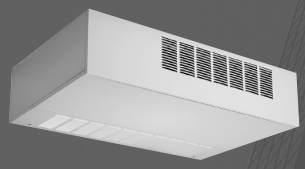
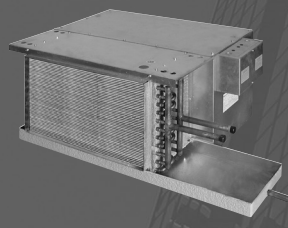
FAN COILS

E2





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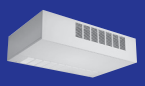
KRUEGER
Excellence in Air Distribution

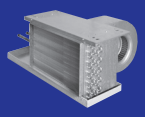


KHFE
Part of the Horizontal Low Profile series, this model features an exposed cabinet configuration.

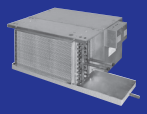
KHFH
Part of the Horizontal Low Profile series, this model features a concealed ceiling configuration.

KHFP
Part of the Horizontal Low Profile Series, this model features a standard concealed ceiling with plenum. configuration.

KHGE
Part of the Horizontal High Capacity Series, this model features a horizontal exposed cabinet configuration.

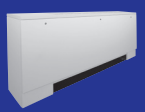


KHGH
Part of the Horizontal High Capacity Series, this model features a concealed ceiling configuration.

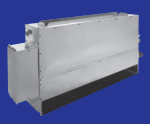


KHGP
Part of the Horizontal High Capacity Series, this model features a concealed ceiling with plenum configuration.

KVFS
Part of the Vertical Standard Series, this model features an exposed cabinet slant top configuration.



KVFF
Part of the Vertical Standard Series, this model features an exposed cabinet flat top configuration.



KVFH
Part of the Vertical Standard Series, this model features a concealed console configuration.

KVPH
Part of the Vertical Stack Series, this model features a vertical stack, recessed hi-rise configuration.

KVPP
Part of the Vertical Stack Series, this model features a vertical stack, recessed primary configuration.

KVPS
Part of the Vertical Stack Series, this model features a vertical stack, recessed secondary configuration.

KVIP
Part of the Vertical Stack Series, this model features a twin pack primary vertical stack, recessed hi-rise configuration.

KVIS
Part of the Vertical Stack Series, this model features a twin pack secondary vertical stack, recessed hi-rise configuration.

KVPE
Part of the Vertical Stack Series, this model features a vertical stack, recessed hi-rise configuration.

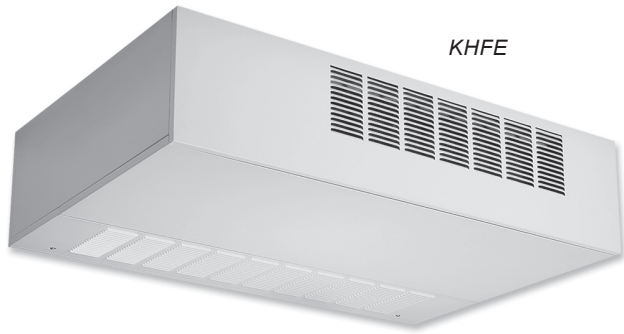
Introduction: KHF Series

Krueger KHF series of horizontal low profile fan coil units are designed to maximize flexibility of selection and installation. The units are also designed to exceed the stringent quality standards of the institutional market, while remaining cost competitive in the light commercial segment of the market. Krueger horizontal fan coil units set the new standards for quality, flexibility, and competitive pricing.

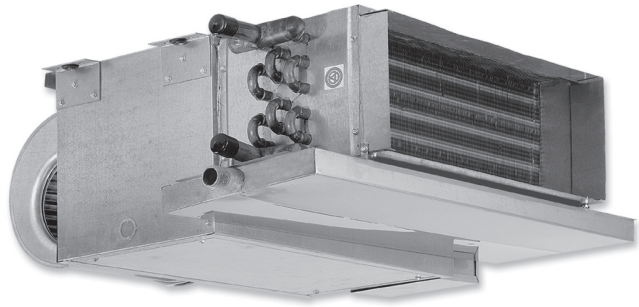
MODEL

KHFE - Horizontal Fan Coil, Exposed Cabinet
KHFH - Horizontal Fan Coil, Concealed Ceiling
KHFP - Horizontal Fan Coil, Concealed with Plenum

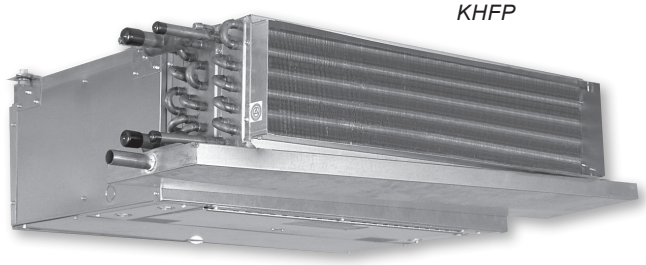
KHFE



KHFH



KHFP



KHF Series Product Description

DESIGNED FOR MAXIMUM FLEXIBILITY

The extensive variety of standard options available on these units are where you find the versatility to fit any HVAC system designer's needs.

Options include: rear or bottom ducted return, foil faced or elastomeric closed cell foam insulation, solid or telescoping bottom panels for unit recessing, single wall stainless steel drain pans, and electric heat with single point power connection. All electric heat units are listed with ETL as an assembly and carry the cETL label.

All units comply with the latest edition of AHRI Standard 440 for testing and rating fan coil units, are certified, and display the AHRI symbol.

High efficiency motors, fan relays, disconnects and fusing mean easier coordination between mechanical and electrical trades.

Coil options allow for three or four row chilled water or DX cooling coils. One or two row hot water coils may be placed in the preheat or reheat position.

Silent solid state relays are available for fan and electric heat control in sound sensitive environments.

QUALITY PRODUCT

These concealed fan coil units are built from galvanized steel, which surpasses the ASTM 125 hour salt spray test for corrosion and rust. Exposed unit cabinetry is powder coated galvannealed steel.

Standard insulation is 1/2" thick fiberglass, complying with UL 181 and NFPA 90A. Optional foil faced or elastomeric closed cell foam insulation may be specified.

All units, with or without electric heat, are cETL listed and labeled. All wiring is in compliance with NEC, assuring safety and quality for the owner.

This series of fan coil units have a removable fan assembly. The entire fan assembly can be removed from the unit and serviced easily on a workbench.

CONSTRUCTION HIGHLIGHTS

Electrical Enclosure

The bottom hinged electrical enclosure provides access to a spacious electrical compartment. This compartment houses all electric heat and control components. Terminal strips are furnished for simple power and control wiring connections. Multiple knockouts allow wiring entries from either side of the compartment.

Filters: 1" throwaway filters are tight fitting to prevent air bypass. Filters are easily removable from the bottom through the access panel or plenum.

Coils: All units are available in 2 or 4 pipe configurations. The heating coil may be placed in the reheat or preheat position. On concealed models, heating and cooling coils are available with right, left, or opposite side connections.

Drain Pan: Standard drain pans are externally insulated, single wall galvanized steel with an option for stainless steel. Drain pans are available with secondary drain connection. On concealed models, the drain pan is easily removable for cleaning or reversing connections.

Telescoping Bottom Panel: The telescoping bottom panel allows for fully recessing the unit while permitting service access into the ceiling plenum. The architectural ceiling panel is finished with a durable powder coat paint.

Fan Deck: The fan assembly is easily removed without disconnecting the ductwork for service access to motors and blowers at or away from the unit.

CONVENIENT INSTALLATION

All fan coil units in this series are shipped completely assembled, reducing field installation time and labor.

All units are thoroughly inspected and tested prior to shipment, eliminating potential problems at startup. Motor wiring is brought to a junction box on the outside of the unit casing, reducing electrical hook-up time.

Plenum units are field reversible for either rear or bottom return without special adapters, tools, or additional parts.

All units have the option of a hinged cover electrical enclosure in the bottom of the unit. The expansive compartment allows for easy access to all electrical components, terminal blocks, and wiring.

Factory furnished valve packages assure proper fit, operation, and performance.

KHF Series Product Description

STANDARD FEATURES

Construction

All Units
- AHRI 440 certified and labeled.
- Galvanized steel construction.
- 1/2” thick fiberglass insulation.
- 1 1/2” duct discharge collar.
- Four point hanger mounting brackets.

Plenum units
- Integral filter rack with 1” throwaway filter.
- Integral rear ducted return - field reversible to bottom return.

Exposed units
- Stamped louver supply and return air grilles.
- Durable powder coat paint.
- 18 gauge bottom panel construction.

Coils
- Cooling - 3 or 4 row chilled water or DX, heat pump compatible.
- Heating - 1 or 2 row hot water – reheat or preheat position.
- 6 total rows of cooling and heating coils maximum.
- 1/2” O.D. seamless copper tubes.
- 0.016” tube wall thickness.
- High efficiency aluminum fin surface for optimizing heat transfer, pressure drop and carryover.
- Left or right hand, same or opposite side connections.
- Access to entering and leaving air sides for cleaning.
- Removable for service.
- Manual air vents.

Drain Pans
- Single wall, galvanized steel, externally insulated – fire retardant and antimicrobial.
- Positively sloped to drain connection.
- Removable, field reversible.
- 7/8” O.D. primary drain connection.

Fan Assemblies
- Forwardly curved, DWDI centrifugal type.
- 115 volt, single phase, three tap PSC motors.
- Quick disconnect motor connections.
- Removable fan/motor deck for service.

Electrical
- cETL listed for safety compliance.
- Electrical junction box for field wiring terminations.
- Terminal block for field connections.

Electric Heat
- ETL listed as an assembly for safety compliance.
- Integral electric heat assembly with removable elements for easy service.
- Automatic reset primary and back-up secondary thermal limits.
- Single point power connection.
- Bottom hinged electrical enclosure.

OPTIONAL FEATURES

Construction

All Units
- Foil faced fiberglass insulation.
- Elastomeric closed cell foam insulation.

Plenum Units
- Bottom return.
- 1” pleated filters (MERV 8).
- Spare 1” throwaway filters.
- Telescoping Bottom Panels.

Exposed Units
- 1” pleated filters (MERV 8).
- Double deflection discharge grille.
- Ducted supply and/or return.

Coils
- Automatic air vents.
- Stainless steel coil casings.
- 3/8" O.D. seamless copper tubes (0.012" tube wall thickness).

Drain Pans
- Stainless steel construction with external insulation.
- 5/8” O.D. secondary drain connection.
- Auxiliary drip pans, galvanized or stainless steel.

Fan Assemblies
- 208-230, 220 & 277 volt, 1-phase, 3-tap PSC motors.
- EC motors (not available on KHFH).

Electrical
- Bottom hinged cover electrical enclosure.
- SCR fan speed controller.
- Fan relay packages.
- Silent solid state fan relays.
- Toggle disconnect switch.
- Condensate overflow switch (drain pan).
- Main fusing.
- Unit and remote mounted three speed fan switches.

Electric Heat
- Manual reset secondary thermal limits.
- Door interlocking disconnect switches.
- Main fusing.
- Silent relay/contactors.

Piping Packages
- Factory assembled – shipped loose for field installation.
- 1/2” and 3/4”, 2 way and 3 way normally closed, two position electric motorized valves.
- Isolation ball valves with memory stop.
- Fixed and adjustable flow control devices.
- Unions and P/T ports.
- Floating point modulating control valves.
- High pressure close-off actuators (1/2” = 50 PSIG; 3/4” = 25 PSIG).

Thermostats
- Remote mounted analog, digital display or programmable.
- 2 and 4 pipe control sequences.
- Automatic and manual changeover.
- Integral three speed fan switches.

KHF Series Coil Information

COILS

Krueger offers hot water, chilled water, and direct expansion (DX) coils for specific application with all KHF series fan coil units. Strict on-site inspection before, during, and after installation guarantees the highest quality and performance available.

STANDARD FEATURES

- Cooling - 3 or 4 row chilled water or DX.
- Heating - 1 or 2 row hot water.
- 6 total rows of cooling and heating coils maximum.
- 1/2” O.D. seamless copper tubes.
- 0.016” tube wall thickness.
- High efficiency aluminum fin surface for optimizing heat transfer, pressure drop and carryover.
- Left or right hand, same or opposite side connections.
- Manual air vents.

OPTIONAL FEATURES

- Automatic air vents.
- Stainless steel coil casings.
- DX coils are heat pump compatible.
- 3/8" O.D. seamless copper tubes (0.012" tube wall thickness).

Unit Size	Coil Face Area	KHFE				KHFP	
		Return Air Grille Free Area	Supply Air Grille Free Area	Filter Face Area	Nominal Filter Sizes	Filter Face Area	Nominal Filter Sizes
20	1.04 [.09]	0.47 [.04]	0.40 [.04]	1.77 [.16]	30 x 8.5 x 1 [762 x 216 x 25]	1.18 [.11]	20 x 8.5 x 1 [508 x 216 x 25]
25	1.35 [.13]	0.58 [.05]	0.50 [.05]	2.36 [.22]	(2) 20 x 8.5 x 1 [508 x 216 x 25]	1.54 [.14]	26 x 8.5 x 1 [660 x 216 x 25]
30	1.56 [.14]	0.68 [.06]	0.56 [.05]	2.36 [.22]	(2) 20 x 8.5 x 1 [508 x 216 x 25]	1.77 [.16]	30 x 8.5 x 1 [762 x 216 x 25]
40	2.08 [.19]	0.81 [.08]	0.80 [.07]	2.95 [.27]	(1) 20, (1) 30 x 8.5 x 1 [508, 762 x 216 x 25]	2.36 [.22]	(2) 20 x 8.5 x 1 [508 x 216 x 25]
50	2.60 [.24]	1.01 [.09]	0.96 [.09]	3.54 [.33]	(2) 30 x 8.5 x 1 [762 x 216 x 25]	2.95 [.27]	(1) 20, (1) 30 x 8.5 x 1 [508, 762 x 216 x 25]
60	3.13 [.29]	1.15 [.11]	1.20 [.11]	4.13 [.38]	(2) 20, (1) 30 x 8.5 x 1 [508, 762 x 216 x 25]	3.54 [.33]	(2) 30 x 8.5 x 1 [762 x 216 x 25]

NOTES: Face and free areas are in square feet [square meters]. Filter sizes are in inches [millimeters]. Return Air Grille Free Area applies to KHFE and telescoping bottom panel return grilles. Supply Air Grille Free Area applies to KHFE supply grille and minimum free area allowable for a supply grille supplied by others.

KHF Series AHRI Ratings

AHRI STANDARD RATINGS

Model / Size	Coil		Airflow CFM (Dry Flow)	Cooling Capacity		Water		Power Input (Watts)
	Rows	FPI		QT (BTUH)	QS (BTUH)	Flow Rate (GPM)	WPD (ft-wg)	
KHFH 20	3	10	331	9699	7210	1.9	5.26	57
KHFH 25	3	10	448	14189	10210	2.8	10.66	125
KHFH 30	3	10	771	18750	14640	3.8	6.5	165
KHFH 40	3	10	793	22559	16719	4.5	10.22	261
KHFH 50	3	10	1273	31649	24379	6.4	10.13	472
KHFH 60	3	10	1561	36240	28750	7.3	5.15	522
KHFH 20	4	10	312	12680	8760	2.5	10.22	57
KHFH 25	4	10	434	15869	11340	3.1	5.79	125
KHFH 30	4	10	721	23790	17469	4.8	11.51	165
KHFH 40	4	10	779	28399	20280	5.7	9.34	261
KHFH 50	4	10	1243	38810	29049	7.7	9.7	472
KHFH 60	4	10	1486	45389	34599	9	4.59	522
KHFP 20	3	10	265	8220	6039	1.6	4.05	57
KHFP 25	3	10	414	13430	9609	2.7	10.02	125
KHFP 30	3	10	620	16309	12500	3.3	5.19	165
KHFP 40	3	10	768	22069	16309	4.4	9.63	261
KHFP 50	3	10	1141	29559	22540	5.9	8.66	472
KHFP 60	3	10	1432	34099	26920	6.8	4.5	522
KHFP 20	4	10	253	10819	7369	2.2	8.42	57
KHFP 25	4	10	404	15100	10729	3	5.43	125
KHFP 30	4	10	604	21280	15310	4.3	9.52	165
KHFP 40	4	10	743	27530	19559	5.5	9.01	261
KHFP 50	4	10	1103	35950	26559	7.1	8.38	472
KHFP 60	4	10	1356	42369	32110	8.4	3.97	522
KHFE 20	3	10	287	8789	6469	1.8	4.56	57
KHFE 25	3	10	432	13829	9920	2.8	10.34	125
KHFE 30	3	10	668	17030	13159	3.4	5.51	165
KHFE 40	3	10	796	22600	16750	4.5	10.22	261
KHFE 50	3	10	1191	30319	23229	6	9.17	472
KHFE 60	3	10	1487	35110	27750	7	4.82	522
KHFE 20	4	10	275	11529	7900	2.3	9.11	57
KHFE 25	4	10	423	15680	11159	3.1	5.79	125
KHFE 30	4	10	638	21989	15939	4.4	9.8	165
KHFE 40	4	10	773	28299	20180	5.7	9.35	261
KHFE 50	4	10	1154	36979	27459	7.3	8.7	472
KHFE 60	4	10	1410	43759	33209	8.7	4.28	522

NOTES: Based on 80°F DB and 67°F WB EAT, 45°F EWT, 10°F temperature rise, high fan speed. Motor type is PSC and motor voltage is 115/1/60. Airflow under dry coil conditions. All models tested at 0.05" external static pressure.

KHF Series Heating Capacity and Weights

UNIT WEIGHT DATA

Component		Unit Size					
		20	25	30	40	50	60
KHFH Base Unit		40 [18]	51 [23]	59 [27]	69 [31]	91 [41]	111 [50]
KHFP Base Unit		45 [20]	56 [25]	65 [30]	80 [36]	103 [47]	123 [56]
KHFE Base Unit		119 [54]	138 [63]	155 [70]	181 [82]	220 [100]	257 [117]
Coil Rows	1 Row - Dry	8 [4]	10 [5]	11 [5]	13 [6]	15 [7]	18 [8]
	1 Row - Wet	10 [5]	12 [5]	13 [6]	15 [7]	18 [8]	21 [10]
	2 Rows - Dry	11 [5]	13 [6]	15 [7]	18 [8]	22 [10]	26 [12]
	2 Rows - Wet	14 [6]	16 [7]	18 [8]	22 [10]	27 [12]	32 [15]
	3 Rows - Dry	14 [6]	17 [8]	19 [9]	24 [11]	29 [13]	34 [15]
	3 Rows - Wet	17 [8]	21 [10]	24 [11]	30 [14]	36 [16]	42 [19]
	4 Rows - Dry	17 [8]	20 [9]	23 [10]	29 [13]	36 [16]	42 [19]
	4 Rows - Wet	21 [10]	25 [11]	29 [13]	36 [16]	45 [20]	53 [24]

NOTES: Unit weight data is in pounds [kilograms].

HEATING CAPACITY

Unit Type	Unit Size	1 Row				2 Rows			
		CFM	QS (MBH)	GPM	WPD	QS (MBH)	CFM	GPM	WPD
KHFH KHFP	20	264	10710	0.5	0.84	264	18110	0.9	0.62
	25	414	15890	0.8	2.11	414	27280	1.4	1.6
	30	619	20370	1	3.58	618	36209	1.9	2.88
	40	767	24440	1.3	0.88	766	46310	2.4	5.56
	50	1141	33569	1.7	1.85	1139	60689	3.1	1.55
	60	1433	42319	2.2	3.37	1429	76639	3.9	2.81
KHFE	20	286	11189	0.6	0.92	286	18920	1	0.67
	25	431	16239	0.8	2.22	430	27930	1.4	1.67
	30	667	21120	1.1	3.85	665	37790	1.9	3.13
	40	795	24860	1.3	0.9	794	47250	2.4	5.74
	50	1190	34189	1.8	1.92	1188	62169	3.2	1.63
	60	1489	43069	2.2	3.49	1485	78269	4	2.93

NOTES: Based on 70°F DB EAT, 180°F EWT, 40°F temperature drop, high fan speed.

KHF Series Electric Heat Features & Capacities

ELECTRIC HEAT STANDARD FEATURES

- ETL listed as an assembly for safety compliance.
- Single point power connection.
- Mounted in preheat position.
- Automatic reset primary and back-up secondary thermal limits.
- Internal wiring rated at 105°C.
- Integral electric heat assembly with removable element for easy service.
- Stainless steel terminals and hardware.

ELECTRICAL CALCULATIONS INFORMATION

- Contact your local Krueger representative.
- Non-fused door interlock disconnect switch shall be sized according to MCA.
- Fused door interlock disconnect switch and main fusing shall be sized according to MOP.

OPTIONAL HEATER CONTROL

- Silent solid state relays.
- Manual reset secondary limits.
- Door interlocking disconnect switch.
- Main fusing.

USEFUL FORMULAS

kW* = (CFM x ΔT x 1.085) / 3413**
1Ø AMPs = (kW x 1000) / Volts

** 1kW = 3413 BTU/H*
*** Capacity at sea level*

Altitude Considerations:
Reduce by 0.034 for each 1000 ft. of altitude above sea level.

Example:
5000 ft./1000 ft. = 5
5 x 0.034 = 0.17
1.085 - 0.17 = 0.915

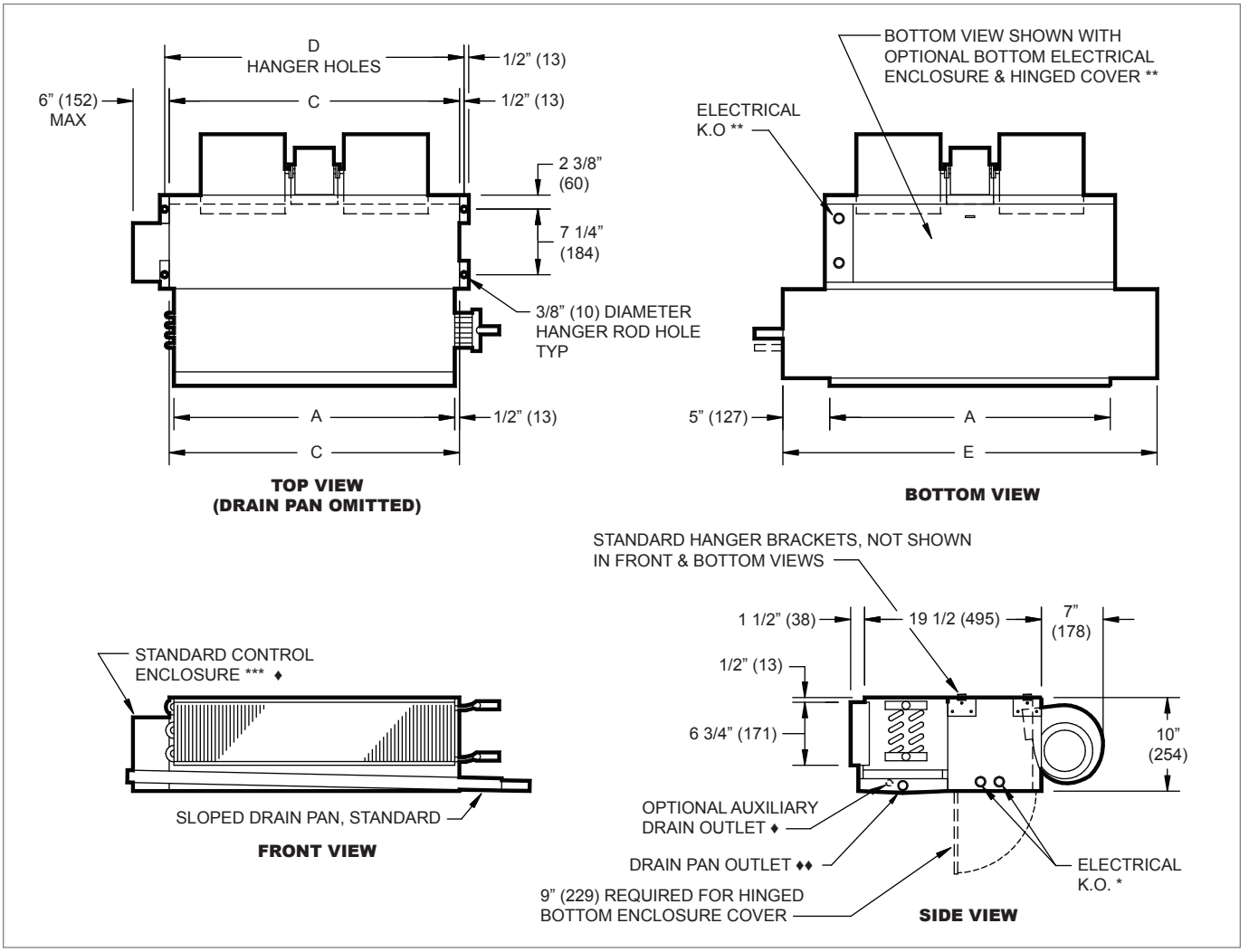
ELECTRIC HEAT SELECTION CHART

Unit Size	MBH	5.1	6.8	10.2	13.7	17.1	20.5	25.6	27.3	34.1
	kW	1.5	2.0	3.0	4.0	5.0	6.0	7.0	8.0	10.0
	Volts	Amps								
20	115	13.0	17.4	26.1	-	-	-	-	-	-
	208	7.2	9.6	14.4	-	-	-	-	-	-
	230	6.5	8.7	13.0	-	-	-	-	-	-
	277	5.4	7.2	10.8	-	-	-	-	-	-
25	115	13.0	17.4	26.1	-	-	-	-	-	-
	208	7.2	9.6	14.4	-	-	-	-	-	-
	230	6.5	8.7	13.0	-	-	-	-	-	-
	277	5.4	7.2	10.8	-	-	-	-	-	-
30	115	13.0	17.4	26.1	34.8	43.5	-	-	-	-
	208	7.2	9.6	14.4	19.2	24.0	28.8	-	-	-
	230	6.5	8.7	13.1	17.4	21.7	26.1	-	-	-
	277	5.4	7.2	10.8	14.4	18.1	21.7	-	-	-
40	115	-	17.4	26.1	34.8	43.5	-	-	-	-
	208	-	9.6	14.4	19.2	24.0	28.8	33.7	-	-
	230	-	8.7	13.1	17.4	21.7	26.1	30.4	-	-
	277	-	7.2	10.8	14.4	18.1	21.7	25.3	-	-
50	115	-	-	26.1	34.8	43.5	-	-	-	-
	208	-	-	14.4	19.2	24.0	28.8	33.7	38.5	-
	230	-	-	13.1	17.4	21.7	26.1	30.4	34.8	-
	277	-	-	10.8	14.4	18.1	21.7	25.3	28.9	-
60	115	-	-	26.1	34.8	43.5	-	-	-	-
	208	-	-	14.4	19.2	24.0	28.8	33.7	38.5	-
	230	-	-	13.1	17.4	21.7	26.1	30.4	34.8	43.5
	277	-	-	10.8	14.4	18.1	21.7	25.3	28.9	36.1

NOTES: Shaded areas of the electric heat selection chart indicate kW and voltage options not available. Available voltages are single phase, 60 hertz. Size heater for Leaving Air Temperature (LAT) less than 104°F. Silent, solid state heater relay is available for sound sensitive environments. Ask your Krueger representative about continuously modulating electric heat using SSR and special control options.

KHFH Dimensional Information

KHFH TOP, BOTTOM, FRONT AND SIDE VIEWS



KHFH DIMENSIONAL DETAILS

Unit Size	A	C	D	E
20	20" (508)	21" (533)	22" (559)	30" (762)
25	26" (660)	27" (686)	28" (711)	36" (914)
30	30" (762)	31" (787)	32" (813)	40" (1016)
40	40" (1016)	41" (1041)	42" (1067)	50" (1270)
50	50" (1270)	51" (1295)	52" (1321)	60" (1524)
60	60" (1524)	61" (1549)	62" (1575)	70" (1778)

NOTES: All dimensions in inches (millimeters). All dimensions ±1/4" (6mm). Metric values are soft conversion. Left hand unit shown, right hand unit opposite.

* *Standard control enclosure is mounted on unit side opposite cooling coil connections. Unit casing includes (2) knockouts on each side. Provide sufficient clearance to access electrical controls and comply with applicable codes and ordinances.*

** *Optional bottom control enclosure with hinged cover replaces standard side mounted enclosure and includes (2) additional knockouts on bottom of unit, on left side.*

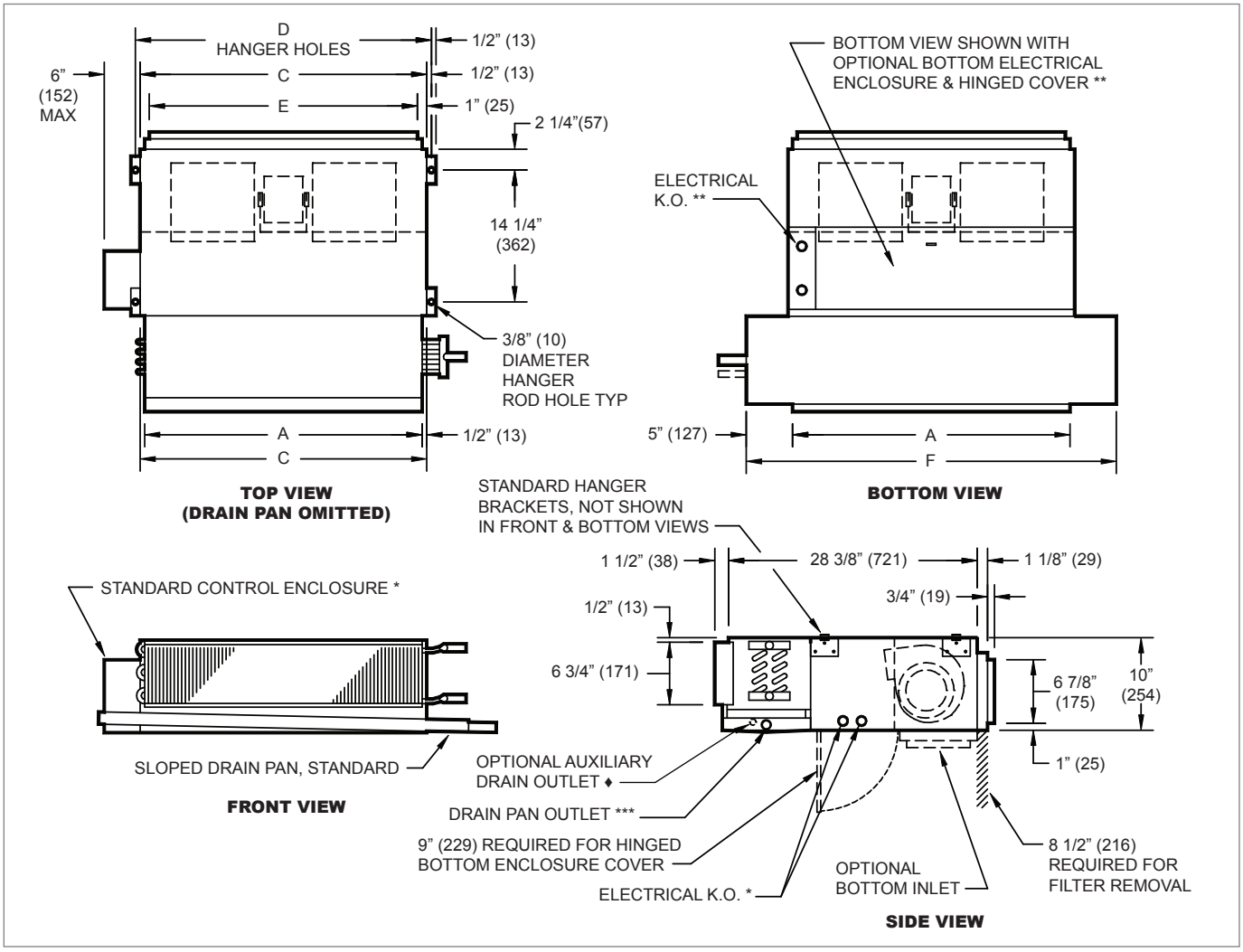
*** *Standard externally foam coated galvanized steel drain pan has 7/8" ODM copper outlet. Stainless steel drain pan has 3/4" MPT galvanized steel outlet.*

♦ *Auxiliary drain outlet is 5/8" ODM copper or 3/8" MPT galvanized steel respectively.*

♦♦ *See coil connection drawings for coil connection sizes and locations.*

KHFP Dimensional Information

KHFP, TOP, BOTTOM, FRONT, AND SIDE VIEWS



KHFP DIMENSIONAL DETAILS

Unit Size	A	C	D	E	F
20	20" (508)	21" (533)	22" (559)	19" (483)	30" (762)
25	26" (660)	27" (686)	28" (711)	25" (635)	36" (914)
30	30" (762)	31" (787)	32" (813)	29" (737)	40" (1016)
40	40" (1016)	41" (1041)	42" (1067)	39" (991)	50" (1270)
50	50" (1270)	51" (1295)	52" (1321)	49" (1245)	60" (1524)
60	60" (1524)	61" (1549)	62" (1575)	59" (1499)	70" (1778)

NOTES: All dimensions in inches (millimeters). All dimensions ±1/4" (6mm). Metric values are soft conversion. Left hand unit shown, right hand unit opposite. See coil connection drawings for coil connection sizes and locations.

* *Standard control enclosure is mounted on unit side opposite cooling coil connections. Unit casing includes (2) knockouts on each side. Provide sufficient clearance to access electrical controls and comply with applicable codes and ordinances.*

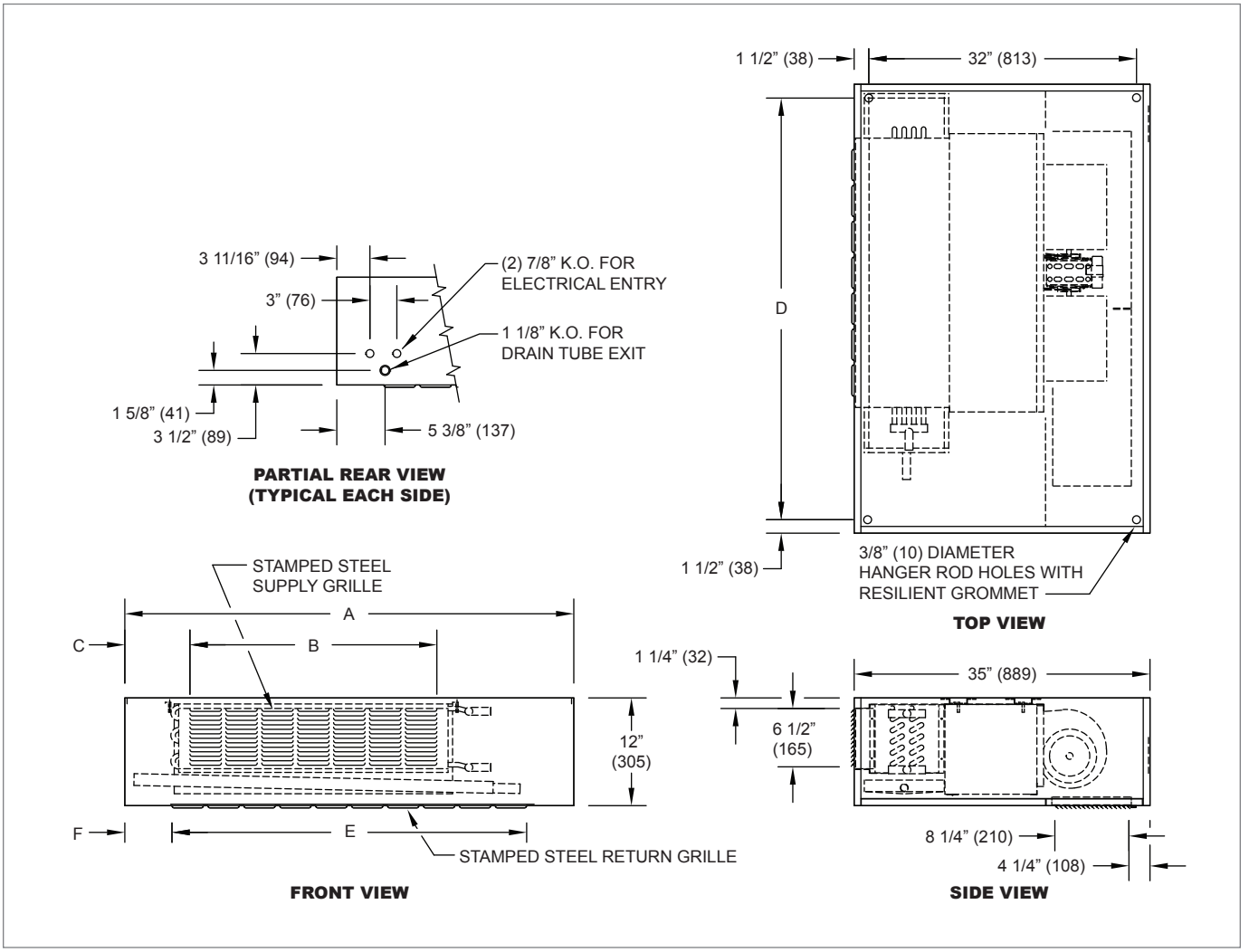
** *Optional bottom control enclosure with hinged cover replaces standard side mounted enclosure and includes (2) additional knockouts on bottom of unit, on left side.*

*** *Standard externally foam coated galvanized steel drain pan has 7/8" ODM copper outlet. Stainless steel drain pan has 3/4" MPT galvanized steel outlet.*

♦ *Auxiliary drain outlet is 5/8" ODM copper or 3/8" MPT galvanized steel respectively.*

KHFE Dimensional Information

KHFE, TOP, BOTTOM, FRONT, AND SIDE VIEWS



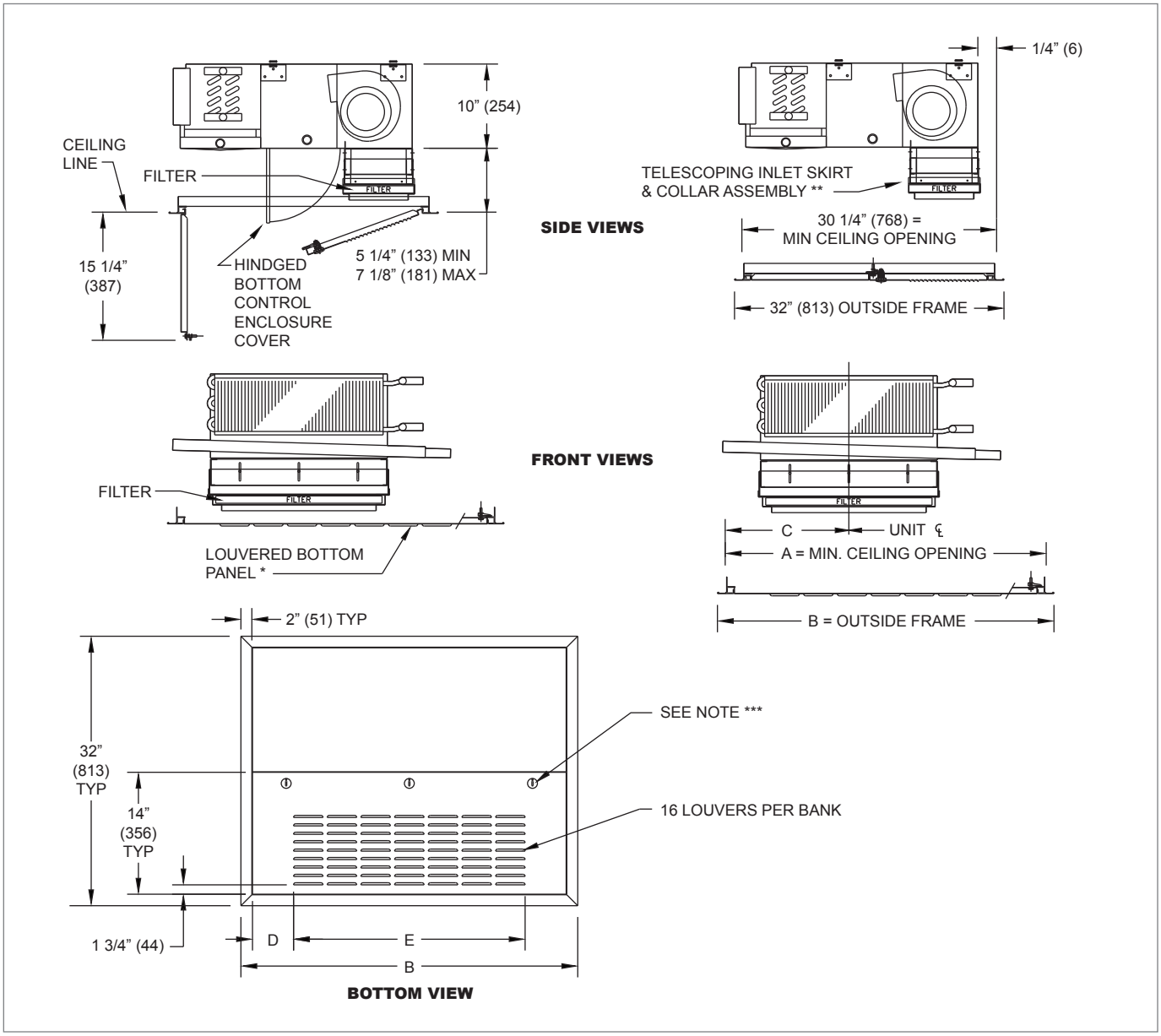
KHFE DIMENSIONAL DETAILS

Unit Size	A	B	C	D	E	F
20	40" (1016)	19 1/2" (495)	6 1/4" (159)	37" (940)	27 1/2" (699)	6 1/4" (159)
25	46" (1168)	23 1/2" (597)	6 1/4" (159)	43" (1092)	35 1/2" (902)	5 1/4" (133)
30	50" (1270)	27 1/2" (699)	7 1/4" (184)	47" (1194)	39 1/2" (1003)	5 1/4" (133)
40	60" (1524)	39 1/2 (1003)	6 1/4" (159)	57" (1448)	47 1/2" (1207)	6 1/4" (159)
50	70" (1778)	47 1/2" (1207)	7 1/4" (184)	67 " (1702)	59 1/2" (1511)	5 1/4" (133)
60	80" (2032)	59 1/2" (1511)	6 1/4" (159)	77" (1956)	67 1/2" (1715)	6 1/4" (159)

NOTES: All dimensions in inches (millimeters). All dimensions ±1/4" (6mm). Metric values are soft conversion. Left hand unit shown, right hand unit opposite. Electrical enclosure size and location may vary with optional features. Provide sufficient clearance to access electrical controls and comply with applicable codes and ordinances. Drain piping should be routed through casing opening indicated to provide proper drain slope. Louvered bottom panel is hinged and removable for access to filter and fan assembly. Fixed bottom panel is removable for access to optional electrical enclosure, coil, and drain pan. Internal insulation of field piping may be required. Field piping casing penetrations must be cut in the field to match individual job requirements.

Bottom Panel Dimensional Information

KHFP TELESCOPING BOTTOM PANEL, SIDE, FRONT, AND BOTTOM VIEWS



KHFP TELESCOPING BOTTOM PANEL DIMENSIONAL DETAILS

Unit Size	A	B	C	D	E
20	38 1/8" (968)	40" (1016)	14 1/2" (368)	4 1/4" (108)	27 1/2" (699)
25	44 1/8" (1121)	46" (1168)	17 1/2" (445)	3 1/4" (83)	35 1/2" (902)
30	48 1/8" (1222)	50" (1270)	19 1/2" (495)	3 1/4" (83)	39 1/2" (1003)
40	58 1/8" (1476)	60" (1524)	24 1/2" (622)	4 1/4" (108)	47 1/2" (1207)
50	68 1/8" (1730)	70" (1778)	29 1/2" (749)	3 1/4" (83)	59 1/2" (1511)
60	78 1/8" (1984)	80" (2032)	34 1/2" (876)	4 1/4" (108)	67 1/2" (1715)

NOTES: All dimensions in inches (millimeters). All dimensions ±1/4" (6mm). Metric values are soft conversion. Left hand unit shown, right hand unit opposite.

* *Portions of the inlet louver not directly below unit inlet may require covering in the field on applications where infiltration of ceiling plenum air into space is undesired.*

** *Telescoping skirt and collar assembly must be field adjusted to assure a proper fit between filter frame and louvered inlet panel assembly.*

*** *1/4 turn latch, (2) quantity for standard sizes, (3) quantity for sizes 40-60.*

KHF Series Fan Curves

Fan curves on the following pages depict actual performance of each motor tap without any additional fan balance adjustment. Actual capacities which fall below each curve can be obtained by adding an adjustment device. Units should not be run prior to installation of downstream ductwork; otherwise, damage to the motor may result.

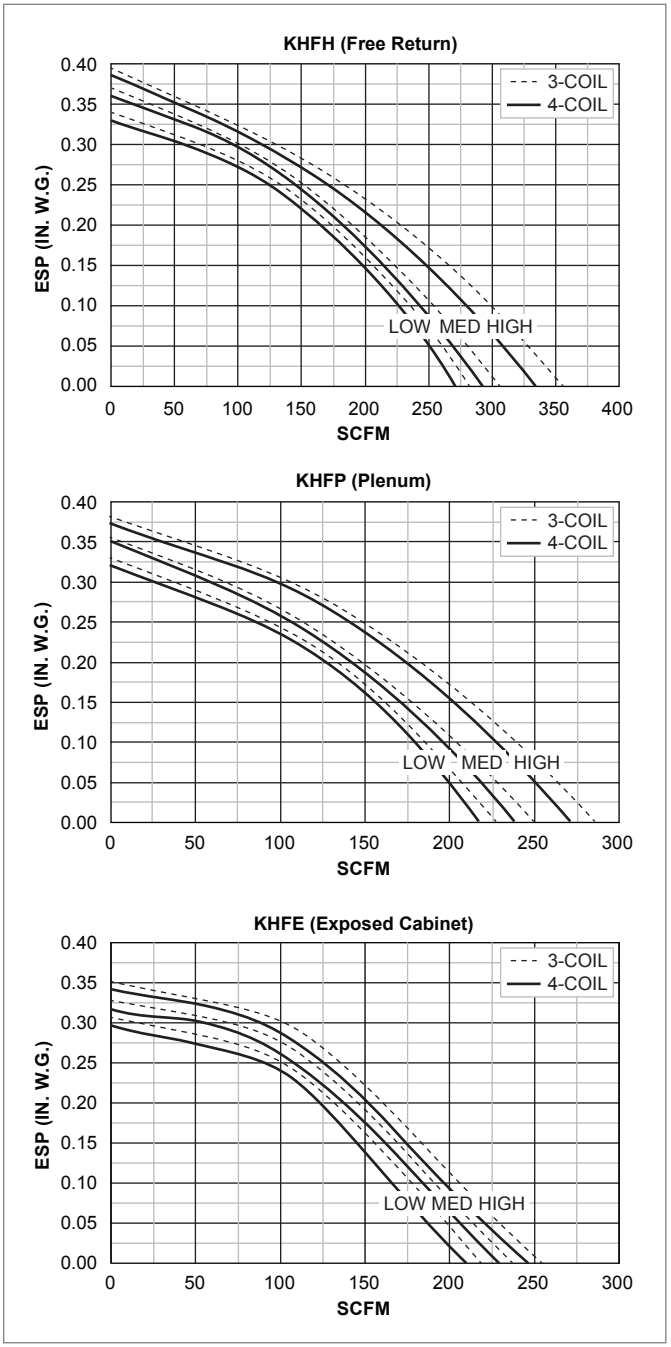
Krueger fan coil units are equipped with permanent split-capacitor (PSC) motors with three taps (High, Medium and Low) which provides variable horsepower outputs. Most often, size selections are conservative and actual CFM requirements and/or external static pressure requirements are lower than those specified. In this case, the unit fan motor can be run at low or medium tap, substantially reducing the operating cost of the unit.

All fan curves are for 115/1/60 motors and include pressure losses for cabinet, electric heater, and 3 or 4 row coil. Plenum units include a clean 1" throwaway filter. For other coil configurations, adjust performance curves based on pressure losses for the coils using our selection software.

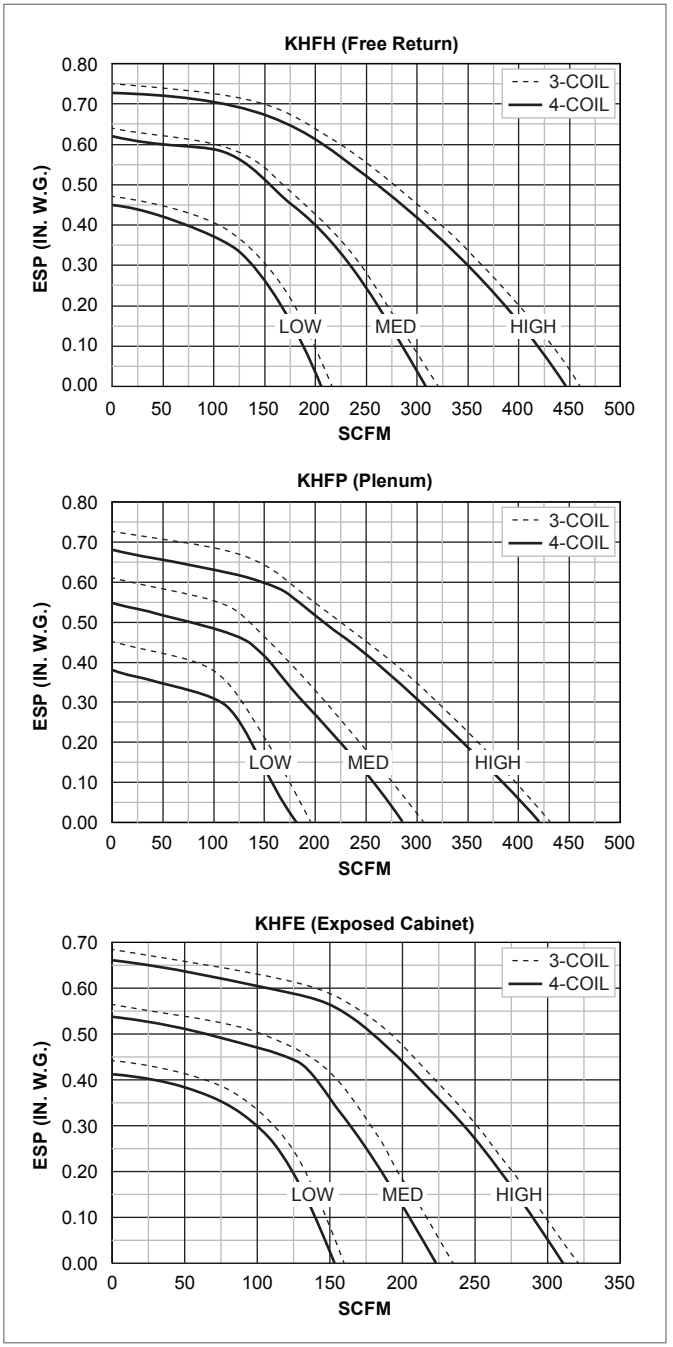
See page E2-17 for fan motor electrical data.

For additional high static pressure applications and rating points, contact Krueger.

UNIT SIZE 20

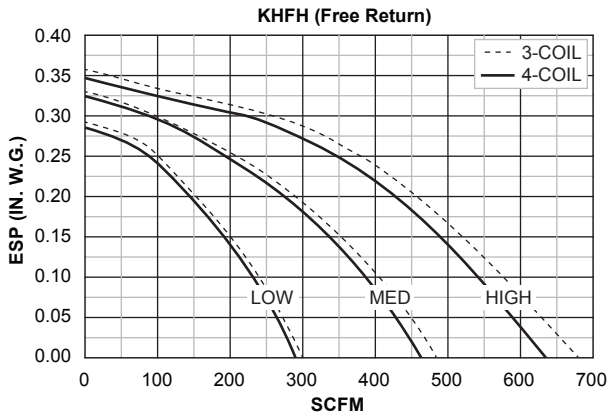


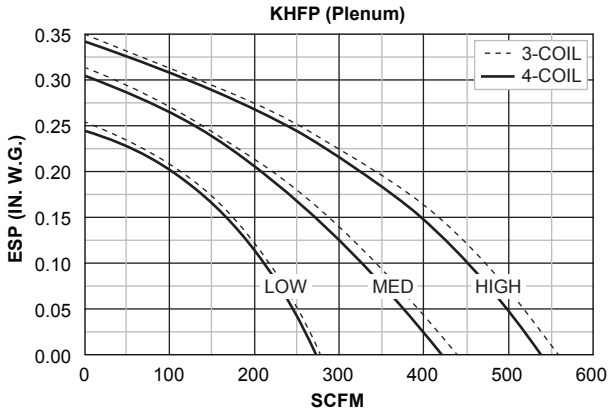
UNIT SIZE 25

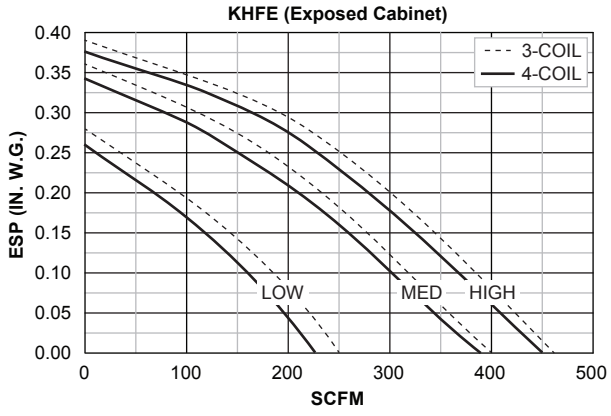


KHF Series Fan Curves

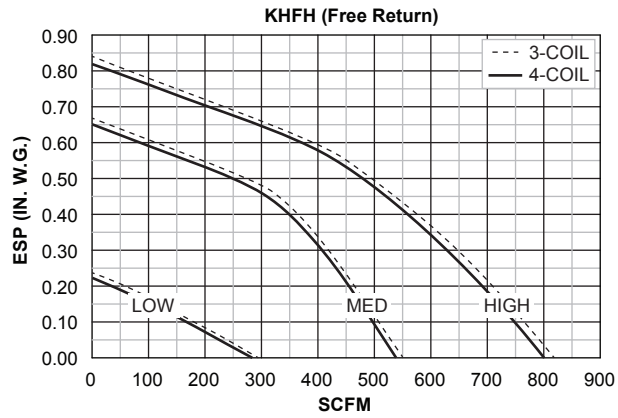
UNIT SIZE 30

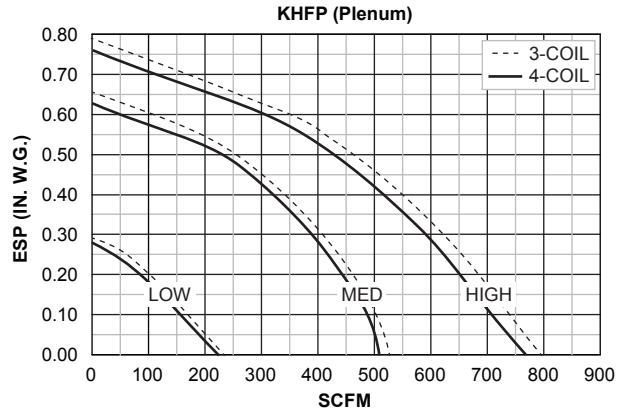


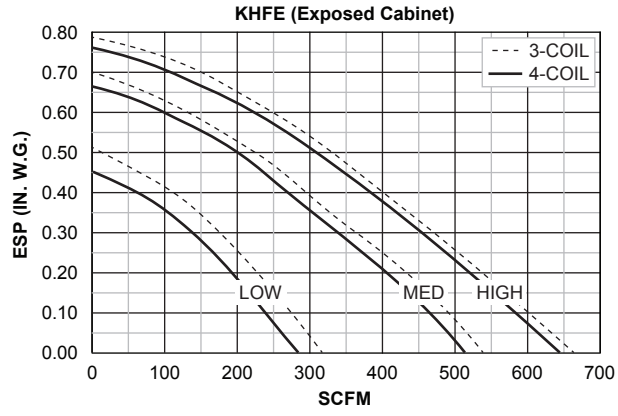




UNIT SIZE 40

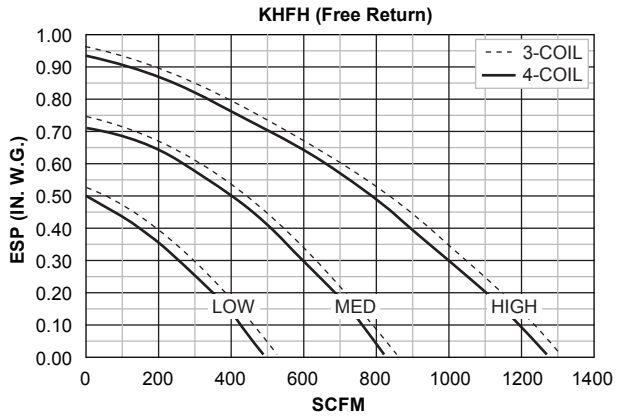


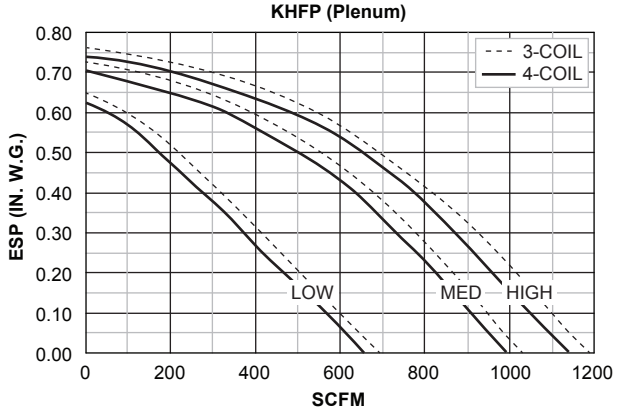


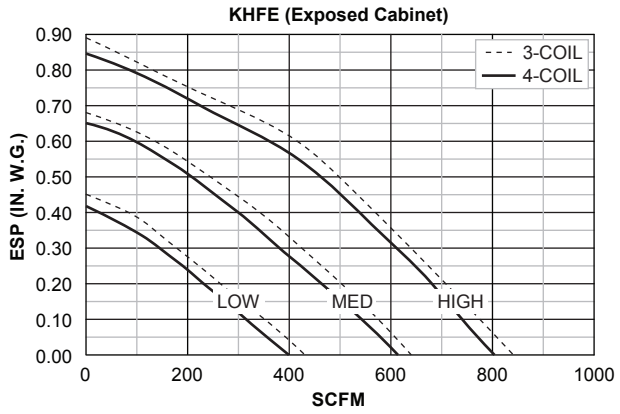


KHF Series Fan Curves

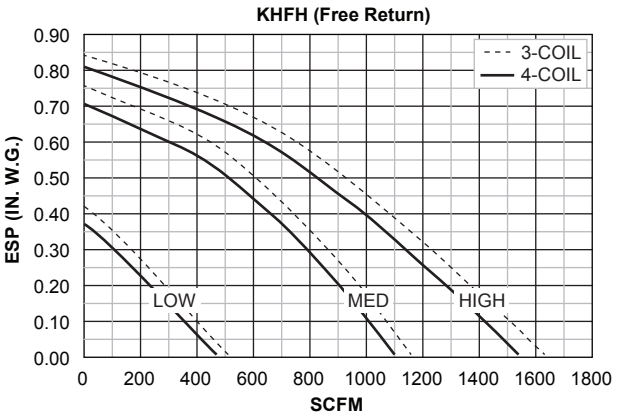
UNIT SIZE 50

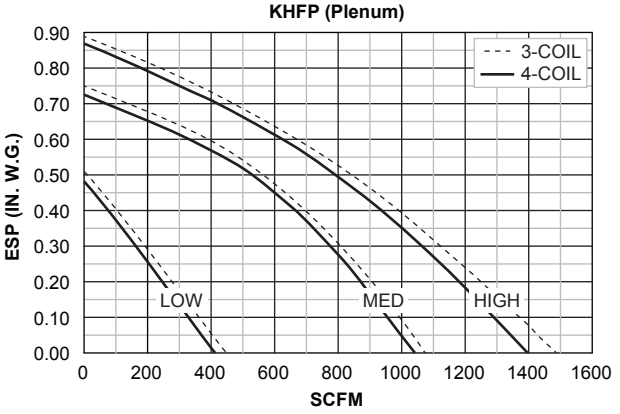


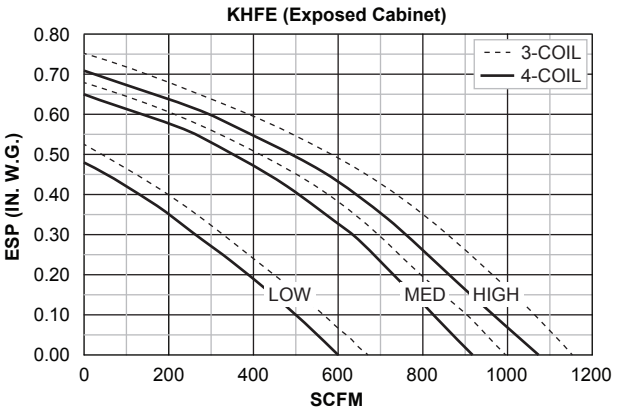




UNIT SIZE 60







KHF Series Performance Data

MOTOR AND FAN DATA

Unit Size	Fan Speed	Motor HP (Qty)	Number of Fans	115 Volts		208-230 Volts		277 Volts	
				Amps	Watts	Amps	Watts	Amps	Watts
20	High	(1) 1/30	1	0.8	57	0.6	77	0.3	71
	Medium	(1) 1/50		0.4	39	0.3	49	0.3	48
	Low	(1) 1/60		0.3	33	0.3	43	0.3	41
25	High	(1) 1/15	1	1.1	125	0.5	120	0.5	120
	Medium	(1) 1/30		0.9	90	0.3	80	0.3	80
	Low	(1) 1/60		0.5	60	0.2	60	0.2	60
30	High	(1) 1/10	2	1.9	165	0.8	158	0.8	162
	Medium	(1) 1/30		0.8	76	0.3	75	0.5	65
	Low	(1) 1/60		0.5	47	0.2	54	0.4	41
40	High	(1) 1/6	2	2.5	261	1.4	284	1.0	254
	Medium	(1) 1/12		1.5	162	0.5	171	0.5	152
	Low	(1) 1/40		0.6	75	0.4	79	0.3	74
50	High	(1) 1/8	3	1.6	215	0.9	216	0.8	214
		(1) 1/6		2.5	257	1.4	233	1.0	255
	Medium	(1) 1/15		1.3	145	0.6	109	0.5	132
		(1) 1/12		1.5	156	0.5	106	0.5	151
	Low	(1) 1/40		0.8	69	0.3	63	0.3	86
		(1) 1/40		0.6	75	0.4	62	0.3	84
60	High	(2) 1/6	4	5.0	522	2.8	568	2.0	508
	Medium	(2)1/12		3.0	324	1.0	342	1.0	304
	Low	(2) 1/40		1.2	150	0.6	158	0.6	148

NOTES: Motor electrical data is nameplated data. Actual data will vary with application. 230 volt motor is nameplated for 208-230/1/60. Use 230 volt motor data for 208 volt applications. Unit size 30, 208-230 and 277 volt motors are 1/12 HP at high tap.

SOUND DATA

Unit Size	Motor Speed	Total Sound Power Level						
		Octave Band / Center Frequency (Hz)						
		2/125	3/250	4/500	5/1000	6/2000	7/4000	8/8000
20	High	57	61	53	52	48	42	40
	Medium	53	54	48	45	41	33	36
	Low	49	49	44	40	34	30	33
25	High	61	63	58	57	54	47	43
	Medium	55	53	50	47	45	36	32
	Low	50	44	39	38	36	30	30
30	High	63	62	58	58	53	48	44
	Medium	60	56	54	53	49	43	40
	Low	50	45	43	40	34	29	34
40	High	68	70	65	63	57	54	51
	Medium	63	62	58	54	50	44	40
	Low	54	47	42	39	31	31	34
50	High	64	69	69	65	57	55	54
	Medium	59	63	63	57	51	47	44
	Low	51	55	60	47	42	37	36
60	High	71	75	72	70	61	59	54
	Medium	63	66	68	60	55	49	45
	Low	53	58	48	42	35	32	35

NOTES: Sound data tested in accordance with AHRI 350-2000. Sound levels are expressed in decibels, dB RE: 1 x 10-12 watts. Total sound power level data based on Model KHFP with fan CFM at corresponding motor tap with 115/1/60 volt motor, 3 or 4 row coil, 1" throwaway filter, 0.0" external static pressure and standard rated internal pressure losses.

KHF Series Engineering Specification & Configuration

GENERAL
Furnish and install Krueger KHF horizontal concealed direct drive fan coil units where indicated on the plans and in the specifications. Units shall be completely factory assembled, tested and shipped as one piece. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. All unit dimensions for each model and size shall be considered maximums. Units shall be ETL listed in compliance with UL/ANSI Standard 1995, and be certified as complying with the latest edition of AHRI Standard 440.

CONSTRUCTION
All unit chassis shall be fabricated of heavy gauge galvanized steel panels able to meet 125 hour salt spray test per ASTM B-117. All exterior panels shall be insulated with 1/2" thick insulation with a maximum k value of .24 (BTU • in) / (hr • ft^2 • °F) and rated for a maximum air velocity of 5000 f.p.m. Insulation must meet all requirements of ASTM C1071 (including C665), UL 181 for erosion, and carry a 25/50 rating for flame spread/ smoke developed per ASTM E-84, UL 723 and NFPA 90A.

All concealed units shall have a minimum 1-1/2" duct collar on the discharge. Plenum and exposed units shall have a minimum 3/4" duct collar on the return. All exposed units shall have exterior panels fabricated of galvannealed steel. The fan and filter bottom access panel shall be attached with quarter turn quick open fasteners to allow for easy removal and access for service.

Option: Provide foil faced insulation in lieu of standard. Foil insulation shall meet or exceed the requirements stated above, and in addition meet ASTM Standards C-665 and C-1136 for biological growth in insulation. Insulation shall be lined with aluminum foil, fiberglass scrim reinforcement, and 30 pound kraft paper laminated together with a flame resistant adhesive. All exposed edges shall be sealed to prevent any fibers from reaching the air stream.

Option: Provide Elastomeric Closed Cell Foam Insulation in lieu of standard. Insulation shall conform to UL 181 for erosion and NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Polyethylene insulation is not acceptable.

Unit mounting shall be by hanger brackets provided at four locations. Hanger brackets shall include rubber grommet isolators with brass eyelets for threaded rod.

PAINTED FINISH
All painted cabinet exterior panels shall be finished with a heat cured anodic acrylic powder paint of the standard factory color.

SOUND
Units shall have published sound power level data tested in accordance with AHRI Standard 350-2000 (nonducted equipment) and AHRI Standard 260-2001 (ducted equipment).

FAN ASSEMBLY
Unit fan shall be a dynamically balanced, forwardly curved, DWDI centrifugal type constructed of 18 gauge zinc coated galvanized steel for corrosion resistance. Motors shall be high efficiency, permanently lubricated sleeve bearing, permanent split-capacitor type with UL and CSA listed automatic reset thermal overload protection and three separate horsepower taps. Single speed motors are not acceptable.

The fan assembly shall be easily removable for servicing the motor and blower at, or away from the unit. The entire fan assembly shall be able to come out of the unit by removing two screws and unplugging the motor. Plenum unit fan assemblies shall be easily serviced through an access panel provided.

Option: Provide an electronic (SCR) fan speed controller as an aid in balancing the fan capacity. The speed controller shall have a turn down stop to prevent the possibility of harming the motor bearings, and incorporate electrical noise suppression to minimize noise on the incoming power lines.

Option: Devices used to energize and de-energize (switch) fan speeds must be totally silent. Magnetic, mercury, and/or quiet relays and/or contactors are not acceptable.

COILS
All cooling and heating coils shall optimize rows and fins per inch to meet the specified capacity. Coils shall have seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and fin. Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover.

All coils shall be hydrostatically tested at 450 PSIG air pressure under water, and rated for a maximum of 300 PSIG working pressure at 200°F.

Direct expansion cooling coils shall include a fixed orifice metering device. All evaporator coils shall be factory sealed and charged with a minimum 5 PSIG nitrogen or refrigerated dry air.

Option: Coil casing shall be fabricated from Stainless Steel. All coils shall be provided with a manual air vent fitting to allow for coil venting.

Option: Provide automatic air vents in lieu of manual air vents.

Heating coils shall be furnished in the reheat or preheat position on units with chilled water coils, or in the reheat position for DX coils.

DRAIN PANS
Primary condensate drain pans shall be single wall, heavy gauge galvanized steel for corrosion resistance, and extend under the entire cooling coil. Drain pans shall be of one-piece construction and be positively sloped for condensate removal. Drain pans on concealed models shall be field reversible for right or left hand connections.

KHF Series Engineering Specification & Configuration

The drain pan shall be externally insulated with a fire retardant, closed cell foam insulation. The insulation shall carry no more than a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723 and an Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21.

Option: Provide a single wall primary drain pan constructed entirely of heavy gauge stainless steel for superior corrosion resistance. Stainless steel drain pans shall be externally insulated and meet or exceed the requirements stated above.

Option: Provide a secondary drain connection on the primary drain pan for condensate overflow.

FILTERS

All plenum and exposed units shall be furnished with a minimum 1" nominal glass fiber throwaway filter. Filters shall be tight fitting to prevent air bypass. Plenum unit filters shall be easily removable from the bottom of the unit without the need for tools.

Option: Provide unit with 1" pleated filter (MERV 8).

ELECTRICAL

Units shall be furnished with single point power connection. Provide an electrical junction box with terminal strip for motor and other electrical terminations. The factory mounted terminal wiring strip consists of a multiple position screw terminal block to facilitate wiring terminations for the electric control valves and thermostats.

Option: Provide a hinged electrical enclosure in the bottom of the unit for easy access to all electrical components, terminal blocks and wiring.

ELECTRIC HEAT

Furnish an electric resistance heating assembly as an integral part of the fan coil unit, with the heating capacity, voltage and kilowatts scheduled. The heater assembly shall be designed and rated for installation on the fan coil unit without the use of duct extensions or transitions, and be located in the unit as to not expose the fan assembly to excessive leaving air temperatures that could affect motor performance.

The heater and unit assembly shall be listed for zero clearance and meet all NEC requirements, and be ETL listed with the unit as an assembly in compliance with UL/ANSI Standard 1995.

All heating elements shall be open coil type nichrome wire mounted in ceramic insulators and located in an insulated heavy gauge galvanized steel housing. All elements shall terminate in a machine staked stainless steel terminal secured with stainless steel hardware for corrosion resistance. The element support brackets shall be spaced no greater than 3-1/2" on center. All internal wiring shall be rated for 105°C minimum.

All heaters shall include over-temperature protection consisting of an automatic reset primary thermal limit and back up secondary thermal limit. All heaters shall be single stage.

Option: Provide a manual reset secondary thermal limit.

All units with electric heat shall have a bottom hinged electrical enclosure for easy access and service to the electrical components and wiring. An incoming line power distribution block shall be provided and designated to accept single point power wiring capable of carrying 125% of the calculated load current.

Option: Devices used to energize and de-energize (switch) electric heat must be totally silent. Magnetic, mercury, and/or quiet relays and/or contactors are not acceptable.

PIPING PACKAGES

Provide a standard factory assembled valve piping package to consist of a 2 or 3 way, on/off, motorized electric control valve and two ball isolation valves. Control valves are piped normally closed to the coil. Maximum entering water temperature on the control valve is 200°F, and maximum close-off pressure is 40 PSIG (1/2") or 20 PSIG (3/4"). Maximum operating pressure shall be 300 PSIG.

Option: Provide 3-wire floating point modulating control valve (fail-in-place) in lieu of standard 2-position control valve with factory assembled valve piping package.

Option: Provide high pressure close-off actuators for 2-way on/off control valves. Maximum close-off pressure is 50 PSIG (1/2") or 25 PSIG (3/4").

Option: Provide either a fixed or adjustable flow control device for each piping package.

Option: Provide pressure-temperature ports for each piping package.

Piping package shall be completely factory assembled, including interconnecting pipe, and shipped separate from the unit for field installation on the coil, so as to minimize the risk of freight damage.

KHF Series Engineering Specification & Configuration

1. SERIES: (XXXX)
KHFE - Horizontal Fan Coil, Exposed Cabinet
KHFH - Horizontal Fan Coil, Concealed Ceiling
KHFP - Horizontal Fan Coil, Concealed with Plenum

2. SIZE: (XX)
20, 25, 30, 40, 50, 60

3. MOTOR: (X)
(*See Krueger's selection software.*)

4. MOTOR CONTROL: (X) (KHFE/KHFP Only)
0 - None
A - A - 3 Speed Adjustable
B - B - 2-10 VDC

5. COIL 1: (X)
A - 3 Row Cold Water
B - 4 Row Cold Water
C - 5 Row Cold Water
D - 3 Row DX
E - 4 Row DX
F - 1 Row Hot Water
G - 2 Row Hot Water
H - 3 Row with Changeover
J - 4 Row with Changeover
K - 5 Row with Changeover

6. COIL 1 DIAMETER: (XX)
38 - 3/8" Tube Diameter
12 - 1/2" Tube Diameter

7. COIL 1 FPI: (XX)
10 - 10 FPI

8. COIL 1 TUBE WALL: (X)
1 - 0.016" Tube Wall Thickness
3 - 0.012" Tube Wall Thickness

9. COIL 1 HAND: (X)
L - Left Hand
R - Right Hand

10. COIL 1 AIR VENT: (X)
1 - Manual Air Vent
2 - Auto Air Vent

11. COIL 1 CASING: (X)
1 - Galvanized Coil Casing
2 - Stainless Steel Coil Casing

12. COIL 1 REFRIGERANT TYPE: (X) (KHFE/KHFH Only)
4 - R-410
2 - R-22

13. COIL 1 DISTRIBUTOR: (XXX)
(*See Krueger's selection software.*)

14. COIL 1 PIPING SIZE: (X)
H - 1/2"
T - 3/4"

15. COIL 1 PIPING VALVE: (X)
0 - None
A - 2-Way Control Valve
B - 3-Way Control Valve
C - 3-Way with Balance ByPass Valve

16. COIL 1 PIPING PACKAGE: (XX)
(*See Krueger's selection software.*)

17. COIL 1 FIXED GPM: (X)
(*See Krueger's selection software.*)

18. COIL 1 UNIONS: (X)
0 - None
U - Union

19. COIL 1 P/T PORTS: (X)
0 - None
P - P/T Port

20. COIL 1 AQUASTAT BLEED LINE: (X)
0 - None
A - Aquastat Bleed Line

21. COIL 1 ACTUATOR TYPE: (X)
0 - Field Provided by Others 2-Position Close-Off
1 - Factory Provided 2-Position Close-Off, NC
2 - MV, 2 Way,Floating Point,Fail-In-Place, 24V
3 - MV, 3 Way, Floating Point, Fail-In-Place, 24V
4 - HP Close-Off Actuator, 2-Way Valve-24/115/208V
5 - HP Close-Off Actuator, 2-Way Valve-230/277V
Note: MV = Modulating Valves, HP = High Pressure

22. ELECTRIC HEAT VOLTAGE: (X)
0 - None
A - 115 Volt, 1 Phase, 1 Stage
D - 208 Volt, 1 Phase, 1 Stage
G - 230 Volt, 1 Phase, 1 Stage
H - 220 Volt, 1 Phase, 1 Stage
K - 277 Volt, 1 Phase, 1 Stage

23. kW: (XX)
(*See Krueger's selection software.*)

24. SILENT RELAY: (X)
0 - None
S - Silent Relay

25. MANUAL RESET: (X)
0 - None
M - Manual Reset

26. COIL 2 SELECTIONS
(*See Coil 1 options. Differences may apply.*)

Continued on next page...

KHF Series Engineering Specification & Configuration

27. BOTTOM RETURN DUCT CONNECTION: (X) (KHFP Only)
0 - None
D - Bottom Return Duct Connection

28. BOTTOM HINGE ELECTRIC ENCLOSURE: (X)
0 - None
B - Bottom Hinged Electrical Enclosure

29. FILTER: (X) (KHFE/KHFP Only)
0 - 1" Throwaway Filter
P - 1" Pleated Filter MERV 8

30. SPARE FILTER: (X) (KHFE/KHFP Only)
(*See Krueger's selection software.*)

31. ACCESS PANEL: (X) (KHFH/KHFP Only)
0 - None
C - Ceiling Access RAP - British White (KHFP Only)
S - Solid Ceiling Access Panel - British White
T - Ceiling Access RAP with Telescoping Duct - British White (KHFP Only)

32. ACCESS PANEL SIZE: (XX) (KHFH/KHFP Only)
(*See Krueger's selection software.*)

33. INSULATION: (X)
F - Foil Faced Insulation
C - Elastomeric Closed Cell Foam Insulation

34. UNIT DRAIN PAN: (X)
0 - Galvanized Drain Pan
S - Stainless Steel Unit Drain Pan

35. SECONDARY DRAIN CONNECT: (X)
0 - None
C - Secondary Drain Connection

36. AUXILIARY DRIP PAN: (X)
0 - None
G - Galvanized Auxiliary Drip Pan
S - Stainless Steel Auxiliary Drip Pan

37. BASIC CONTROL PACKAGE: (X)
0 - Line Voltage with Electric Heat (EH)
1 - Line Voltage
2 - 24V, Unit S/S Relay, Fan Op. Relay, Trans.
3 - 24V, Unit S/S Relay, Fan Op. Relay, Trans. with EH

38. FAN SPEED CONTROLLER: (X)
0 - None
F - SCR Fan Speed Controller

39. DISCONNECT SWITCH: (X)
0 - None
L - Door Interlocking non-Fused Disconnect
T - Toggle Disconnect Switch

40. MAIN FUSING: (X)
0 - None
M - Main Fusing

41. FLOAT SWITCH: (X)
0 - None
D - Drain Pan Float Switch

42. SPEED SWITCH: (X)
0 - None
U - Unit Mount 3-Speed Switch with Off Position
R - Remote Mount 3-Speed Switch with Off Position

43. SOLID STATE RELAY: (X)
0 - None
1 - SSR (1) in Lieu of Start/Stop Relay
2 - SSRs (2) for (High, Low) Fan Control
3 - SSRs (3) for (High, Medium, Low) Fan Control

44. RETURN AIR: (X) (KHFE Only)
0 - Bottom Stamped Louver Grille
1 - Rear Stamped Louver Grille
2 - Rear Duct Collar

45. SUPPLY AIR: (X) (KHFE Only)
0 - Stamped Louver Grille
1 - Aluminum Double Deflection Grille
2 - Front Duct Collar

46. PAINT: (X) (KHFE Only)
0 - Pearl White Satin
1 - British White

47. THERMOSTAT: (XXXX)
(*See Krueger's selection software.*)

48. AQUASTAT: (X)
0 - None
A - Aquastat

49. FACTORY MOUNTED DDC MANUFACTURER: (X)
(*See Krueger's selection software.*)

50. FACTORY MOUNTED DDC MODEL: (XX)
(*See Krueger's selection software.*)