HP ECM Standard	1	1090	980	940	890	840	920	800	760
		2, 4	1260	1090	1040	980	930	890	810	780
		3, 5	1370	1260	1220	1170	1120	1090	1080	990
	10" 1/3 HP ECM Optional	1	1700	1680	1670	1660	1650	1640	1630	1620
		2, 4	1810	1800	1790	1750	1740	1730	1720	1710
		3, 5	1960	1940	1930	1910	1870	1860	1850	1830
Large (20-35 KW) 37.5" tall	9" (KFS2420A)	1	1160	1120	1090	1050	1020	990	960	850
		2, 4	1310	1230	1200	1150	1120	1050	990	910
		3, 5	1480	1410	1390	1270	1240	1180	1120	1040
	10" Standard	1	1860	1850	1840	1830	1820	1810	1790	1740
		2, 4	2000	1980	1960	1940	1930	1920	1910	1900
		3, 5	2120	2100	2070	2050	2030	2020	2010	2000

Air Filter Size: 16" x 20" x 1" on both furnace sizes

Engineering Specifications

Contractor shall supply and install KFS ECO2S Series electric furnaces manufactured by King Electrical Mfg. Company. Furnaces shall be of the wattage and voltage as indicated on the plans.

Transformer: Each furnace is equipped with a heavy duty low voltage (40 VA) transformer for the thermostat control circuit.

Time Delay Sequencer: Actuates heating element banks to minimize electrical surges in compliance with E.E.I. and N.E.M.A. standards.

Heating Elements: Quick heating, long life Ni-Chrome elements are sized to provide proper watt density for maximum heat dissipation.

Terminal Block: For field wiring (optional special order) KFSTB Single Strike Connection. Takes multiple circuits into a single feed.

Air Filter: Convenient access for replacement of standard 16" x 20" x 1" filter. Do not use pleated filters.

Motor: Energy Saving, Long life, thermally protected, permanently lubricated, direct drive ECM motor—no belts to adjust or slip.

This low noise, 3 speed motor is designed for use with air conditioning capability as well as heating. Very quiet operating. 60 second fan delay.

Overcurrent Protection: 208 and 240 volt KFS models have 60 amp circuit breakers.

Limit Control: Integral automatic high temperature limit control in each heating element bank prevents the delivery of air at unsafe temperatures. 20-35 KW models use a manual reset limit control to completely shut the furnace off should an unsafe temperature occur. Summer fan only operation. Fan can be run independently from heating. Mobile Home approved.

Unique Fan Orifice: Louver directs air over all heating elements and side walls evenly ensuring longer life performance.

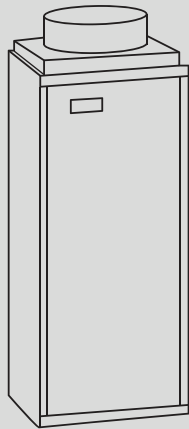
Low Voltage Terminal Block: 24 Volt control screw terminals.

Approvals: cULus (E48864) USA and Canada

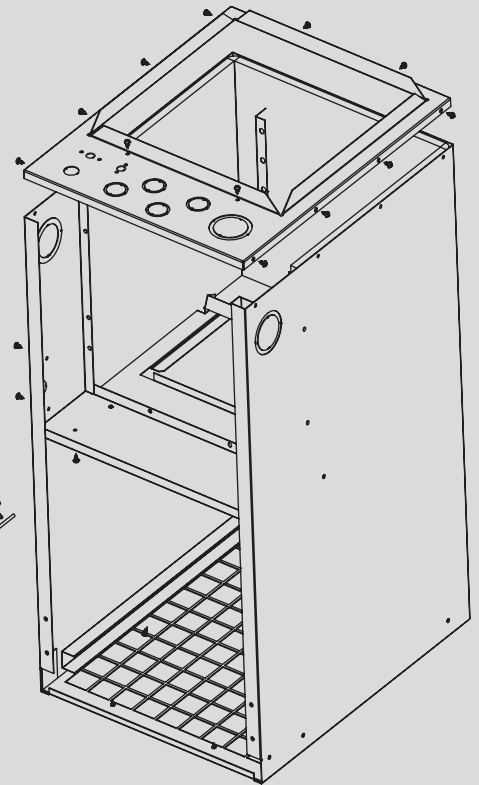
Electronic Furnace KFS EC02S Series

Internal Diagram - *exploded view*

Smart Heating Solutions



12" Round KFS-DT
Duct Transition



Transformer

Each furnace is equipped with a 40VA low voltage (24 volt) transformer for the thermostat control circuit.

Low Voltage Terminal Block

Comes standard. With aux 24V access for dampers & air conditioning

Heating Elements

Quick heating long life nichrome elements are sized to provide proper watt density for maximum heat dissipation by fan forced air convection currents

Terminal Block

For Field Wiring (Optional Special Order)
For single strike

Heating Elements

Fan Relay

Heavy duty dual speed fan relay comes standard with furnaces for air conditioning or summer fan

Time Delay / Contactor Sequencer

Actuates heating element banks at random intervals to minimize electrical surges in compliance with EEL and NEMA standards.

Limit Control

Integral automatic high temperature limit control in each heating element bank prevents the delivery of air at unsafe temperatures. 20-35 KW also use a manual reset limit control to completely shut the furnace off should an overtemperature condition occur.

Jumper Bar

for circuit breaker-JB

Overcurrent Protection

60 Amp circuit breakers may be built in to comply with code requirements and offer ultimate safety in overcurrent protection. Front mounted for easy reset. Multiple circuits or single power source points

Motor

Energy Saving, Long life, thermally protected, permanently lubricated, direct drive ECM motor—no belts to adjust or slip. This low noise, 3 speed motor is designed for use with air conditioning capability as well as heating. Very quiet operating. 60 second fan delay.

Air Filter

Convenient access for replacement of standard 16" x 20" x 1"
Do not use pleated filters.

